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УЧЕБНИК АНГЛИЙСКОГО ЯЗЫКА

для втузов

·Выща школа·

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Допущено
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в качестве учебника
для студентов
общетехнических
факультетов вузов

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Редакционная группа литературы по иностранной филологии
Редакторы *Л. А. Нагорная, А. А. Гусак*

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Учебник состоит из краткого фонетического курса, основного курса, текстов для самостоятельной работы, краткого грамматического справочника, англо-русского словаря. Ставит своей целью вырабатывать у студентов навыки чтения и беспереводного понимания оригинальной технической литературы на английском языке, развивать навыки устной речи по тематике, предусмотренной программой.

Для студентов I и II курсов общетехнических факультетов вузов.

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ПРЕДИСЛОВИЕ

Настоящий учебник составлен в соответствии с новой программой для студентов I и II курсов общетехнических факультетов высших учебных заведений.

При составлении учебника авторы преследовали цель подготовить студентов к самостоятельной работе над общетехническими, научно-популярными и общественно-политическими текстами, а также развить у студентов навыки устной речи.

Основная задача учебника — выработать у студентов навыки чтения и беспереводного понимания оригинальной технической литературы на английском языке, умения извлекать нужную для работы информацию, а также навыки общения по тематике, предусмотренной программой. Большое внимание уделено развитию навыков правильного чтения.

Текстовой материал учебника касается страноведческой тематики, образования, достижений в области науки и техники. Несколько текстов знакомят студентов с творческой деятельностью отечественных и зарубежных ученых. К текстам, в которых встречаются грамматические и лексические явления, представляющие трудности для перевода, дан комментарий.

Краткий фонетический курс знакомит студентов с артикуляцией звуков, правилами чтения гласных и согласных звуков, интонацией английского предложения.

Объем лексико-грамматических упражнений обеспечивает работу в аудитории, выполнение домашних заданий, а также подготовку к контрольным работам. К некоторым упражнениям разработаны программированные задания.

Основной курс содержит 26 уроков, из которых 1—13 прорабатывают на I курсе, 14—26 — на II курсе. Тексты для самостоятельной работы направлены на развитие

у студентов навыков чтения и бесперевoдного понимания текста, поскольку текстовой материал этого раздела тематически связан с текстовым материалом основного курса и содержит в основном знакомую студентам лексику. Тексты для самостоятельной работы предназначены для синтетического чтения.

При работе с текстом для синтетического чтения полезны упражнения, которые помогают ориентироваться в тексте и находить в нем нужную информацию. Такими упражнениями на начальном этапе могут быть задания быстро отыскать в тексте предложения, которые являются ответом на вопрос преподавателя или содержат основные сведения, связанные с тематикой текста, составить план текста, краткую аннотацию, подобрать заголовки к отдельным частям текста. Выполнение подобных упражнений создает основу для работы над реферированием литературы по специальности.

Краткий грамматический справочник содержит грамматический материал, необходимый для практической работы. Значительная часть его, для наглядности и лучшего усвоения, представлена в таблицах.

Перед каждым уроком указан грамматический материал, который изучается в данном уроке. Этот грамматический материал необходимо проработать по краткому грамматическому справочнику, после чего приступить к выполнению грамматических упражнений.

Цель лексических упражнений — закрепление лексического материала. Для лучшего усвоения лексические единицы многократно употребляются в различных сочетаниях и языковых ситуациях.

Англо-русский словарь охватывает в основном лексику учебника. К каждому слову дана транскрипция, что способствует выработке навыков произношения. Упражнения необходимо выполнять в том порядке, в котором они даны в учебнике.

При переводе следует обратить особое внимание на характерный для английского языка порядок слов в предложении, на многозначность слов и грамматические явления. Если в процессе перевода возникнут трудности, следует сделать грамматический анализ предложения (найти главные и второстепенные члены предложения, определить, какими частями речи они выражены). Перевод должен соответствовать нормам родного языка.

Контроль усвоения лексического и грамматического материала осуществляется с помощью программированных тестов. Кроме контроля знаний студентов, тесты можно также использовать для повторения и закрепления отдельных лексических и грамматических явлений.

Каждая тема завершается лабораторными работами, предназначенными для закрепления и проверки знаний студентов с использованием технических средств — магнитофона, слайдов, диафильмов.

Раздел I
КРАТКИЙ ФОНЕТИЧЕСКИЙ КУРС

О НЕКОТОРЫХ ФОНЕТИЧЕСКИХ ОСОБЕННОСТЯХ АНГЛИЙСКОГО ЯЗЫКА

В отличие от русского языка, в котором преобладают синтетические элементы, то есть, когда грамматические отношения между отдельными словами выражаются посредством окончаний, в английском языке преобладают аналитические элементы, когда грамматические отношения между словами выражаются либо порядком слов в предложении, либо вспомогательными словами (предлогами, союзами, вспомогательными глаголами и т. п.). Предлоги в английском языке передают те отношения между словами, которые в русском языке выражаются с помощью падежей. Предлог в сочетании с глаголом может изменить значение глагола. Например, глагол go означает *идти*, с частичкой on — go on *продолжать* и т. п.

Порядок слов. В английском языке существует определенный порядок слов в предложении, который произвольно изменить нельзя. Так, по-русски можно сказать: *студенты переводят тексты, тексты переводят студенты.* А в английском аналогичном предложении возможен только один вариант: students translate texts.

Схематически порядок слов английского утвердительного предложения можно изобразить так: Subject, Predicate, Object, то есть формула SPO. Подлежащее стоит на первом месте, сказуемое — на втором, дополнение — на третьем. Место обстоятельств — так называемое нулевое (перед подлежащим) или четвертое (в конце предложения после дополнения).

В английском языке одно и то же слово без изменения формы может относиться к различным частям речи. Определить, к какой части речи относится слово, можно по его функции в предложении. От того, какое место занимает слово в предложении, зависит и его значение. Например: I help my friend. Слово help — глагол-сказуемое «помогаю». I need your help. В этом предложении слово help — имя существительное «помощь». Итак, прежде чем искать новое

слово в словаре, нужно определить, какую функцию в предложении это слово выполняет.

Звуки и буквы. В английском языке 44 звука, из них согласных 24 и гласных 20. В английском алфавите только 26 букв — 6 гласных и 20 согласных. Поскольку число звуков намного превышает число букв в алфавите, некоторые буквы могут передавать несколько звуков, используются буквосочетания для передачи отдельных звуков, разные буквы и буквосочетания передают один и тот же звук, одно и то же буквосочетание может передавать разные звуки. (Буквосочетания и примеры к ним даются в таблицах). Поэтому в фонетике применяется фонетическая транскрипция — система знаков, в которой каждый знак соответствует только одному звуку. Транскрипция точно передает все тонкости произношения слова. При изучении иностранного языка необходимо овладеть звуковой системой и интонацией языка.

Согласные звуки. Большинство английских согласных звуков мало отличаются от соответствующих русских звуков. Английские звуки, как правило, произносятся более энергично. Например:

[b] [p] [k] [m] [f] [v] [s] [z] [tʃ] [ʃ]
[bʌt] [pit] [kʌm] [mʌst] [from] [vesl] [send] [iz] [tʃɛə] [ʃelf]

А некоторые звуки значительно отличаются от соответствующих звуков русского языка, поэтому на них следует остановиться более подробно. Так, при произнесении английских звуков d, t, n, l кончик языка касается альвеол — подушечек над верхними зубами: [dɔt, tɔp, nɔt, lɔt].

Необходимо обратить внимание на произнесение звуков, которых нет в русском языке. Звук h произносится как легкий выдох: [hɔt, help].

При произнесении [w] губы напряжены, округлены и вытянуты вперед: [wel, wil, wen, wɛə].

Буквосочетание th передает звуки [θ, ð]. При произнесении этих звуков кончик языка находится между передними зубами. Он лежит на нижних зубах, между верхними зубами и кончиком языка — щель, через которую проходит воздух: [θik, ðis].

Английский звук [r] не вибрирует как русский «р». Его артикуляция подобна русскому звуку [ж]. Например: [red, rait].

Звук [ŋ] — носовой сонант, в русском языке такого звука нет. Место его артикуляции такое же, как и согласного звука [g], но мягкое небо опущено, что делает [ŋ] носовым сонантом: [ɪŋk, θɪŋk, θɪŋ].

В английском языке конечные согласные не оглушаются, так как это приводит к изменению значения слова. Так, например:

[lɔg] — колода	[kɔd] — треска (рыба)
[lɔk] — замóк	[kɔt] — раскладушка

Гласные звуки. Английские гласные звуки подразделяются на долгие и краткие. Долгота влияет на значение слова. Долгота гласного звука в транскрипции обозначается знаком [:], который ставится после транскрипционного символа. Нельзя заменить краткий гласный долгим и наоборот, так как это приводит часто к изменению значения слова. Например:

[lɪv] — жить	[li:v] — уезжать
[ʃɪp] — корабль	[ʃi:p] — овца
[mʌtʃ] — много	[mɑ:tʃ] — марш
[spɔt] — пятно	[spɔ:t] — спорт

Интонация. Нужно не только правильно произносить отдельные звуки, но и помнить о ритме и интонации. Под интонацией, или мелодией, понимается понижение или повышение голоса в процессе речи. Каждый язык имеет свою особую, характерную для него мелодию. Английскую мелодию можно, в основном, свести к двум мотивам.

В мотиве I — tune one — ударные слоги образуют нисходящий ряд, заканчивающийся понижением голоса. В мотиве II — tune two — ударные слоги образуют также нисходящий ряд, заканчивающийся, однако, повышением голоса:

He is a ↘student.
Is he a ↗student?

Мотив I, как правило, употребляется в утвердительных, отрицательных и повелительных предложениях, специальных вопросах, в восклицаниях, а мотив II — в общих вопросах, в просьбах, при перечислении, в предложениях, грамматически незаконченных (в придаточных предложениях, в абсолютных причастных оборотах).

Примеры на употребление мотива I:

She is a ↘student.
Translate the ↘text.
Where do you ↘study?
What an interesting ↘book!

Примеры на употребление мотива II:

Is she a ↗student?
May I have your ↗book?
It isn't so ↗bad.

Ритм. Для каждого языка характерен свой ритм. В английском предложении, как правило, ударные слоги произносятся через одинаковый промежуток времени. Под ударением, как правило, находятся имена существительные, прилагательные, смысловые глаголы, числительные, наречия, вопросительные и указательные местоимения. Ударный слог обозначается штрихом ['] : [ðə 'buk ɪz ˌɪntrɪstɪŋ].

Типы слогов. Чтение гласных зависит от ударения и нахождения гласных среди других букв. В английском языке, в отличие от русского языка, существует не два типа слогов, то есть закрытый и открытый, а четыре, благодаря влиянию буквы «r» на чтение гласной, которая стоит перед «r».

В закрытом слоге гласная произносится кратко. В открытом слоге гласная произносится так, как она называется в алфавите. См. таблицу чтения гласных в четырех типах слогов на с. 12.

В многосложных словах ударение, как правило, падает на третий слог от конца. Независимо от того, является слог открытым или закрытым, гласная читается по правилу закрытого слога:

family ['fæmɪlɪ]
chemistry ['kemɪstrɪ]
ministry ['mɪnɪstrɪ]
property ['prɔpətɪ]

Чтение буквосочетаний. Некоторые согласные в английском языке влияют на чтение гласных, которые находятся рядом. Запомните их и запомните правила чтения некоторых буквосочетаний:

Буквосочетания	Произношение	Примеры
a + s + согласная	[ɑ:]	class, task, fast
a + l + согласная в закрытом слоге под ударением	[ɔ:]	all, small, salt
a + l + k (l не читается)	[ɔ:]	talk, chalk
a в буквосочетаниях wa, qua + r, l + согласная	[ɔ:]	war, warm, quarter; wall
wa, qua + согласная (кроме r, l)	[ɔ]	want, quantity
wa, qua в открытом слоге,	[eɪ]	wave, quake
ai, ay под ударением	[eɪ]	main, day
air под ударением	[ɛə]	air, pair
au, aw	[ɔ:]	author, law
ea, ee	[i:]	teacher, steel
ear — под ударением, если не стоит после него согласная	[ɪə]	dear
ear—перед согласной	[ə:]	learn, early
eer — под ударением	[ɪə]	engineer
ew — если не стоит после l, r, j	[ju:[	new, few
ew после l, r, j	[u:]	grew, flew, jewel

В односложных словах некоторые буквосочетания произносятся следующим образом:

i + ld / nd / gh	[aɪ]	mild, find, fight
o + ld	[ou]	old, gold
oo + k	[u]	took, look

Продолжение

oo + другие согласные, кроме **r**	[u:]	**moon, tool** Исключение: **foot** **wood** [u]
oa	[ou]	**coal, road**
ou, ow — под ударением Исключение:	[au]	**out, town** **country** [ʌ], **group** [u:] **grow** [ou]
u после **r, l, j**	[u:]	**rule, blue, June**
ui Исключение:	[ju:]	**suit** **build** [ɪ]
ui после **r, j**	[u:]	**fruit, juice**

Запомните чтение некоторых согласных и их буквосочетаний:

c + **e, i, y** **c** в других случаях	[s] [k]	**place, pencil, icy** **crystal, cubic, can**
g перед **e, i, y** в других случаях Исключение:	[dʒ] [g]	**page, giant, Egypt** **go, big, gave** **get, give** [g] и др.
j	[dʒ]	**jet, just**
s в конце слова после гласной и звонкой согласной, в середине слова между гласными **s** в других случаях	[z] [s]	**his, plans, to use** **so, stand, lamps**
sh	[ʃ]	**show, ship**
ch, tch	[tʃ]	**inch, match**
ph встречается в словах греческого происхождения	[f]	**physics, telephone**
w перед **r** в начале слова	не читается	**write, wrong**

Двойные согласные передают один звук: will, rubber.

qu	[kw]	quick, equipment
gh в конце слова и перед t	не читается	high, light
wh + гласная (кроме o)	[w]	when, what, why
wh + o	[h]	who, whom, whose
ture — не под ударением	[tʃə]	lecture, culture
-tion — не под ударением -ssion	[ʃn]	motion, session
ci + неударный гласный	[ʃ]	social, ancient, electrician

ТАБЛИЦА ЧТЕНИЯ ГЛАСНЫХ В ЧЕТЫРЕХ ТИПАХ СЛОГОВ

	I — закрытый слог	II — открытый слог	III — гласная + r (+ согласная)	IV — гласная + + r + гласная
a	fat [æ]	fate [ei]	far [ɑ:]	fare [ɛə]
o	not [ɔ]	note [ou]	nor [ɔ:[	ore [ɔ:]
u	bus [ʌ]	use [ju:]	turn, her, firm, myrtle [ə:]	pure [juə]
e	pen [e]	Pete [i:]		here [iə]
i	mill, system [i]	mile, type [ai]		fire, tyre [aiə]
y				

Раздел II
ОСНОВНОЙ КУРС

LESSON 1

Grammar: The word order of English sentence.
The plural of nouns.
Indefinite Tenses (Active).
Wordbuilding.

READING DRILLS

I Read the following words with the stress on the first syllable:

language, carry, extra, enter, peasant, specialist, civil, different, system, number, under, subject, study.

II. Read the following nouns:

students, departments, types, tasks, hostels, schools, daughters, mines, citizens, nations; classes, houses, studies, villages, societies.

III. Read many-syllable words:

revolution, revolutionary, extramural, university, opportunity, territory, education, population, application, graduation.

IV. Read the following word-combinations:

to discuss the problems of education, the drawbacks in education system, the secondary and higher school reform, to improve the quality of teaching, there are unlimited opportunities, the majority of the country's population, either higher or secondary education, is free of charge, take part in research.

DEVELOPMENT OF EDUCATION IN THE SOVIET UNION

The first lesson for schools and institutes in the USSR is a lesson on peace.

The academic year starts with precisely such a lesson in each and every Soviet school. It is the ABC of peace and fri-

endship among nations, of memory of the fallen and of a hatred for war.

Most of the problems of our socio-economic and cultural development are rooted in secondary, vocational and further education.

Recently Soviet teachers gathered for their Congress to discuss the problems of education. They spoke sincerely about the drawbacks in education system in our country. They were looking for the ways of restructure of Soviet school.

The purpose of the secondary and higher school reform is to improve the quality of teaching and to prepare the growing generation for independent life and work in the conditions of social, economic, scientific and technological progress of Soviet society.

In the Soviet Union there are unlimited opportunities to obtain education, including higher education. At present the majority of the country's population has either higher or secondary or incomplete secondary education while before the Revolution four out of five children were unable to go to school.

More than five million students attend universities and institutes. Education at Soviet higher schools as at all other educational establishments is free of charge and almost 75 per cent of students receive stipends. All Union Republics have a large number of higher schools furnished with up-to-date teaching materials and highly qualified staff of professors and teachers.

There is a wide system of evening and extramural education in the USSR. This form of education helps millions of young Soviet citizens to complete their studies.

Many students take part in research work. Science and education are inseparable. The natural unity of research and education at higher schools enriches the study process.

Every young man and woman graduating from a higher school is granted a job even before graduation. Special commissions for the distribution of young specialists, based on applications from different ministries and enterprises offer jobs to graduates in line with the profession which they acquire not later than a year before graduation.

EXERCISES

I. State which words in the right column are synonyms for the words in the left column:

1. to get	1. labour
2. work	2. factory
3. plant	3. branch
4. field	4. to end
5. to finish	5. to receive

II. Form nouns with the suffix -tion:

to organize, to combine, to create, to educate

III. Translate the following sentences into English:

1. Каждый гражданин Советского Союза имеет возможность получить высшее образование. 2. В Советском Союзе более пяти миллионов студентов. 3. Студенты-вечерники посещают занятия вечером. 4. Большинство студентов получают стипендию. 5. Вчера вечером они работали в читальном зале. 6. Прочтите эту статью, она поможет вам в работе. 7. Молодые специалисты работают в разных отраслях промышленности. 8. Студенты нашей группы будут принимать участие в научной работе.

IV. Write the following sentences in the negative form:

1. They work in the field of physical chemistry. 2. We made many experiments in the laboratory. 3. You will continue your work in the evening.

V. Write the following sentences in the interrogative form and translate them into Russian:

1. Most Soviet higher school students live in student hostels. 2. This student works hard at his diploma project. 3. Students will use these automatic devices in their work. 4. Soviet people have great opportunities to get education. 5. The academic year begins in September.

VI. Form plural of the following nouns:

achievement, work, pump, month, class, inch, tractor, contribution, language, woman, leaf, science, state, gas, change, factory.

VII. Define which sentence is the question to the 1) subject, 2) adverbial modifier of place:

A large number of factories and plants go up in the Soviet Union every year.

a) Where do a large number of factories and plants go up every year?

b) What goes up in the Soviet Union every year?

VIII. Use the verbs in brackets in the required tense and translate the sentences into Russian:

a) 1. It is a well-known fact that the Soviet Union (to train) qualified specialists. 2. Many students (to take part) in research work. 3. There (to be) about 900 institutions of higher learning in the Soviet Union with five million students. 4. The Soviet Union (to have) a large number of higher schools furnished with up-to-date teaching materials and equipment, and a highly qualified staff of professors and teachers.

b) 1. Next summer they (to work) on the construction site. 2. Students (to do) practical work in laboratories and workshops. 3. There (to be) a conference in the hall of our Institute in the evening. 4. These young workers (to take) part in the construction of this power station. 5. In the modern world radio and TV (to play) an important role as a means of people's political and cultural education. 6. We (enter) the Polytechnic Institute next year.

IX. Write the following sentences in plural:

1. This young man and that woman take part in our work. 2. The achievement of our country in the field of space exploration is great. 3. An extramural student has the paid leave during exams. 4. He makes great progress in studies. 5. She will enter the higher school next year. 6. I carry on experiment and she helps me. 7. This scientist makes a great contribution to science.

X. Replace the verbs in the Present Indefinite by the Past and Future Indefinite and translate the sentences into Russian:

1. He is an extramural student. 2. Many students take part in research work. 3. Evening and extramural students have many privileges. 4. Young people who graduate from Institutes and Universities have already practical experience. 5. They are good specialists and work well. 6. She is a teacher of English. 7. They do not discuss this problem. 8. All graduates from higher schools get work according to their speciality.

XI. Answer the following questions:

1. What subjects do the students study at your Institute? 2. Do many students take part in research work? 3. How many departments are there in your Institute? 4. What department do you study at? 5. What subjects do you like best of all? 6. Is there an evening or extramural education form at your institute? 7. Do workers combine their work and studies? 8. Have extramural students any privileges?

XII. Retell the text.

LESSON 2

Grammar: Indefinite Tenses (Active).
Numerals.
Prepositions.
Construction *there + to be.*
Wordbuilding.

READING DRILLS

I. Read the following words with the stress on the first syllable:

right, high, higher, centre, system, network, technical, general, lecture, regular, popular, leave, reach, major, project, college, period.

II. Read the following many-syllable words:

educational, education, consultation, qualification, constitution, construction, holiday, industry, opportunity, necessary, secondary, compulsory.

III. Memorize the pronunciation of the following words:

citizen ['sɪtɪzn], hour [auə], extramural ['ekstrə'mjuərəl], acquire [ə'kwaɪə], equipment [ɪ'kwɪpmənt], quickly ['kwɪklɪ], guarantee [ˌqærən'ti:], vocational [vou'ke'ʃənəl].

EDUCATION WITHOUT INTERRUPTING WORK

All people in the USSR have the right to education at schools, technical schools and colleges. Apart from general educational secondary schools, there are *vocational, specialized secondary and higher schools*[1] that can be within the reach of all young men and women. Soviet young people have the right to choose a trade or profession, type of work.

General educational schools *are not the only way*[2] for Soviet citizens to get a secondary education. After eight years at school they can enter a secondary vocational school or a specialized secondary school, where they can master a trade *as well as*[3] complete their secondary education. For those who cannot study in the day-time the part-time education system gives opportunities to acquire further education in *off-work hours*[4].

There are a lot of extramural and evening higher and specialized secondary schools and thousands of extramural and evening departments. There is a network of general engineering departments and consultation centres of a number of institutes and specialized secondary schools at major factories and construction projects. The students attend classes after their work four times a week.

It is not easy to combine work and studies, but this way is very popular. The government grants a number of privileges to part-time students. Twice a year these students have holidays for the period of their exams, and a four month leave for preparing a diploma project. Likewise, leave is granted for taking graduation examinations. Besides that, they have the right to regular holidays.

For the convenience of students[5] many of the educational institutes function at enterprises of the same type.

Extramural students can attend evening lectures and use all the necessary equipment and services of the scientific libraries free of charge.

Combining work and studies helps raise one's qualification more quickly. *The right number*[6] of specialists leave higher schools each year. They work in different branches of industry and science.

COMMENTARY

[1] **vocational, specialized secondary and higher schools** профессиональные, специальные средние и высшие учебные заведения
[2] **are not the only way** не являются единственным источником
[3] **as well as** а также
[4] **off-work hours** свободное от работы время
[5] **for the convenience of students** для удобства студентов
[6] **the right number** определенное количество

EXERCISES

I. Define to what parts of speech the following groups of words belong and translate them into Russian:

North — Northern; village — villager; fish — fisherman; literate — literacy — illiteracy; storm — stormy; to select — selection; science — scientist — scientific; chemist — chemistry — chemical; just — justly; to found — founder — foundation; to depend — dependent — independent; to transform — transformer — transformation; part — particle; to exist — existence; possible — possibility; to know — knowledge.

II. State which words in the right column are synonyms for the words in the left column:

1. holiday	1. to struggle
2. to wish	2. to call
3. to obtain	3. to get

4. to name	4. leave
5. to fight	5. to want
6. trade	6. profession
7. general	7. common

III. State which words in the right column are antonyms to the words in the left column:

1. illiterate	1. the same
2. impossible	2. to enter
3. young	3. possible
4. to graduate (from)	4. old
5. easy	5. literate
6. different	6. difficult

IV. Translate the following sentences into English using the words and expressions from the text:

1. Нелегко совмещать учебу и работу. 2. Система высшего образования включает вечернюю и заочную формы обучения. 3. Советское государство расширяет сеть профессионально-технических учебных заведений как важнейший источник пополнения народного хозяйства квалифицированными рабочими. 4. Государство обеспечивает студентов стипендией и общежитием. 5. Для удобства студентов на предприятиях функционирует много учебных заведений. 6. Государство предоставляет студентам-заочникам много льгот.

V. Translate the following sentences into Russian:

1. Perestroika, glasnost and democratization are opening up the way to spiritual emancipation and awakening public thinking. 2. The new school reform will bring some changes in the system of education. 3. Its purpose is to improve the quality of teaching and to prepare the growing generation for independent life and work in the conditions of rapid social, economic, scientific and technological progress of Soviet society. 4. Computers are widely used in teaching process. 5. The coming academic year will be especially full and interesting for both the students and teachers.

VI. Translate the following sentences into Russian, paying attention to the tense-forms of the verbs:

a) 1. The academic year begins on the 1st of September. 2. Many students go to the Institute by bus. 3. In May he will work at a factory. 4. His working day begins early in the morning. 5. He leaves home for work at 7 o'clock. 6. The factory

is not far from his house. 7. It takes him twenty minutes to get from home to the factory. 8. He arrives at work at 20 minutes past seven. 9. Her flat is on the second floor. 10. When she wants to open the door she takes the key out of her bag and puts it into the key-hole. 11. In the library the shelves are full of books, the books are from the floor to the ceiling. 12. We see many books on the table and even under the table.

b) 1. Many students live in hostels. 2. There are many trees in front of the hostel and behind it. 3. It often rains in autumn. 4. The sun rises in the east. 5. We rest in the evening. 6. She writes with a pen. 7. We have our English lesson on Wednesday. 8. Professor Petrov delivers lectures on mathematics at the University.

VII. Define the tense-forms of the verbs:

1. The higher school provides the students with theoretical knowledge, but they lack practical skills. 2. During their practice at a plant students use technical facilities. 3. Two years ago he studied at a vocational school. 4. Twice a year they took their examinations. 5. Next year he will enter the University. 6. After graduating he will be a teacher of English.

VIII. Give three forms of the following verbs:

to teach, to read, to write, to build, to put.

IX. Analyse the following sentences and translate them into Russian, paying attention to the words in bold type:

a) 1. He is **one** of the best students. 2. **One** must know how to do this work. 3. What book would you like to read? — Give me the **one** you consider the best. 4. Give me this book and that **one** and those **ones:** they carry the most interesting articles.

b) 1. Physical chemistry became an independent science **only** in the 19th century. 2. Lomonosov's **only** aim was to serve his Motherland and Russian people.

c) 1. Lomonosov **had** to struggle against the countless enemies of Russian science. 2. They **had** many English books.

X. Translate the following sentences into Russian:

1. There is a beautiful park in front of Kiev University with Shevchenko's monument in it. 2. There are many bridges across our rivers. 3. There are thousands of construction and industrial enterprises in Siberia. 4. There are many power stations in our country. 5. There are already over 120 known oil and gas deposits in Western Siberia. 6. There will be many new industrial enterprises and power stations in Eastern Siberia in the near future.

XI. Write the following sentences in the interrogative form and translate them into Russian:

1. There is an extensive network of scientific and planning institutes, laboratories and research centres in our country. 2. There are many places in London associated with the names of Marx, Engels and Lenin. 3. There will be a scientific conference in our institute and we shall take part in it. 4. Western Siberia will become one of the biggest sources of oil supply.

XII. Answer the following questions:

1. Is it easy to combine work and studies? 2. Where can Soviet young people get education? 3. What system of education exists in our country? 4. Where can young workers master their trades and complete their secondary education? 5. What types of schools provide secondary education? 6. What types of schools provide higher education? 7. What privileges do part-time students possess? 8. In what way can the young people raise their qualification?

XIII. Retell the text.

LESSON 3

Grammar: Indefinite Tenses (Passive). The Participle. Wordbuilding.

READING DRILLS

I. Read the following words with the stress on the first syllable:

culture, number, study, country, student, unity, institute, volume, further, burn, effort, regular, specialist, socialist, progress, process, closer.

II. Read the following words with the stress on the second syllable:

associate, exchange, research, event, agreement, important, importance, develop, development, dependent, establishment.

III. Read the following many-syllable words:

anniversary, university, history, discovery, secondary, education, delegation, cooperation, instruction, tradition, solution.

IV. Fluent reading:

a major event, in the history of science, is associated, with the names, of worldwide importance, such outstanding scientists, over half a million, fitted out with the latest equipment, its scientific library, a persistent effort is made, its close ties with secondary schools, with a number of foreign universities, this facilitates a rapid solution, stimulates further scientific progress.

MOSCOW UNIVERSITY

Universities are sources of scientific knowledge and culture. This is graphically illustrated by Moscow State University named after M. V. Lomonosov. It is one of the country's oldest educational establishments.

Moscow University is associated with the names of many wellknown scientists and workers in literature, art and education, whose works have added glory to our country, enriched science with discoveries and studies of worldwide importance. Among them are such outstanding scientists as Zhukovsky and Timiryazev, Vernadsky and Lebedev, Sechenov and Ushinsky, Vavilov, Keldish and others.

V. I. Lenin *displayed a keen interest*[1] in the development of university education. Today there are more than 50 universities in the USSR with a total student body of over half a million.

Moscow University now possesses excellent training facilities — auditoriums, laboratories fitted out with the latest equipment. It consists of more than 250 departments. Besides 15 faculties, the University has research institutes, experimental stations, astronomical observatories, museums, the main and auxiliary botanical gardens. Its scientific library has more than six million volumes on its shelves.

A persistent effort is made[2] in the Soviet Union to further development of higher and secondary education. Measures were and are taken to draw students into independent research work on a broader scale and to improve the organization of the educational process and practical training. Special attention is paid to humanitarian education. Consequently, university *instruction*[3] is based on the unity of training educational work and research.

Moscow University has many fine traditions, one of them is its close ties with secondary schools. The University regularly organizes *refresher courses*[4] for school-teachers.

Among the students of Moscow University there are representatives of many countries from all the world: the Afro-Asian, Latin-American and West-European countries.

Moscow University concludes agreements on scientific cooperation with a number of foreign universities.

Moscow University exchanges delegations of scientists with most countries, and specialists from more than thirty countries who undergo advanced training here.

.Moscow University sends its professors and instructors to universities in other countries for example to establishments of higher education in the Afro - Asian countries to help to organize teaching and research work there. The business ties between Moscow University and related educational establishments become *ever closer*[5]. This facilitates a rapid solution of topical problems and stimulates further scientific progress.

COMMENTARY

[1] to display a keen interest проявлять большой интерес
[2] a persistent effort is made уделяется постоянное внимание
[3] instruction обучение
[4] refresher courses курсы повышения квалификации
[5] ever closer все теснее

EXERCISES

I. Form nouns of the following words:

scientific, to illustrate, to establish, to found, to develop, to observe, to qualify, to strengthen, to measure, independent, to organize, to unite.

II. State which words in the right column are synonyms for the words in the left column:

1. to name	1. quick
2. department	2. work
3. rapid	3. qualification
4. labour	4. teacher
5. speciality	5. faculty
6. instructor	6. to call

III. State which words in the right column are antonyms to the words in the left column:

1. old	1. backward
2. advanced	2. disagreement
3. agreement	3. narrow
4. broad	4. main
5. low	5. young
6. auxiliary	6. high

IV. State to what parts of speech the following words belong:

scientific, knowledge, culture, graphically, country, education, cultural, equipment, astronomical, instructor, socialist, extremely, specialist.

V. Write the following numerals in English:

52; 0,5; 250; 316,000; 5,500; 486,; 23,102; 6,000,000.

VI. Translate the following word-combinations:

the illustrated facts, the University named after Lomonosov, advanced training, the laboratories fitted out with, made efforts, the improved methods, related educational establishments.

VII. State of what verbs the participles are formed:

changing, advancing, training, giving, coming, moving, making, introducing, representing, improving, paying, teaching, becoming,.

VIII. Form Participles of the following verbs:

to realize, to set, to produce, to plan, to dry, to be, to study.

IX. State the form of the verb and translate the sentences into Russian:

1. Moscow University is named after M. V. Lomonosov. 2. University's laboratories are fitted out with the latest equipment. 3. The foundation of Moscow State University is regarded as a major event in the history of Russia's science and culture. 4. Persistent efforts are made to improve the training of specialists. 5. Measures were and are taken to strengthen the ties between instruction and life. 6. Great attention is paid to social sciences in schools of higher learning. 7. University instruction is based on the unity of training educational and research work. 8. Agreements on scientific cooperation with a number of foreign universities are concluded by Moscow University. 9. The Russian language is taught to students and schoolchildren in nearly a hundred countries.

X. Translate the following word-combinations into English using Participle I:

1. Студенты, занимающиеся в высших учебных заведениях. 2. Ученые, принимающие участие в конференции. 3. Люди, живущие в Ленинграде. 4. Ученые, изучающие ядерную физику. 5. Высшие учебные заведения, имеющие все условия для занятий. 6. Факты, иллюстрирующие достижения в области образования.

XI. State the function of the verb «to be» in the following sentences and translate the sentences into Russian:

a) 1. Universities are sources of scientific knowledge and culture. 2. There are many universities in the USSR. 3. Among the students of our institute there are representatives of different nationalities. 4. Near the old buildings of Moscow University there is the bronze statue of Lomonosov. It is situated in a small garden. This monument was erected as a mark of

gratitude to the man who gave Russia her first University, as a tribute to the founder of Russian science.

b) 1. Moscow's Metro is recognized as the best underground railway in the world. 2. Its stations are decorated with coloured marble and granite. 3. A persistent effort is made in the Soviet Union to further development of higher and secondary education. Measures were and are taken to draw students into an independent research work.

XII. Answer the following questions:

1. Why is Moscow University named after M. V. Lomonosov? 2. What was M. V. Lomonosov? 3. Who displayed a keen interest in the development of university education? 4. How many universities are there in the USSR? 5. What training facilities does Moscow University possess now? 6. What fine traditions has Moscow University? 7. Representatives of what countries study at Moscow University?

XIII. Retell the text.

LESSON 4

Grammar: Personal and possessive pronouns.
Impersonal sentences.
Indefinite Tenses (Passive).
Wordbuilding.

READING DRILLS

I. Read the following words:

high, higher, light, fight, mind, find, kind, practical, national, patriot, travel, graduate, cultural, number, stipend, microscope, process, homeland, hostel.

II. Read the following words with the stress on the second syllable:

analysis, establish, establishment, electron, develop, developing, development, experiment, significant, assistance equipment, unique, computer, computing, phonetics, award.

III. Read the words ending in -tion:

attention, accommodation, combination, education, organization, institution, production, recognition, tuition.

IV. Read the following word-combinations:

the name of the University, it is the only educational establishment, to render assistance to developing countries, tuition is free, as it is at all universities, get a stipend, free medical services, at the end of the course, comprehensive knowledge, in the field of science, fitted out with the latest equipment, electron microscope, at an up-to-date level, was awarded the Order of Friendship Among Peoples.

PEOPLES' FRIENDSHIP UNIVERSITY

The name of the University contains two very significant words — «Peoples' Friendship». Indeed, *the atmosphere here is permeated whith friendship*[1], mutual respect and mutual assistance.

The University was opened on October 1, 1960, when nearly 600 young people filled its numerous auditoriums. In 1961 it was named after the outstanding African political leader Patrice Lumumba.

The Peoples' Friendship University is unique — it is the only educational establishment specially set up *to render assistance*[2] to developing countries in training national cadres.

Students, post-graduate and advanced students from more than 100 countries study at the University. *Tuition is free*[3] at Lumumba University as it is at all universities and institutes in the USSR and all students have free hostel accommodations.

The students are given *comprehensive knowledge*[4] in the fields of science, technology and production. It is interesting to note that special attention is given to the use of electronic computers in teaching.

The University has many laboratories fitted out with the latest equipment, a modern computing centre, and numerous laboratories: of experimental physics, radiophysics, spectral analysis, electron microscope, organic chemistry, physical and colloid chemistry, strength of materials, etc.

It is important that the students take their practical courses at the most advanced industrial and agricultural enterprises, medical, scientific and cultural institutions of the Soviet Union.

The work done at the University is based on the principles of Soviet educational system — the unity of the teaching process and research; the combination of theoretical studies with practical training; the development of laboratories which make it possible to stage extensive scientific experiments and to conduct the study process at an up-to-date level.

The University has agreements with many foreign universities to exchange specialists.

The University's faculties and departments have creative ties with related faculties and departments of foreign higher schools. Many graduates head industrial enterprises and state organizations in their countries. Some of them are mini-

sters while others are directors or chief engineers at enterprises or the heads of research centres.

In 1975, in recognition of its achievements in training national personnel for the developing countries of Asia, Africa and Latin America the University was awarded the Order of Friendship Among Peoples.

COMMENTARY

[1] the atmosphere here is permeated with friendship здесь царит атмосфера дружбы
[2] to render assistance оказывать помощь
[3] tuition is free обучение бесплатное
[4] comprehensive knowledge всесторонние знания

EXERCISES

I. Read the following groups of words of the same root and translate the words into Russian:

to name — name; number — numerous; to lead — leader; science — scientist — scientific; to produce — production; electron — electronic; to equip — equipment; to base — base; to research — research; to graduate — graduate.

II. State which words in the right column are synonyms for the words in the left column:

1. significant	1. almost
2. to comprise	2. branch
3. assistance	3. and so on
4. nearly	4. to contain
5. field	5. important
6. modern	6. help
7. etc.	7. to establish
8. faculty	8. department
9. to set up	9. to pay attention to
10. to give attention to	10. up-to-date

III. Find in the text English equivalents for the following expressions:

оказывать помощь, обучение бесплатное, студенты обеспечиваются общежитием, студенты получают стипендию, уделяется особое внимание, новейшее оборудование, различные лаборатории, награждать орденом.

IV. Translate the following sentences into English using the words from the text:

1. В Университете дружбы народов царит атмосфера дружбы и взаимного уважения. 2. Университет назван именем Патриса Лумумбы. 3. Университет — единственное учебное заведение, созданное с целью помочь развивающимся странам в подготовке национальных кадров. 4.Обучение в Университете имени Патриса Лумумбы бесплатное, как и во всех других учебных заведениях нашей страны. 5. Лаборатории Университета оснащены новейшим оборудованием. 6. Студенты проходят практику на ведущих предприятиях нашей страны. 7. Университет награжден орденом Дружбы народов. 8. Много выпускников Университета возглавляют промышленные предприятия и государственные учреждения в своих странах.

V. State the form of the verb and translate the sentences into Russian:

1. The Peoples' Friendship University was opened on October, 1, 1960. 2. It was named after the outstanding African political leader Patrice Lumumba. 3. The University's main aim is to help countries of Asia, Africa and Latin America in training national cadres. 4. Special attention is given to the use of electronic computers in teaching. 5. The laboratories are fitted out with the latest equipment. 6. Its work is based on the combination of theoretical studies with practical training.

VI. Translate the following sentences, paying attention to the possessive pronouns:

a) 1. I shall defend my diploma paper in June. 2. She will collect some data and make her calculation. 3. He was sent to the University for raising his qualification. 4. Students take their exams twice a year — in January and in June. 5. Our working day is over at 5 o'clock. 6. You have up-to-date equipment in your laboratory.

b) 1. This is my book. The book is mine. 2. This is his dictionary. The dictionary is his. 3. That is her text-book. The text-book is hers. 4. That is our reference book. The reference book is ours. 5. These are your drawings. The drawings are yours. 6. Those are their computers. The computers are theirs.

VII. Translate the following impersonal sentences into Russian:

1. It is cold. It is necessary to put on warm clothes. 2. It is dark. It is necessary to switch on the light. 3. It is interesting

to know where he got this dictionary. I need such a dictionary for my work. 4. It was important that they were provided with all the necessary instruments for their experiment. 5. It will be necessary to ventilate the room if you are going to make experiments with gases.

VIII. Answer the following questions:

1. When was the Peoples' Friendship University opened? 2. After whom was it named? 3. Why is the Peoples' Friendship University unique? 4. What are the students of the University provided with? 5. How many laboratories are there at the University? 6. What principles is the work done at the University based on? 7. What do you know about its graduates?

IX. Define which sentences «a», «b» or «c» are the questions to the words in bold type:

1. **The University** numbers 200 post-graduates. a) What numbers 200 post-graduates? b) What does the University number? c) How many post-graduates does the University number?

2. Many graduates now head **the industrial enterprises** of their countries. a) What do many graduates head? b) What enterprises do many graduates head? c) Who heads the industrial enterprises?

3. The Peoples' Friendship University was opened **on October 1, 1960.** a) When was the University opened? b) What was opened on October 1, 1960?

X. Be ready to speak about the Peoples' Friendship University.

Laboratory Work on the Topic «Education in the USSR»

Work with the Tape-recorder

I. Listen to the following questions and answer them:

1. What is the Soviet system of education? 2. What schools, apart from general education schools, are there in the USSR? 3. Can working people complete their education without interrupting work and how can they do it? 4. What privileges do extramural and evening students enjoy? 5. Do all the students get their (living allowances) state stipends? 6. Where do students live? 7. What training facilities do universities and institutes possess? 8. What is new in teaching and learning methods now? 9. Do students take part in scientific

researches? 10. How does the Soviet state improve the students' material and living conditions? 11. Does the Soviet state guarantee jobs for young specialists? 12. Does the cooperation in higher education exist between the Soviet Union and other countries? 13. Is there an exchange of professors, teachers and students between countries? 14. Who studies at the Peoples' Friendship University? 15. When was the Peoples' Friendship University established? 16. What role does Moscow University play in the development of science in our country? 17. Name the oldest universities of our country. 18. What is the leading centre of Soviet science? 19. Name the prominent Soviet academicians and scientists who made great contribution to world science.

II. Listen to the text and translate it:

TRAINING ENGINEERS IN THE SOVIET UNION

Soviet engineers are trained at higher technical and polytechnical schools and universities.

Higher technical education is a component of our country's higher education system. Secondary school graduates who successfully pass the entry examinations can study at higher technical schools. The course of studies takes five years with another possible six months for particular specialization.

Along with the essential subjects, engineering students study the modern scientific and technological achievements, research methods and take field training.

There is a balance of lectures, seminars, labs and practical training. The humanities are also taught, including philosophy, political economy, the politics and foreign languages. Labs get a lot of time, and senior-year students, besides their lab work, learn to set up lab equipment and instruments, do experiments and evaluate their results.

Daily practical classes last approximately 4—5 hours.

Alongside regular studies, much time is given to research which can be offered at student scientific conferences or written up in scientific papers.

Field training is important. After the third and the fourth years there are two months of technological field training.

On finishing their courses, field work and final exams, the students prepare their graduate project.

The project is presented to the State Examining Board and, if successfully defended, the student graduates as an engineer.

All graduates are given jobs in line with their speciality.

III. Ask questions on the text; tape-record your questions and answers.

IV. Translate the following sentences from Russian into English and tape-record them:

1. В Советском Союзе много высших учебных заведений. 2. Молодежь получает высшее образование без отрыва от производства. 3. Инженеров готовят технические высшие учебные заведения. 4. Курс обучения длится 5 лет. 5. Государство платит студентам стипендию и обеспечивает их общежитием. 6. Молодые специалисты получают работу по специальности.

LESSON 5

Grammar: Indefinite Tenses (Passive).
The Participle.
The Gerund.
Wordbuilding.

READING DRILLS

I. Read the following words with the stress on the first syllable:

age, camera, national, science, isolate, icebreaker, peaceful, shielding, special, heavy, penetrate, nuclear, numerous, fuel, powerful, launch, quarter.

II. Read the following words with the stress on the second syllable:

atomic, important, reactor, compartment, equipment, device, design, designer, equipped, installed, control, controlled, suggested.

III. Read many-syllable words:

economy, capacity, machinery, reliability, necessary, radiation, navigation, installation, communication, negotiation, investigation, attention, condition.

IV. Read the following word-combinations:

is very important, for science and national economy, in our age of powerful icebreakers, without the help of an icebreaker, played the decisive role, the first vessel with a nuclear installation, designed for peaceful use, at the same time, many research and designing bureaus, is equipped with nuclear reactors, the turboelectric power unit, the stock of nuclear fuel, which enable to use helicopters, installed in the control post, makes possible the remote control.

ATOMIC ICEBREAKERS

Exploration of Arctic is very important for science and national economy of our country. Lomonosov, the great Russian scientist, was the first who suggested using the Great Northern Sea Route. It was done in our age of powerful icebreakers. The era of nuclear-powered icebreakers in the USSR began in 1957 with the first icebreaker «Lenin» built in Leningrad. Ships could not sail through the heavy ice without the help of an icebreaker. In these conditions the atomic icebreaker «Lenin» played the decisive role in ensuring regular communications along the Northern Sea Route.

The icebreaker «Lenin» was the first vessel with a nuclear installation designed for peaceful use and at the same time it was the largest and most powerful icebreaker in the world. *It could negotiate*[1] much thicker ice than any other icebreaker.

Over 500 Soviet industrial enterprises and many research and designing bureaus took part in its making.

The icebreaker «Arktika» is larger than the icebreaker «Lenin». Its capacity is 75,000 h. p. It opened the navigation in 1975. The icebreaker «Sibir» which was launched at the beginning of 1976 is still larger. The latest atomic icebreaker is «Rossiya».

All icebreakers are equipped with modern machinery, devices and instruments. They have *well-appointed flight decks*[2] which enable to use helicopters when necessary for investigating ice conditions, for communication with the coast and other needs.

The reactors are worked and controlled[3] from a special post, from which all the complex machinery installed on board the icebreakers is also operated. Besides the numerous instruments of various kinds installed in the control post there is also a TV camera which makes possible the remote control of the atomic devices in the reactor compartment.

All the equipment of the atomic steam-producing plant of the icebreakers is installed in a special, well isolated compartment. The compartment is isolated from other parts of the ship by biological shielding. The shielding does not allow the radiation to penetrate inside the ship's quarters.

The icebreakers have on board a number of specialists in various fields connected with serving the atomic power installations.

The designers paid special attention to ensure comfort in *the living and service quarters*[4] of the ship. The crew have all modern comforts while on long cruises.

Particular attention was paid to the reliability of atomic units, safety and convenience of machinery.

The icebreakers convoy vessels which transport machinery, equipment and fuel to outlying areas of the Far North, and guarantee a steady flow of ships to Igarka to carry away its timber.

Thanks to the icebreakers the navigation season in the Arctic seas begins earlier and ends considerably later than it used to.

COMMENTARY

[1] **it could negotiate** он мог проходить сквозь
[2] **well-appointed flight decks** удобные палубы для взлета
[3] **the reactors are worked and controlled** реакторы приводят в движение и управляют ими
[4] **the living and service quarters** жилые и служебные отсеки

DIALOGUE

When we speak about different kinds of energy and its utilization we always mention atomic energy. We know that the reserves of mineral fuels in the world are limited. The most important fuel and the basic source of energy is coal. But some day coal may be replaced by atomic energy.

Q. What can you say about atomic energy?

A. For centuries men of science tried to know the secret of the atom. But when man learnt the structure of the atom he also learnt to split its nucleus and to release great quantity of energy and use it.

Q. Where is atomic energy obtained?

A. It is obtained in the nuclear reactor which produces it in the form of heat.

Q. What is atomic energy obtained from?

A. Atomic energy is obtained from uranium.

Q. When did atomic research begin in the Soviet Union?

A. Atomic research was conducted in the Soviet Union as *far back as the early thirties*[1]. Soviet nuclear physicists carried out research work with I. Kurchatov at the head. When many experiments were completed I. Kurchatov launched the first cyclotron in Europe. And after World War II, in 1954 the first atomic power station in the Soviet Union opened the epoch of the peaceful use of nuclear energy for generating electricity.

Q. Can you say anything about the construction of atomic power stations in our days?

A. Yes, of course. Major commercial atomic power stations already operate in a number of countries, and *large-scale construction*[2] of such stations began. *The vast scope of research*[3] and design work carried out in the Soviet Union and other countries permitted the construction of a large number of *pilot and commercial atomic power stations (APS)*[4] with various types of reactors.

COMMENTARY

[1] **as far back as the early thirties** еще в начале тридцатых годов
[2] **large-scale construction** строительство в широком масштабе
[3] **the vast scope of research** огромный объем исследований
[4] **pilot and commercial APS** опытные и промышленные атомные электростанции

EXERCISES

I. Find in the text synonyms for the following words:

far, energy, big, to work, device, to assist, application, significant, distant, several, to start, to permit, to participate, to give attention to.

II. Form adjectives of the following nouns and translate them into Russian:

atom, economy, difference, creator, power, automatics, importance, science, nucleus, industry, necessity, number.

III. Translate the following groups of words into Russian:

to equip — equipment; to penetrate — penetration — penetrative; to break — break — breaker; to design — designer; to install — installation; to construct — construction — constructor — constructive; to exist —existence; to fuel — fuel; to investigate — investigator— investigation; to produce — product — production — productive; reaction— reactive; to move — motion — motionless; peace — peaceful.

IV. State which words are the third form of irregular verbs:

taken	heated	known
been	launched	took
become	controlled	became

V. Translate the following sentences into English using the Passive Voice:

1. Ледокол «Ленин» был спущен на воду в Ленинграде в 1957 году. 2. Ледокол оснащен мощными ядерными реак-

торами. 3. На ледоколе установлено много различных точных механизмов и приборов. 4. Атомное оборудование ледокола установлено в специальных изолированных помещениях. 5. Ледокол предназначен для мирного использования. 6. Для исследования льдов используют вертолеты. 7. Экипаж ледокола надежно защищен от влияния радиации. 8. Жилые отсеки отделены от других помещений защитной системой. 9. Ледокол оснащен всем необходимым для работы и отдыха экипажа.

VI. Translate the following sentences into Russian, paying attention to the meaning of the words in bold type:

1. The **number** of students in the USSR increases every year. 2. The **number** of protons in the nucleus of an element determines its atomic weight. 3. There is a great **amount** of useful minerals in Siberia. 4. The use of atomic energy will **amount** to a higher and higher per cent. 5. **One** of the first atomic icebreakers is the Soviet icebreaker «Lenin». 6. **One** can say that it is one of the greatest achievements of Soviet science and engineering. 7. Take this device and he will take that **one**. 8. The **use** of titanium as one of the most useful structural materials increases rapidly. 9. We widely **use** different metals and their alloys in industry and science. 10. Metals are subjected to physical and chemical **changes**. 11. Heat **changes** the state of matter. 12. We make books, maps and papers out of **paper**. 13. The scientist published some of his **papers** in this magazine.

VII. Translate into Russian:

1. It is cold in January. 2. It often snows in winter. 3. What is it? — It is a watch. 4. What time is it? — It is 3 o'clock. 5. It is a substance made of several substances, it has a complicated structure. 6. It will be mentioned in the next article about the properties of these metals. 7. It is known that the first sputniks were launched in the Soviet Union. 8. It is impossible to live without water.

VIII. Use the adjectives in brackets in the required form:

1. The (important) properties of aluminium are its low specific gravity, high electrical and thermal conductivities and corrosion resistance. 2. The (common) conductors are metals, and silver and copper are (good) of them. 3. The advantage of copper is that it is (cheap) than silver. 4. The (low) the resistance of the material the (much) current can pass through it. 5. Tartu is the seat of one of the Europe's (old) Universities founded in 1632. 6. Even in the (small) towns modern

houses are gradually replacing the old cottages. 7. Hydrogen is the (light) element.

IX. Translate the following sentences into Russian, paying attention to the verbs in Passive Voice:

1. The «Sibir» atomic icebreaker is looked upon as one of the largest icebreakers in the world used for peaceful purposes. 2. The work of the atomic reactors on board the ship can be relied upon. 3. When a body is subjected to high pressure it changes its shape. 4. These plastics are worked at and experimented upon in different conditions. 5. Iron is acted upon by moist air. 6. The first sputniks were followed by a number of sputniks used for different purposes. 7. The conclusion he arrived at was based on his practical and theoretical work.

X. State the function of the words ending in -ed and translate the sentences into Russian:

1. A tremendous volume of work was accomplished on oil deposits discovered in the West Siberian taiga. 2. The machine designed for cutting metals is installed in this shop. 3. The results obtained varied with the conditions of work and temperature. 4. In the Soviet Union a higher proportion of metal parts was joined by welding. 5. Volts and amperes are measured by dial instruments called voltmeters and ammeters. 6. Electric conductors usually consist of wires or cables made of copper. 7. Wire conductors are usually covered with an insulator. 8. The first artificial satellites of the earth were created in the Soviet Union, they provided important information on space. 9. The first industrial nuclear power station in the world constructed not far from Moscow is used for peaceful purposes. 10. The energy generated by the power plant is supplied to industrial enterprises. 11. There is also the nuclear installation where thermal energy generated in the reactor is transformed directly into electric energy.

XI. State the functions of the Gerunds and translate the sentences into Russian:

1. Welding is the process of joining together pieces of metal or metallic parts by heating the places of contact to a state of fusion or plasticity. 2. In studying engineering processes we must know the characteristics of engineering materials. 3. Studying chemistry without experimenting is useless. 4. This device is designed for detecting and measuring current. 5. Changing the resistance of a circuit is one of the methods of controlling the flow of current in the circuit. 6. In rotating the turbines the mechanical energy of water is converted into electrical energy.

XII. State the function of Participle II in the following sentences and translate the sentences into Russian:

1. The battery was the first source of electric energy developed by a man and it is still widely used. 2. A group of cells connected together is called a battery. 3. The machine tested works well. 4. The substance formed when examined showed important properties. 5. This article gives a brief description of the phenomenon known as electric current flow. 6. Academician Petrov was the first scientist in the world who observed the phenomenon known later as the electric arc. 7. The improved methods of work gave good results.

XIII. Answer the following questions:

1. How is atomic icebreaker equipped? 2. What kind of fuel does it operate on? 3. When and where were the atomic icebreakers created? 4. How is the ship controlled? 5. Is the radiation coming from the atomic fuel dangerous to human life? 6. Is there any protection from atomic radiation on board the icebreaker?

XIV. Reproduce the dialogue in pairs. Retel it 1) in Russian 2) in English.

LESSON 6

Grammar: Adjectives and adverbs, degrees of comparison. Indefinite pronouns. Many, much, few, little. Wordbuilding.

READING DRILLS

I. Read the following words:

speed, deep, meet, feet; teach, read, reach, steam, clean; receive; head, spread; near, hear; earn, learn.

II. Read the following words with the stress on the first syllable:

matter, planet; nature, vapour; proper, common; product, optics; hundred, cover.

III. Read the following many-syllable words:

hydrogen, powerful, significant; illustration, formation, penetration, composition.

IV. Fluent reading:

mark an important step, is our closest neighbour, moving on its orbit, only slightly smaller than, gets approximately

the same amount of heat, formed out of relatively heavy elements, are composed chiefly of hydrogen and helium, scientists did not exclude the possibility, to penetrate deep into the atmosphere, km per hour, proves the total reliability of calculation techniques, the flight control systems, cosmic rays and ultraviolet and X-ray radiation, the artificial satellites.

VENUS AND MARS

The new Soviet experiments of research into Venus and Mars mark an important step towards the solution of the fundamental task of cosmic science — the understanding of the origin and evolution of the solar system and forecasting its future.

Venus is our closest neighbour in space. The distance is shortest when, moving on its orbit, it passes between the Earth and the Sun — it is then a «mere» 40 million kilometres or so away. It is only slightly smaller than the Earth in mass and radius, and gets approximately the same amount of heat from the Sun.

Mercury, Venus, the Earth and Mars are the planets closest to the Sun, formed out of relatively heavy elements — iron, silicon and oxygen, and have only insignificant doses of hydrogen and helium. The more remote planets — Jupiter, Saturn, Uranus and Neptune — are composed chiefly of hydrogen and helium. They are bigger and less dense. The Earth and Venus are in the middle of the belt composed of denser and less massive planets and that is why their mass and their radius are about the same, and their chemical composition and internal structure are similar.

Scientists did not exclude the possibility that there was life on Venus. But the powerful cloud cover made it impossible to penetrate deep into the atmosphere of the planet with the aid of optical telescopes to study its surface. The first information about it was obtained by radio-astronomic and radio-locating observations. But the most important results were obtained by the Soviet Venera-4, Venera-5 and Venera-6 probes. The descent capsules of the new Soviet automatic interplanetary stations «Venera-13» and «Venera-14» made a soft landing on Venus in March 1982.

Our Earth orbits the Sun at a speed of more than 100,000 km per hour, but Venus moves still faster — some 130,000 km per hour. The successful flight of the stations proves the total reliability of calculation techniques and the flight control

systems show the progress made by the USSR in developing automatic systems for studying the Universe.

Soviet automatic stations measured the temperature and pressure of Venus's atmosphere, investigated the characteristics of solar wind, cosmic rays and ultraviolet and X-ray radiation in outer space.

The chemical gas analysers on board Venera-4, -5, -6 established that atmosphere of Venus consists almost wholly of carbone dioxide. There can be no liquid water on the planet because its temperature is too high.

Astronomers and other scientists are interested in Mars, the planet most resembling the Earth in its physical conditions. The observations, made by optical and radio-astronomical photometric and other methods, recreate the complete picture of the physical conditions in the atmosphere and on the surface of Mars. Research is most intensive when Mars and the Earth are in opposition.

The exploration of Mars with the help of space probes made it possible to obtain precise data on the chemical composition of the Martial atmosphere, its pressure and temperature near the surface.

The study of planets will be continued. And it is very important to concentrate research on smaller bodies in the solar system such as comets, asteroids and the planets' smaller moons.

The Vega-1 and Vega-2 automatic space stations were used for studying Halley's comet. The Vega project is an outstanding success for Soviet and international science. The scientists have obtained a great amount of new data on the comet, its composition and its surroundings.

The project Phobos is a new important step in the planet research programme. One of the main tasks of the project, besides the further study of Mars, is a comprehensive study of its moon Phobos. Scientists received many pictures of Mars and its satellite Phobos during the work of the station.

The station used three TV cameras, one of which was equipped with a telephoto lens.

COMMENTARY

Venus ['vi:nəs] Венера, Mars [mɑ:z] Марс, Mercury ['mə:kjurɪ] Меркурий, Saturn ['sætən] Сатурн, Jupiter ['dʒu:pɪte] Юпитер, Uranus ['juərənəs] Уран, Neptune ['neptju:n] Нептун.

EXERCISES

I. State which words in the right column are synonyms for the words in the left column:

1. important	1. distant
2. near	2. velocity
3. far	3. similar
4. aid	4. exact
5. to get	5. help
6. like	6. close
7. accurate	7. to obtain
8. amount	8. significant
9. speed	9. quantity

II. Define to what part of speech the following words belong:

slightly, approximately, greatly, relative, central, impossible, powerful, automatic, systematic, composition, penetration, information, achievement, possibility.

III. Translate the following sentences into Russian:

1. The surface of Venus is screened from the observers' view by a dense blanket of clouds. 2. Though Venus belongs to the planets of the Earth group, it differs greatly from the Earth. 3. We know from a study of the upper layers of the terrestrial atmosphere and the results obtained by the Soviet «Venus» automatic space stations that both planets have a hydrogen corona, with the difference that that of Venus is much weaker than that of the Earth. 4. Venus has apparently lost its water as a result of the higher temperature of its atmosphere and surface. 5. The heated surface emits longer infrared waves, which practically cannot penetrate the dense atmosphere.

IV. Write the following sentences in the affirmative form and translate them into Russian:

1. Is there a research centre in your town? 2. Are there many students in your group? 3. Were there special devices in this laboratory? 4. Are there any materials for our research work in your laboratory?

V. Translate the following sentences into Russian, paying attention to the meaning of the word «there»:

1. We study at the Polytechnic institute, there are many laboratories and workshops there. Students do a lot of experiments and practical work there. 2. There will be a concert in our club, we shall go there. 3. The meeting with foreign students took place in our institute. Our group was present there.

VI. Explain the use of tenses in the following sentences, translate them into Russian:

1. If he finishes his research work, he will publish its results. 2. When you study the properties of these materials you will use them for your experiments. 3. As soon as we obtain (get) the information about the test of this device, we shall be able to describe its capacity.

VII. Write the following sentences in the Past and Future Indefinite:

1. The specialists must know the properties of the materials which they use for construction. 2. You may apply the new methods of work in your research. 3. He can explain to you the principle of work of these instruments.

VIII. Insert the words «much», «many», «little», «few». Translate the sentences into Russian:

1. Scientists collected . . . information about the Moon, its atmosphere and surface. 2. Our Government pays . . . attention to space exploration. 3. ... young specialists take part in scientific research. 4. We have .. . time for this work that is why we must work hard. 5. There are . . . new power stations in Siberia. 6. Very . . . people could read and write in Tajikistan, Kirghizia and Uzbekistan before the October Revolution. 7. There is . . . water in this lake. 8. We had . . . time for experiments and we made only . . . of them. 9. This scientist works . . at the problem of using semiconductors. 10. . . . time passed but . . . was done. 11. There is . . . light in the laboratory. 12. There are . . . different devices there.

IX. Write the following sentences in the interrogative and negative form, translate the sentences into Russian:

1. There are some interesting papers in this magazine. 2. He told us something interesting about his latest works. 3. Somebody left the books on the desk. 4. Somebody came in and brought some English newspapers. 5. I met him somewhere 6. Some students of our group will take part in this research.

X. Translate the following sentences into English:

1. Я никого не вижу в этой комнате. 2. Никто не сделал эту работу. 3. Вы пойдете куда-нибудь сегодня вечером? — Нет, не пойдем. 4. Он ничего не знает об этих исследованиях. 5. Они не задавали никаких вопросов. 6. Был кто-нибудь дома, когда вы пришли? 7. Никто не опоздал. 8. Вы знаете что-нибудь о достижениях в этой области техники? — Да, кое-что знаю.

XI. Answer the following questions:

1. What planet is the closest to the Sun? 2. What planet is larger the Earth or Mars? 3. What does the atmosphere of Venus consist of? 4. Does Venus get the same amount of heat from the Sun as the Earth? 5. Is there any life on Venus? 6. When did scientists get first information about the surface of Venus? 7. Is there water on Venus?

XII. Pay attention to the degrees of comparison of adjectives and adverbs; translate the sentences into Russian:

1. The Volga is the largest river in the European part of the Soviet Union. The silvery stream runs through a number of lakes and becomes wider and wider. 2. Norilsk is one of the biggest mining and metallurgical centres not only of the North, but of the entire country. 3. Before the October Revolution less than 10 per cent of the doctors in Russia were women. Today the figure is more than 70 per cent. 4. In our days the most difficult work in our homes is mechanized. 5. More and more young people go in for sports and many of them later become well-known sportsmen. 6. Baikal is one of the most beautiful lakes in the world. 7. Moscow, the capital of the USSR, grows but does not grow older. On the contrary, each year finds it younger and more beautiful. 8. Light moves faster than sound. 9. Venus is the nearest planet to the Earth, but until recently earthmen knew least of all about it. 10. The first direct measurements of the atmosphere of Venus and the photographs of Mars from a relatively close distance are valuable material for further study of the origin and evolution of planets.

XIII. Use the words in brackets in the required form and translate the sentences into Russian:

a) 1. The city of Ivanovo is the (old) centre of the textile industry in Russia. It was one of the (large) centres of the revolutionary movement. 2. Iron is the main product of the Kursk Magnetic Anomaly, and Kursk iron is one of the (good) in the Soviet Union. Before long this region will become one of the world's (big) centres of iron ore industry. 3. Chess in the USSR is one of the (popular) sports. 4. Automation reached the (high) stage in the development of technology. 5. Modern man comes (little) and (little) in contact with nature.

b) 1. The Soviet Union is one of the (advanced) countries in the world as to the level of education, culture and science. 2. The machines do not think, but they are of the (great) aids to the man who thinks. 3. The house in which the Ulyanovs lived is now a museum. Vladimir Ilyich's room is, of course,

the (interesting) thing in the house. 4. We are working to make our country the (good) and the (might) country in the world.

XIV. Fill in the blanks with conjunctions as . . . as, not so . . . as:

1. Your research is . . . important . . . ours. 2. This problem is . . . interesting . . . that one. 3. Theoretical training is . . . important . . . practical work. 4. Aluminium is . . . good conductor of electricity . . . copper. 5. Your information is . . . important . . . his.

XV. Read the text without a dictionary and retell it 1) in Russian, 2) in English

EXPLORATION OF OUTER SPACE

Mankind will always remember April 12, 1961 the date of man's first flight into outer space. The fact that man came back *safe and sound*[1] after enormous launching overloads, worked and lived in the mysterious weightlessness and travelled at a speed of 28,000 kph (kilometres per hour) *held promise of fantastic achievements*[2].

But space exploration is, of course, no easy or simple matter. Since Gagarin's flight automatic space stations Lunas, Veneras and Marses have enriched us with valuable information. With their help we have seen new worlds. Near-earth orbits have been turned into work places.

Relay satellites have revolutionised communications. TV can now be watched in the remotest corners of the world. The Orbita satellite communication system allowed TV programmes to be broadcast from Moscow to the remotest corners of our country. Space telecasting was born in the first years of the space age. International space cooperation has become a good practice nowadays.

Soviet orbital stations — both the Salyuts and Mir — have helped Soviet cosmonautics gain considerable experience of extra-long space flights. Orbital stations allow people to work in outer space *for months on end*[3].

The unique conditions of high vacuum and weightlessness help produce substances and materials which are difficult or impossible to make on earth.

The time will probably come when spaceships will travel to distant planets and man will start settling the solar system, as was predicted by Konstantin Tsiolkovsky. Future generations will gradually reach a level of technology that will permit them to transform Mars and Venus into habitable worlds.

COMMENTARY

[1] **safe and sound** цел и невредим
[2] **held promise of fantastic achievements** обещал фантастические успехи
[3] **for months on end** в течение многих месяцев

LESSON 7

Grammar: Modal Verbs and their equivalents.
The Present Indefinite Tense in subordinate clauses of time and condition.
Wordbuilding.

READING DRILLS

I. Read the following words with the stress on the first syllable:

atom, plastic, natural, valuable, change, charge, branch, carbon, hydrocarbon, chemist, element, study, structure, substance, current, compound, nuclear.

II. Read the following words with the stress on the second syllable:

predict, exist, existence, depend, dependence, achieve, achievement, derive, derivative, arrange, include, behaviour, material.

III. Read the following many-syllable words:

chemistry, property, discovery, biology, polymer, organism, atomic, synthetic, organic, inorganic, periodic, physical, analytical.

IV. Fluent reading:

different branches of chemistry, deals with the study of materials, compounds are prepared by chemists, in the past few decades, the so-called polymers, remarkable properties, even more valuable properties, closely linked with physics, chemistry deals with, biochemistry has appeared, the joint work of chemists and biologists, is one of the corner stones of modern chemical theory.

FIELDS OF CHEMISTRY

The science chemistry includes a study of properties, composition and structure of matter, the changes in structure and composition which matter undergoes, and the accompanying energy changes.

There are more than 30 different branches of chemistry. Some of the better known fields are: inorganic chemistry, orga-

nic chemistry, physical chemistry, analytical chemistry, biological chemistry, nuclear chemistry, colloidal chemistry, electrochemistry, industrial chemistry, etc.

Inorganic chemistry deals with the study of materials not derived from living organisms. However it now includes all substances other than the hydrocarbons and their derivatives.

Organic chemistry is the chemistry of carbon compounds. The term *organic* arose from the relationship of this branch of chemistry to organic, or living, matter. But many other «organic» compounds are prepared by chemists in the laboratory.

In the past few decades chemistry has achieved tremendous successes in producing a new type of material, the so-called polymers. It is the product of organic synthesis. These materials possess truly remarkable properties which in some respect are similar to the properties of natural metals. Sometimes synthetic plastics combined with natural elements might have even more valuable properties than natural ones have.

Physical chemistry is concerned with these parts of chemistry which are closely linked with physics as for instance, the behaviour of substances when a current of electricity is passed through them.

Analytical chemistry deals with the methods of separation of purer substances from mixtures, of elements from compounds, and with their estimation.

Synthetic chemistry deals with the methods by which complex bodies may be built up from simpler substances.

Electrochemistry *is concerned with*[1] the relation between electrical energy and chemical change. Electrolysis may be an example of it.

Biochemistry has appeared on the boundaries between biology and chemistry. The joint work of chemists and biologists promotes further development of science. Nevertheless modern chemical science is based on the achievements of such an outstanding scientist as D. Mendeleyev. His greatest discovery was his Periodic Law. The Periodic Law is one of the corner stones of modern chemical theory. It can be simply stated as follows: The properties of the elements are a periodic function of the nuclear charges of their atoms.

It was D. Mendeleyev, the famous Russian chemist, *who was the first to discover the law*[2] of dependence of the properties of elements upon their atomic weights and showed the elements arranged according to a definite system. This system is called the Periodic System. The Periodic System *is of great importance*[3] for modern science.

There were several vacant spaces in Mendeleyev's table which led him to predict the existence of six undiscovered elements (scandium, gallium, germanium, polonium, etc.).

He predicted not only the existence of these elements but their physical and chemical properties as well[4]. In his table the symbols of the elements are given with their atomic weights. Mendeleyev's Periodic Law was the beginning of a new era in the history of chemistry.

COMMENTARY

[1] **is concerned with** занимается
[2] **it was D. Mendeleyev... who was the first to discover the law** именно Д. Менделеев ... первый открыл закон
[3] **is of great importance** имеет большое значение
[4] **as well** также

EXERCISES

I. Read the following verbs, pay attention to the reading of -ed:

worked	learned	wanted
smiled	stopped	opened
started	invited	asked

II. Underline the suffixes and translate the words into Russian:

period — periodic; system— systematic; peculiar — peculiarity; similar — similarity; chemical — chemistry — chemist; to discover — discovery; to depend — dependent — dependence; to know — knowledge; to define — definite — definition; important — importance; to predict — prediction; to exist — existence; to arrange — arrangement; to contain — container.

III. Give synonyms for the following words:

to look, similar, well-known, to invent, to illustrate, classify, significance, to foretell, vacant space, every, the same.

IV. Give antonyms to the following words:

different, unknown, independence, indefinite, to decrease.

V. Write the following sentences in the past and future tense:

1. Students must make a great number of experiments to acquire good knowledge. 2. We can remove all the impurities from water by the process called distillation. 3. Water must be decomposed to obtain oxygen. 4. You may take my test tube.

VI. Put the sentences into the interrogative and negative form:

1. The students may use all the dictionaries from the library. 2. You must use these books. 3. They may speak aloud here. 4. We had to discuss the accident there. 5. This student will need his freind's help. 6. The post-graduates could find this hand-book in the library.

VII. Translate the following sentences, paying attention to the predicates:

1. Nitric acid may be used to oxidize hydrogen. 2. All the laboratory vessels have to be carefully washed before using them for any experiments. 3. A chemist must know the physical laws which govern the behaviour of matter in various states. 4. Considering all the elements together, we may see that there are certain groups that have very similar chemical properties. 5. In the chart we can see that the elements are arranged in horizontal rows of ten in the order of increasing atomic weights. 6. The Periodic Law can be simply stated as follows: The properties of the elements are a periodic function of the nuclear charges of their atoms. 7. Synthetic chemistry deals with the methods by which the complex bodies may be built up from simpler substances. 8. Electrolysis may be an example of electrochemistry. 9. According to the law of conservation of matter, matter can neither be created nor destroyed. 10. Matter can exist in three physical states, namely, solid, liquid, or gaseous. 11. Because atoms are so very small their number must be extremely large. 12. We had to use a catalyst to accelerate the reaction.

VIII. Replace the Modal Verbs by their equivalents and translate the sentences into Russian:

1. When a house is to be built a number of things are to be taken into consideration. 2. Among these may be mentioned the quality of material. 3. At the same time we must remember about the «style» in which the building is to be planned. 4. This decision should be made before plans for the house are started. 5. For concrete sand and stone must be proportioned and mixed. 6. Cement should be ground extremely fine.

IX. Explain the use of tense-forms in the following sentences and translate the sentences into Russian:

1. When the students come to the plant they will be taken to the plant laboratory and will be shown modern apparatus and devices. 2. If you pour water into sulphuric acid, heat will be given off, an explosion will take place. 3. If we heat the solution, the reaction will take place at a higher rate.

4. If we cool the solution, the reaction will slow down. 5. If they finish their experiments, they will tabulate the data.

X. Translate the following sentences into Russian, paying attention to the words in bold type:

1. There exist, **at least**, two modifications of sulphur. 2. This mixture consists of **at least** three constituents. 3. Nitrogen and oxygen are **both** necessary for breathing. 4. Hydrogen peroxide acts **both** as an oxidizing and as reducing agent. 5. According to the law of conservation of matter, it can **neither** be created **nor** destroyed.

XI. Give three forms of the following verbs:

to cut, to know, to catch, to take, to make, to see, to predict, to be, to present.

XII. Insert prepositions where necessary:

1. D. Mendeleyev, the great Russian scientist, was born . . . Tobolsk, Siberia, . . . 1834. 2. . . . the age of sixteen he entered the Institute . . . Pedagogy . . . St. Petersburg, from which he graduated . . . 1855. 3. Two years later he presented his thesis . . . the degree . . . Master . . . science . . . chemistry and . . . some years abroad he was given his Doctor's degree. 4. . . . 1856 he worked as a professor of the University . . . St. Petersburg where he gave a course . . . lectures . . . theoretical, organic and technological chemistry. 5. He was warmly loved . . . his students . . . the University. 6. Mendeleyev's greatest discovery was the Periodic Law, which was published . . . 1869. 7. Mendeleyev was interested not only . . chemistry. 8. He made great contributions . . . the studying . . . petroleum extraction and aeronautics. 9. He was greatly interested . . . ship-building and investigation of the Polar regions. 10. Once Mendeleyev ascended all by himself . . . a balloon to watch a solar eclipse. 11. He put forward the idea . . . an investigation . . . the upper layers . . . the atmosphere which he called the great weather laboratory. 12. Mendeleyev was a great patriot. He looked . . . work as man's duty and calling. 13.The Russian people are justly proud . . . their great son, the genius . . . science Dmitri Mendeleyev.

XIII. Answer the following questions:

1. How many different branches of chemistry are there? 2. Which are the better known fields of chemistry? 3. What does inorganic chemistry deal with? 4. Give an example of an inorganic compound. 5. What does organic chemistry deal with? 6. What is the subject of electrochemistry? 7. What methods does synthetic chemistry deal with? 8. What outstan-

ding Russian chemists do you know? 9. What is Mendeleyev's greatest discovery?

XIV. Write a summary of the text.

XV. Make a short report about the development of chemistry in our country.

LESSON 8

Grammar: Present Perfect (Active, Passive).

READING DRILLS

I. Read the words with the stress on the first syllable:

channel, radio, area, effort, centre, peace, progress, programme, modern, mobile, purpose, culture, cultural.

II: Read the words ending in -ed:

reached, helped, equipped, received, called, lessened, demonstrated, fitted, transmitted, conducted, extended, provided.

III. Read the following word-combinations:

great progress has been made in radio engineering, a newspaper needing no paper, radio broadcasting, with the appearance of television, in remote areas of the country, is fitted out with the most modern equipment, a powerful source of entertainment, the idea of using an electron-beam tube, at the beginning of the television age, an independent branch of technology, is one of the highest structures in the world, with the help of mobile TV stations.

RADIO AND TELEVISION

In 1895 Russian scientist A. Popov demonstrated his receiver.

Great progress has been made in radio engineering, radio communications, radio broadcasting and television since then.

At the dawn of the development of radio V. I. Lenin aptly called it a newspaper needing no paper, and reaching to all distances. It has helped *to bring* remote areas of the country *closer*[1] to Moscow and other cultural centres of the country.

The importance of radio has not lessened with the appearance of television.

Television is a powerful source of entertainment and information, a door through which the whole world can enter our homes.

The development of television as we know it today began with the work of Boris Roding, a professor at the St. Petersburg Institute of Technology, who put forward the idea of using an electron-beam tube to receive pictures. He demonstrated this method successfully for the first time on May 9, 1911, a date which may be regarded as the beginning of the television age. But many years were to pass before laboratory experiments such as these developed into an independent branch of technology.

In 1945 the television studio in Moscow was the only source of regular transmissions in the whole of Europe. These early post-war broadcasts were received by only 425 television sets.

Now in the big cities, such as Moscow, Leningrad, Kiev and many others, practically every family has a TV set.

Cosmic transmitters *have made their appearance*[2], and TV has become accessible in remote areas of the country. The main TV centre is, of course, situated in Moscow. It is fitted out with the most modern equipment. It has more than 20 studios and a Concert Hall from which telecasts are transmitted. The TV transmission tower near the TV centre is one of the highest structures in the world.

Many programmes are transmitted from the special TV Theatre. The big concert halls and theatres in Moscow, such as the Kremlin Palace of Congresses, the Bolshoi Theatre and others are equipped with TV apparatus.

Transmissions are conducted from other concert halls and theatres with the help of mobile TV stations.

Soviet television and Soviet radio may conduct broadcasts from any concert hall and stadium in the country.

We exchange programmes with other countries within the framework of Intervision.

Soviet radio and television have but one purpose, and that is to serve the people, *to disseminate knowledge*[3], to extend education and to provide cultural recreation. Many institutes *make wide use of tuitional television*[4] not only for instructing evening and extramural students, but for full-time students as well. The institute «has come to their homes». Educational programmes are enjoying increasing popularity.

Moscow boradcasts over four radio programmes. Moscow TV has several channels.

The Soviet Union is a multinational country. It is natural, therefore, that in addition to Moscow TV and radio studios, all the Union and autonomous Republics, National Areas

and large regional centres have their own TV and radio studios. No other *mass.media*[5] *can rival*[6] television.

The mass information and propaganda media play a growing role in the life of society. Special attention is devoted to improving radio and TV programmes making them richer in content, more interesting and raising their ideological and artistical level.

Colour TV is rapidly developing in the Soviet Union. Soviet scientists have made a great contribution to the development of colour television.

The voice of Soviet radio is heard all over the world. Our stations broadcast in many languages of the world daily. They describe Soviet affairs and the efforts made by the Soviet state to bring about peace, security and cooperation between the nations.

COMMENTARY

[1] **to bring closer** сократить расстояние, приблизить
[2] **have made their appearance** появились
[3] **to disseminate knowledge** распространять знания
[4] **make wide use of tuitional television** широко используют учебное телевидение
[5] **mass media** средства массовой информации
[6] **to rival** соперничать

EXERCISES

I. Define to what part of speech the following words belong:

receiver, indicator, transmitter, development, equipment, importance, appearance, (to) lessen, transmission, population, recreation; autonomous.

II. Group the following words with the same meaning (synonyms) and translate them into Russian:

modern, importance, to reach, to help, remote, main, chief, present-day, distant, significance, to assist, to achieve, a year, every year.

III. Translate the following words and expressions and use them in the sentences of your own:

therefore, in addition to, all in all, of course, daily, a year, to be used to, but one purpose, the same, such as, with the help of.

IV. Translate the following sentences into English using the words from the text:

1. В больших городах, таких как Москва, Киев и многих других, почти каждая семья имеет телевизор. 2. С помощью

передвижных телевизионных станций передачи ведутся из разных уголков страны. 3. Мы привыкли к телевизионным передачам. 4. У советского радио и телевидения одна цель — служить людям. 5. Московское радио имеет несколько каналов. 6. Советское телевидение и радио могут вести передачи из любого концертного зала и стадиона страны. 7. Советский Союз — многонациональная страна. 8. В каждой республике есть своя телевизионная студия. 9. Советские ученые внесли большой вклад в развитие цветного телевидения. 10. Голос советского радио слышен во всем мире. 11. Советский Союз выступает за мир и сотрудничество между всеми народами.

V. State the tense-forms of the verbs and translate the sentences into Russian:

1. Great progress has been made in radio engineering since A. S. Popov's invention. 2. Radio has helped to bring remote areas of the country closer to Moscow. 3. The importance of radio has not lessened with the appearance of television. 4. With the appearance of cosmic transmitters TV has become accessible in remote areas of the country. 5. The Bolshoi Theatre is equipped with TV apparatus. 6. Transmissions are conducted from other theatres with the help of mobile TV stations.

VI. Use the verbs in brackets in the required tense:

1. Popov's «storm indicator», which he (to demonstrate) in 1895, (to be) the prototype of modern radio receivers. 2. Great progress (to be made) in radio engineering since then. 3. V. I. Lenin (to call) radio a newspaper needing no paper and reaching all distances. 4. Radio (to help) to bring remote areas closer to cultural centres of the country. 5. The importance of radio (not to lessen) with the appearance of television. 6. The main TV centre (to be situated) in Moscow. 7. Many programmes (to be transmitted) from special TV Theatre. 8. The inventor of the radio A. S. Popov (to be born) in 1859. 9. He (to graduate) from the Petersburg University in 1883. 10. The development of television (to begin) with the work of Boris Roding. 11. He (to put forward) the idea of using an electron-beam tube to receive pictures.

VII. Form the plural of the following nouns where possible:

scientist, receiver, newspaper, distance, area, country, centre, family, set, structure, congress, radio, studio, language, man, woman, knowledge, progress.

VIII. Translate the following sentences into English:

1. Изобретателем радио является известный русский ученый А. С. Попов. 2. В нашей стране ученые добились

больших успехов в области радиотехники. 3. В. И. Ленин назвал радио газетой без бумаги. 4. Главный телевизионный центр находится в Москве, но каждая республика имеет свои телевизионные студии. 5. Наши радиостанции ежедневно ведут передачи на многих языках. 6. Кремлевский дворец съездов оснащен телевизионной аппаратурой. 7. Радио и телевидение — средства массовой информации.

IX. Answer the following questions:

1. Who is the inventor of radio? 2. What did V. I. Lenin call radio? 3. Has the importance of radio lessened with the appearance of television? 4. What date may be regarded as the beginning of the television age? 5. How many TV sets does the Soviet Union produce every year? 6. Where is the main TV centre situated? 7. What is one of the highest TV towers in the world? 8. What purpose have Soviet radio and television? 9. Do institutes make wide use of tuitional television? 10. Are educational programmes enjoying increasing popularity? 11. Can any other mass media rival television? 12. Who has made a great contribution to the development of colour television?

LESSON 9

Grammar: Perfect Tenses (Active, Passive).

READING DRILLS

I. Read the following words with the stress on the first syllable:

practice, laser, framework, decade, to separate, beam, medium, treatment, science, diamond, micro, hundred, tunnel, concrete, optical, problem, modern, source, system, liquid, silicon, instrument.

II. Read the following words with the stress on the second syllable:

awarded, developed, already, discovery, equipment, success, successful, machine, material, emission, internal, reliably, to increase.

III. Read the following many-syllable words:

accuracy, tendency, intensity, property, technology, amplification, communication, operation, production, construction, solution.

IV. Read the following groups of words:

the young branch of science, appliances for commercial use, the source of their powerful beam, treatment of materials,

the technology of welding, this powerful source of light energy, is widely applied in drilling, joining up with millimetre accuracy, band of electromagnetic waves, a number of operations, are either inapplicable or ineffective.

LASERS IN THE SERVICE OF MAN

More than three decades separate us from the time when the first laser was developed. The Nobel Prize has been awarded to the Soviet scientists Alexander Prokhorov and Nikolai Bassov and American scientist Charles H. Townes for this outstanding discovery. The young branch of science has already developed into hundreds of instruments and appliances for commercial use. The source of their powerful beam *is no longer confined*[1] to rubies, *as was the case*[2] in the first lasers. Various gases, liquids, semiconductors are now used as a medium.

A laser is a machine for making and concentrating light waves into a very intense beam. The letters LASER stand for Light Amplification by Stimulated Emission of Radiation. The light made by a laser is much more intense than ordinary light. With ordinary light, all the light waves are of different lengths. With lasers, all the light waves are of the same length, and this increases the intensity.

Lasers have been used by building workers, drillers, communication workers. They have been made to help doctors and scientists in their research.

Treatment of materials was one of the first areas where lasers have not only replaced the old equipment, but have given rise to fundamentally new technological methods.

The technology of welding *is wide-spread*[3] in modern production. Soviet-made laser equipment welds reliable gold with silicon, aluminium with nickel, and a number of other metals.

This powerful source of light energy is widely applied in drilling and primarily in effecting micro-openings in such hard materials as rubies and diamonds.

The laser beam is successfully used in communication. The optical band of electromagnetic waves opens up big prospects for multichannel wireless communication. Multichannel laser telephone systems have already been developed.

Our scientists have succeeded in obtaining a new generation of solid-state lasers and have grown up crystals which convert up to 10 per cent of the energy into a laser beam. This is about 3 to 5 times as much as in the familiar crystals.

Certain laser properties are successfully applied in medical practice. The eye doctors *were the first to apply them*[4]. The laser knife is undergoing successful trials at the Vishnevsky Institute of Surgery. The bloodless knife has been used to perform a number of operations on internal organs. Experts believe that by 2 000 lasers will have been used in many fields of technology and especially in those fields where other instruments *are either inapplicable or ineffective*[5].

Already, there is a tendency to manufacture not individual lasers as such, but integrated laser systems and to apply laser methods for the solution of scientific and technological problems.

COMMENTARY

[1] is no longer confined больше не ограничивается
[2] as was the case как было
[3] is wide-spread широко применяется
[4] were the first to apply them применили их первыми
[5] are either inapplicable or ineffective или нельзя применить, или они неэффективные

EXERCISES

I. Give synonyms for the following words and translate them into Russian:

little, to award, outstanding, branch, to use, mighty, construction, assistance, investigation, exactness, ray, test.

II. Give antonyms to the following words and translate them into Russian:

many, less, to join, undeveloped, old, weak, short, unreliable.

III. Read the following words ending in -ed:

opened, changed, used, played, explored, lived, carried, increased, worked, helped, liked, noticed, produced, wished, finished, demanded, prospected.

IV. Translate the following groups of words of the same root:

to develop — development; to discover — discovery; science — scientist — scientific; to apply — application —applicable — inapplicable; power — powerful — powerless; to treat — treatment; product — production — productivity — to produce; to communicate — communication; to establish — establishment; success — successful.

V. Explain the use of tenses in the following sentences and translate the sentences into Russian:

a) 1. The Nobel Prize has been awarded to Soviet scientists for this outstanding discovery. 2. The young branch of science

has already developed into hundreds of instruments. 3. Lasers have been used by building workers, drillers, communication workers. They have been made to help doctors and scientists in their research. 4. Soviet specialists have developed laser units for continuous cutting of metals, glass, plastics, and so on. 5. Newspapers reported that a multichannel 20 km laser communication line had been established between Moscow and Krasnogorsk. 6. The bloodless knife has been used to perform a number of operations on internal organs. 7. Experts believe that by 2 000 lasers will have been used in many fields of technology.

b) 1. Soviet scientists have opened a fundamentally new road in space exploration. 2. By the beginning of the 19th century the atomic theory of the structure of matter had been established experimentally. 3. When modern computers had been designed they found wide application in industry. 4. Great success has been achieved in the study of the Moon and the planets of the Solar System. 5. Many new industrial enterprises will have been built in Siberia by the end of the five-year period. 6. By the end of the year the data obtained during our researches will have been processed. 7. More than 300 new models of tractors and various other machines have been designed and recommended for mass production. 8. Modern enterprises have been built in many cities and towns.

VI. State the functions of the verbs «to be» and «to have» and translate the sentences into Russian:

a) 1. Our scientists have succeeded in obtaining a new generation of solid-state lasers. 2. Laser beem is heavily absorbed by water and living tissues, and can, therefore, be employed as a high precision sterile and bloodless scalpel. 3. Lasers have been used by building workers, drillers, communication workers. 4. Everybody has to know his speciality well. 5. Chemists will have to make analysis of this substance and inform us about the results of their work. 6. Lasers have such properties that are of great importance in engineering. 7. You have to change the position of the device, its measurements are incorrect.

b) 1. The study of the ionosphere is of great scientific and practical importance. 2. He is to control the work of these devices. 3. Rivers are the main sources of fresh water in our country. 4. The face of Siberia is changing, and the ones who are changing it are the people of Siberia themselves. 5. City traffic

is also to undergo changes. Public means of transport — the metro, high-speed trams, trolley-buses, electric buses — will do the main job.

VII. Insert the proper forms of the verbs given in brackets (Past Indefinite, Present Perfect, Past Perfect) and translate the sentences into Russian:

1. Gagarin's flight (to mark) the beginning of space exploration and thus (to open) a new epoch in human history. 2. Soviet engineers (to make) an electric car of original construction. 3. The workers (to get) good results when the methods of their work (to improve). 4. Women (to make) a great contribution to education and scientific progress. 5. Three years ago he (to graduate) from the Polytechnic Institute and (to begin) to work. 6. An automatic lunar self-propelled vehicle, remote-controlled from the Earth (to place) on the Moon for the first time in history of cosmonautics, and (to start) research work there. 7. The direct study of the lunar surface (to begin) with Moon landing by automatic space stations.

VIII. Put questions to the subject or object of the following sentences:

1. The new villages will not essentially differ from urban type settlements. 2. Soviet scientists have developed several welding methods. 3. The middle of the twentieth century is characterized by the broad-scale introduction of the latest scientific achievements into industry. 4. More than one hundred gas and oil deposits have been discovered in Bashkiria.

IX. Answer the following questions:

1. Who received the Nobel Prize for the discovery of lasers? 2. Where were the first lasers used? 3. In what fields of science are lasers used now? 4. What can you say about Soviet-made laser equipment? 5. What do the letters LASER stand for? 6. For what purpose is the laser used by building workers? 7. How is laser applied in communication? 8. What laser communication lines operating in our country do you know? 9. What can you say about laser application in medicine? 10. What are lasers prospects for the future?

X. Write a summary of the text.

XI. Retell the text.

Laboratory Work on the Topic «Science»

Work with the Tape-recorder

I. Read the text and tape-record it:

Today everyone can see the development of a new scientific and technical branch — biochemical technology. This branch is of great importance.

The success of modern chemistry has been *amazingly great*[1]. Scientists have created the world's best polymers.

Successes in power engineering play an important role in the country's economy.

Great changes took place in physics. Today, the laser beam is used in metal welding and cutting, in surgery, electronics and so on. Lasers and quantum generators are *the fruit of Soviet science*[2].

Soviet manned space flight *signifies*[3], *a gigantic leap*[4] forward in space exploration: from Yuri Gagarin's entering the Earth orbit to long-term space expeditions lasting several months and to international expeditions with cosmonauts from other countries.

Such constructive international cooperation in space contributes much to the development of science, strengthens friendly relations among nations.

Buran reusable spaceship launched on the 15th of November 1988 is a brilliant victory of Soviet scientists.

After being lifted off, it reached its *designated orbit*[5], circled the Earth twice and made a pilotless landing on a runway at Baikonur cosmodrome.

The policy of restructuring, democratization and acceleration of scientific and technological progress in the Soviet Union and other countries opens up new opportunities for the development of international cooperation.

COMMENTARY

[1] **amazingly great** поразительно велики
[2] **the fruit of Soviet science** достижение советской науки
[3] **to signify** свидетельствовать
[4] **a gigantic leap** огромный скачок
[5] **designated orbit** расчетная орбита

II. Translate the text into Russian.

III. Ask questions about the text.

IV. Translate the following sentences into English using the words from the text.

1. Советские ученые добились значительных успехов в фундаментальных научных исследованиях. 2. Запуск космического корабля многоразового использования является блестящей победой ученых. 3. Успехи в области электроники имеют большое значение для экономики страны. 4. В исследовании космоса сделан огромный скачок. 5. Сотрудничество многих стран в области космических исследований способствует развитию науки и укрепляет дружественные отношения между народами. 6. 15 ноября 1988 года в Советском Союзе был запущен космический корабль многоразового использования «Буран». 7. После старта «Буран» вышел на расчетную орбиту, совершил двухвитковый полет вокруг Земли и приземлился автоматически на посадочной полосе космодрома Байконур.

LESSON 10

Grammar: Continuous Tenses (Active, Passive).

READING DRILLS

I. Read the following words with the stress on the first syllable:

Asia, nature, desert, sensitive, Arctic, harvest, harmony, cover, ocean, polar, socialist, voluntary, equal, mineral, system, climate, mountain.

II. Read the following words with the stress on the second syllable:

discover, produce, resource, machine, deposit, accomplish, industrial, republic, reform, development, profound, restructure.

III. Read the following words ending in -ic:

Atlantic, Pacific, Arctic, economic, climatic, public.

IV. Fluent reading:

rich in natural resources, discovered on the territory of the USSR, all sorts of machines, more sensitive than the human nerve, hydroelectric power stations, in different regions of our country, on an equal and voluntary basis, profound revolutionary reforms, social and economic development, the all-round renewal of society.

V. Memorize the following words:

iron, steel, copper, nickel, lead, zinc, aluminium, molybdenum, manganese, coal, potassium salts, apatite, phosphorus, oil, gold, diamond, raw material.

THE SOVIET UNION

The Soviet Union is one of the largest countries in the world. *It stretches*[1] from the Arctic to the mountains and deserts of Central Asia, from west to east, from Atlantic to Pacific and *covers*[2] the territory of 22 million square kilometres. The Soviet Union occupies 1/6 part of the globe.

The Soviet Union is rich in natural resources. Vast deposits of natural gas, oil and coal have been discovered on the territory of the USSR. The Soviet Union produces iron, steel, copper, nickel, lead, zinc, aluminium and many other key metals. It builds all sorts of machines from spaceships to the instruments more sensitive than the human nerve.

No other country in the world has such huge resources of water power. Many hydroelectric power stations have been built and are being built in different regions of our country. The most powerful ones are being built in Siberia. The energy of the atom is not to hurt the ecological relevance.

The Soviet Union is a federation of the associated republics. Nowadays the Soviet federation is going through profound revolutionary reforms of historic significance. Each member of the federation shall retain control of internal matters and be also sovereign in forming foreign affairs, defence etc. The Soviet peoples have taken the course towards accelerated social and economic development, the all-round renewal of society, and the elevation of the country to a qualitatively new level.

The Congress of People's Deputies has become a major event in the life of Soviet people. Great problems in all spheres of our life were lighted and discussed at the Congress. The Congress has set forth a number of necessary measures for self-management and democratization within labour collectives and society as a whole. It discussed not only the current economic, political and social problems, but pushed into light problems in the public education system, in social development and foreign policy.

The country is today facing great common tasks: the struggle for world peace and ecological problem.

Perestroika, democratization and glasnost have become the norms of the life of Soviet people.

COMMENTARY

[1] it stretches он простирается
[2] it covers он занимает

EXERCISES

I. Define the suffixes, translate the words into Russian:

economics, policy, diversity, fraternity, coexistence, development, brotherhood, communist, socialist, historic, patriotic, monolithic, social, industrial, exhaustible, peaceful, different, sensitive, continuous, population, revolution, naturally, greatly, numerically.

II. State which words in the right column are synonyms for the words in the left column:

1. to allow	1. triumph
2. victory	2. to permit
3. fraternity	3. wish
4. desire	4. whole
5. entire	5. nation
6. people	6. brotherhood
7. important	7. large
8. big	8. significant

III. State which words in the right column are antonyms to the words in the left column:

1. powerful	1. small
2. rich	2. artificially
3. cold	3. the same
4. hard	4. low
5. different	5. powerless
6. high	6. tiny
7. huge	7. poor
8. large	8. easy
9. naturally	9. hot

IV. Form adjectives of the following nouns:

power, culture, industry, sensitivity, nature, peace, socialism, economics.

V. Translate the following sentences, paying attention to the expressions: as many as, as much as, as soon as, either ... or, as ... as, not so ... as:

1. It seems that the new stage of cosmonautics has produced as many questions as there were at the dawn of the space era.

However, they are not so insoluble as they may seem. 2. It is a little over 60 kilometres from Irkutsk to Lake Baikal, the journey to the lake can be made either by car or by boat. 3. The Yenisei, this deep and fast river, has enough energy to operate several hydropower stations and generate as much electricity as the Volga, the Kama, the Dnieper and the Don can produce together. 4. The Decree on Peace was proclaimed as soon as the October Revolution was accomplished.

VI. State the tense and the voice of the verbs and translate the sentences into Russian:

1. The reform of the political system is to open new possibilities for the deepening of perestroika in every sphere of public life to provide guarantees that will make perestroika irreversible. 2. The USSR is today facing great common tasks: the struggle for world peace and ecological problems. 3. Today environmental protection is a global problem second in significance only to the prevention of nuclear war. 4. Party's economic and social strategy is based on speeding up scientific and technological progress. 5. One of the vital problems of today is to put an end to the arms race and prevent it from spreading into outer space.

VII. State the function of the verb «to be» and translate the sentences into Russian:

1. The territory of the Soviet Union is a little smaller than Africa, bigger than South America and three times as big as Australia. 2. The climate, too, is varied. 3. It is hard to name a raw material that is not used industrially in the USSR. 4. While travelling about the Soviet Union one sometimes wonders if it really is all one country. 5. At present the Soviet Union is expanding its chemical industry. 6. Accurate meteorological data are being transmitted every three hours from ice deserts. 7. In Arctic people are to work in very difficult conditions but they are all enthusiasts of their work. 8. The first step in the solution of any problem is to understand the aim and usefulness of this problem.

VIII. Translate the following sentences into English using the words from the text:

1. Советский Союз — одна из самых больших стран в мире. 2. Он занимает 1/6 часть земного шара. 3. Перестройка, демократизация и гласность стали нормой жизни советского народа. 4. Советская страна производит различные машины — от космических кораблей до мельчайших приборов, более чувствительных, чем нерв человека. 5. Ни в одной стране мира нет таких огромных водных ресурсов, как в Со-

ветском Союзе. 6. В стране построено много гидростанций, самые крупные из них в Сибири. 7. Космический корабль вышел на расчетную орбиту.

IX. Make a plan of the text.

X. Retell the text according to your plan.

CHIEF DESIGNER

Sergei Korolev (1907—1966) is the outstanding Soviet scientist and designer in the field of cosmonautics and rocketry, founder of applied space exploration, chief designer of the first carrier rockets, artificial satellites and manned spacecraft, member of the USSR Academy of Sciences. His contribution to the Soviet and world science is great. Korolev succeeded in accomplishing during his lifetime what many generations of people had only dreamed about before. Korolev's contribution to the development of Soviet rocketry is so great that he ranks second only to Tsiolkovsky[1].

At the end of thirties, his liquid-propelled rockets acquired a design that subsequently came to be regarded as classic[2]. Using the experience gained at home and abroad, Korolev and his team not only enriched the theory of technology but designed a number of rockets of a more advanced type in the stage of technological development.

In the early 1930s, Korolev and his associates laid a foundation which enabled them later on, from 1946 through 1966, to carry out a tremendous scope of work at a breath-taking pace[3].

Epoch-making events in the human civilization are associated with the name of Academician Sergei Korolev: the launching of Sputnik, the first artificial satellite, unmanned space flights to the Moon and Venus, and the unprecedented space flight of our countryman Yury Gagarin. His creative work was crowned by the creation of powerful ballistic missiles for national security, unmanned space probes and spacecraft of various purposes, even flights to the Moon, Venus and Mars.

COMMENTARY

[1] **...he ranks second only to Tsiolkovsky** его считают вторым после Циолковского

[2] **...that subsequently came to be regarded as classic** которая впоследствии стала классической

[3] **... at a breath-taking pace** стремительными темпами

LESSON 11

Grammar: Structure of questions.
Prepositions.
Wordbuilding.

READING DRILLS

I. Read the words with the stress on the first syllable:

capital, nation, ancient, cradle, centre, century, memory, glory, monument, instrument, interest, industry, visit, eager, cultural, technical.

II. Read the words with the stress on the second syllable:

historical, industrial, administrative, magnificent, suggest, research, develop, invader, apartment.

III. Memorize the following words:

friendship, government, beautiful, picturesque, triumphant, magnificent, administrative, inseparable.

IV. Fluent reading:

one of the largest centres of our country, the cradle of the history, in its mighty water, friendship of nations, in honour of the liberators, a city of science, a number of new plants.

KIEV ANCIENT AND YOUNG

Dialogue

Several English students came to Kiev on a tour. While visiting the town they met some Soviet students. Before sightseeing they asked many questions about the town.

English student: Can yon tell me anything about the city?

Sergey (Soviet student): Certainly, I can. I like my city very much and know many *places of interest*[1] there.

English student: Is Kiev a large city?

Sergey: Kiev is the capital of the Ukrainian Soviet Socialist Republic. It is one of the largest industrial, scientific and cultural centres of the Soviet Union.

English student: Is Kiev an old city?

Sergey: Yes, it is. It was founded 1500 years ago. By the end of the tenth century it had already been the capital of Kiev Rus.

English student: What is the central street of the city?

Sergey: Khreshchatik is the central street.

English student: Was Kiev greatly ruined during World War II?

Sergey: Yes, it was. The central part of the city was reduced to ruins. Now it is completely restored and became even more beautiful than ever before.

English student: Are there many institutes, universities, technical and secondary schools in the city?

Sergey: Yes, there are. There are many institutes, technical and secondary schools there. The University is named after T. G. Shevchenko, an outstanding Ukrainian poet.

English student: What places in Kiev is it interesting to visit?

Sergey: For a start I should suggest Khreshchatik with its fine new buildings.

English student: What monuments is it interesting to see in Kiev?

Sergey: First of all the monument to V. I. Lenin, which stands in Shevchenko Boulevard. Fresh flowers are always at the foot of it. Then, the monument to T. G. Shevchenko. It is situated in the Shevchenko Park. Then the monuments to Bogdan Khmelnitsky, to Shchors and others.

English student: What parks are worth seeing[2] in Kiev?

Sergey: First, go to Vladimir Hill or the First of May Park. We have a very beautiful view on the Dnieper from these places.

English student: Be so kind, let's go sightseeing together. And you will tell us more about this wonderful town. We are eager to know about Kiev as much as possible.

Sergey: With pleasure.

KIEV

Ancient and eternally young Kiev is one of the largest administrative and cultural centres of the Soviet Union. It was founded 1500 years ago.

Kiev is justly called the Mother of Russian Cities. It is indeed the cradle of the history and the cradle of the culture of three East Slav nations — the Russian, Ukrainian and Byelorussian. The town is situated on the banks of the deep and wide Dnieper.

All the historical life of the Ukraine *is closely linked*[3] with Kiev. Kiev remembers the glorious reunion of the Ukraine and Russia.

Kiev still keeps fresh in memory the outbreak of the Revolution of 1905 the battles for the establishment of Soviet power after the Great October Socialist Revolution of 1917. It remembers the heroic struggle against the fascist invaders during the years of World War II, for which the hero city was awarded the second Order of Lenin.

The monuments to the organizer of the Communist Party and founder of the first socialist state Vladimir Ilyich Lenin stand in the centre of the city at the corner of Khreshchatik Street and Shevchenko Boulevard and on the October Revolution Square. *At the foot of the monuments*[4] there are always flowers.

Many monuments in Kiev are devoted to the memory of Great Patriotic War heroes: the monument to General Vatutin, who was the commander-in-chief of the troops that liberated Kiev; the Obelisk of Glory at the tomb of the Unknown Soldier in the park of Eternal Glory. The newest complex-museum of the Great Patriotic War and the V. I. Lenin public, political and cultural centre were recently erected in Kiev.

The beautiful monument to the revolutionary military leader Shchors is situated in Shevchenko Boulevard. In Kiev green parks and squares there stand the monuments to the outstanding Ukrainian writers and poets: the monument to the Taras Shevchenko, the monument to Lesya Ukrainka, the monument to Gregory Skovoroda and many others.

Kiev is a city of wonderful beauty with rich historical background and quite a number of sights. As it was mentioned Kiev is situated on the banks of the Dnieper. It has some bridges to connect one part of the city with the other. Embankment is a very beautiful place in Kiev.

Kreshchatic is the main street lined with multi-storeyed buildings, shops and department-stores, hotels, restaurants and cafés. It is a wide beautiful modern street.

The cultural life of the city is rich and many-sided. Most of Kiev's state buildings, theatres and educational institutions are in the centre of the city.

The inhabitants of the city must take more care to preserve the famous buildings dating from the ninth to the twelfth centuries, like the St. Sophia's Cathedral, the Kiev-Pechersk Monastery, the Golden Gate, etc.

There are many stadiums, sports grounds, swimming-pools, skating-rinks, cycling tracks, rowing stations, tennis courts, football pitches and other facilities in Kiev.

The city of Kiev has its own University and many institutes for students of various specialities. It is the seat of the Ukrainian Academy of Siences.

COMMENTARY

places of interest достопримечательности
are worth seeing стоит посмотреть
is closely linked тесно связана
at the foot of the monuments у подножия памятников

EXERCISES

I. Define to what part of speech the following words belong:

culture — cultural; history — historic; eternal — eternally; triumph — triumphant; to establish — establishment; to govern — government; beauty — beautiful; nation — national; to liberate — liberator; industry — industrial.

II. Give synonyms for the following words:

large, to call, city, broad, powerful, linked, to free, remember, to happen, battle, fine, apartment.

III. Give antonyms to the following words:

small, old, new, narrow, weak, broken, to forget, to occupy, before, to ruin.

IV. Put questions to the subject of the sentences:

1. Kiev is called the Mother of Russian cities. 2. Both Kiev and the Dnieper are for us symbols of the eternal and indestructible friendship of nations. 3. All the historical life of the Ukraine is closely linked with Kiev. 4. Kiev has especially flourished in Soviet time.

V. Translate the following sentences into Russian:

1. The Shevchenko Museum is devoted to the life and public activity of a great Ukrainian poet and painter, a revolutionary democrat. 2. St. Sophia's Cathedral, an outstanding monument of old Russian architecture in the Ukraine, was built in the first half of the 11th century. 3. The history of Shevchenko Opera Theatre is closely connected with the establishment and progress of Ukrainian musical culture. 4. The Kiev State University was named after Shevchenko in 1939. 5. Kreshchatik, the main street of Kiev was restored in the 1950s. 6. In 1954, on the occasion of the 300th anniversary of the reunification of Russia and the Ukraine, Kiev was awarded the Order of Lenin.

VI. Read and translate the following sentences:

1. Collected in the 17 halls of the Kiev branch of the Central Museum of V. I. Lenin there are numerous exhibits devoted to Lenin's life and work. 2. There are several outstanding mo-

numents of the cultural heritage on the territory of the Kiev-Pechersky Monastery created in the course of nearly nine centuries. 3. Kreshchatik, the main street of Kiev is extremely beautiful and unique, displaying a unity of architecture and wonderful greenery. 4. The heroism and courage displayed by the people of Kiev in the struggle against fascist invaders merited the city the honorary title of Hero City and the Second Order of Lenin. 5. The formation of the USSR in 1922 with Soviet Ukraine being one of the members, opened up infinite opportunities for further progress of economy and culture. 6. Working in creative cooperation with scientists from other fraternal republics, Ukrainian scientists have split the atom, built the first electronic computers, established powder metallurgy, synthetic diamonds and made many other important scientific discoveries. 7. On a high bank overlooking the Dnieper rest the fallen Soviet soldiers, the heroic defenders and liberators of Kiev. 8. A stately obelisk has been erected on the grave of the Unknown Soldier in the centre of the park. 9. However the best monument to the heroes is the memory of generations and the achievements made by the country in the post-war years. 10. The numerous museums of the city are treasuries of interesting monuments of material and spiritual culture, describing not only the past, but also the present life of the Soviet Ukraine.

VII. Translate the following sentences into English using the words from the text:

1. Киев — колыбель истории и культуры трех восточнославянских народов — русского, украинского, белорусского. 2. В памяти Киева живут и революция 1905 года, и бои за становление власти Советов после Великой Октябрьской социалистической революции 1917 года, и героическая борьба против фашистских захватчиков в годы Великой Отечественной войны. 3. Киев — один из самых красивых городов в мире. 4. Киев — город науки и искусства, город многих учебных заведений, город театров и музеев, город развитой промышленности. 5. Киев поддерживает экономические, научные и культурные связи со многими городами различных стран. 6. Киевляне делают все возможное, чтобы превратить Киев в образцовый город.

VIII. Read the following rhyme and learn it by heart:

I have six honest serving men. They taught me all I knew.
Their names are What and Why and When and How and Where and Who.

I send them over land and sea.
I send them East and West. One million Hows, ten million Whys.
And seven million Wheres.

IX. Fill in the blanks with the words «when», «what», «where», «which», «for what»:

1. ... did you arrive in Kiev? 2. ... street is the central one in Kiev? 3. ... are the best monuments in Kiev? 4. ... is your institute situated? 5. ... purpose have you arrived in Kiev?

X. Fill in the blanks with the prepositions «in», «at», «with», «into», «of», «for», «to», «out of», «along» and translate the sentences into Russian:

SIGHTSEEING

1. Two friends . . . mine arrived . . . Kiev . . . the first time . . . their life. 2. I met them . . . the railway station and we went to see the places of interest . . . the capital . . . the Ukraine. 3. First we took the metro and went . . . Khreshchatik Street. 4. When we came . . . the metro we got . . . a very beautiful street. 5. We went . . . the street. 6. Going . . . the street my friends looked . . . fine buildings and wonderful squares . . . admiration. 7. It was . . . summer. There were many flowers everywhere. We enjoyed our walk very much.

XI. Make a short report about your native town.

XII. Make up a dialogue: «My Native Town».

Laboratory Work

Work with the Tape-recorder and Slides

I. Answer the following questions and tape-record your answers:

1. When was the USSR formed? 2. Who put forward the idea to form the USSR, the most multinational state in the world? 3. What territory does the Soviet Union occupy? 4. What is the population of the USSR? 5. What can you say about the climate in our country? 6. What minerals can be found in our country? 7. What industries are developed in the USSR? 8. What is the capital of the Soviet Union? 9. When was the Congress of People's Deputies held? 10. In what Soviet

city was it held? 11. What is the capital of the Soviet Ukraine? 12. What monuments of ancient Russian architecture in Kiev do you know? 13. When did the reunion of Russia and the Ukraine take place? 14. What monuments to national heroes in Kiev do you know? 15. Where is the monument to the founder of the Soviet State V. I. Lenin situated in Kiev? 16. What kinds of industry are being developed in Kiev? 17. What can you say of Kiev as an educational centre? 18. What museums do you know in Kiev? 19. What schools of higher learning are there in Kiev?

II. Listen to the text and retell it.

WHAT IS PHYSICS

Until the end of the eighteenth century, the study of material things was treated as a single aspect of human thought and called natural philosophy. But, as knowledge increased, it was found necessary to divide the study of nature into two main branches, the physical sciences and the biological sciences. The biological sciences deal with living things, while physical sciences are concerned with the properties and behaviour of non-living matters.

The two main physical sciences are physics and chemistry. It is difficult to make a clear-cut distinction between the two, but, broadly speaking chemistry deals with the action of one kind of substance on another while physics is concerned mainly with matters in relation to energy. It is the purpose of this text to explain what we understand by energy, to discribe the various forms it can take and to show how its laws have been investigated. For elementary purpose, the study of physics may be grouped under such headings as mechanics, properties of matters, heat, wave motion, light, magnetism, and electricity, but this list is by no means exhaustive. At a higher level we have particle physics which is concerned with the ultimate partikles of which matter is composed; nuclear physics which deals with atomic nuclei, and plasma physics wich relates to research on the production of energy by processes similar to those believed to be responsible for the sun's energy.

Since it is the most fundamental of sciences, physics finds numerous applications in other fields.

Thus we have those branches of science known as physical chemistry and biophysics. Physics has also come to play an important role in medical and surgical research.

LESSON 12

READING DRILLS

Grammar: Review of tenses.

I. Read the words with the stress on the first syllable:

active, attitude, talent, practice, satellite, magnetism, change, nation, member, method, benefit, winner, system, physics, recent, science, number, progress, modern, launch, foreign, nuclear.

II. Read the words with the stress on the second syllable:

mechanics, explain, obtain, compare, control, compose, perform, belong, direct, elect, event, concern, include, produce, supreme, contribute, initiative.

III. Read the following many-syllable words:

specific, scientific, periodic, organic, economic, prominent, physicist, concentrate, incorporate, investigate, experiment, development, establishment, phenomenon, geology, geography, geometry.

IV. Fluent reading:

the supreme scientific body, has greatly contributed to world science, to meet the country's scientific and technical needs, a prominent physicist and mathematician, made an enormous contribution to science, the law of matter conservation, became a major centre of science, saw certain changes in the structure, the best representatives of Russian science, plans for national economic development.

THE USSR ACADEMY OF SCIENCES

The Academy of Sciences, the supreme scientific body of the Soviet Union, was 250 years old in 1974. The Academy has been very productive in those years and has greatly contributed to world science and culture.

The Russian Academy of Sciences was founded on the initiative of Peter the First in St. Petersburg in 1724. The Academy was established as a state institution intended not only to develop science as such, but also *to meet* the country's scientific and technical *needs*[1] and to promote education.

Right from the start the Russian Academy of Sciences combined research and teaching.

The Academy benefited greatly from the work of scientists such as L. Euler, the creator of modern mathematics and me-

chanics, and D. Bernouilli, a prominent physicist and mathematician.

M. Lomonosov, a Russian scientist of genius, a great thinker and materialist, made an enormous contribution to science. He built Russia's first chemistry laboratory where he studied metal oxides and discovered the law of matter conservation. He worked out the theory of light and electrical phenomena in the atmosphere. The great scientist studied metallurgy, geology and geography. Moscow University, opened in 1755 on Lomonosov's initiative, became a major centre of science and education in our country.

The Petersburg Academy of Sciences became a leading science centre in the 18th century.

The international prestige of the Academy was growing from year to year. It had close contacts with the foreign Academies of Sciences and Universities.

The 19th century saw certain changes in its structure. It dropped its teaching functions *to concentrate on research*[2]. The best representatives of Russian science won recognition everywhere in the world. P. Chebyshev's work opened a new epoch in mathematics.

Lobachevsky discovered the unknown world of non-Euclidean geometry, E. Lenz — the laws of electromagnetism. B. Yacobi invented galvanoplastics, and V. Petrov discovered the voltaic arc. Butlerov worked out the theory of chemical structure which is the basis of modern organic chemistry. Another prominent scientist D. Mendeleyev, discovered the periodic system of chemical elements, which is the foundation of the studying of matter.

After the Great October Socialist Revolution the attitude to science changed. Now science serves the people, the development of science became *a nation-wide concern*[3].

The Academy of Sciences is a centre coordinating and planning scientific research all over the country. Research is concentrated and connected with the state plans for national economic development. Scientists belonging to 60 nationalities have been elected to the Academy. They work in different parts of our vast country.

Speaking about the Soviet scientists we should mention the name of Igor Kurchatov who played an outstanding part in the progress of nuclear physics.

The launching of the first artificial Earth satellite in the history of our civilization on October 4, 1957, marked the beginning of the space era. The achievements in this field are

connected with Academician S. Korolev, a prominent Soviet scientist.

Soviet scientists Basov and Prokhorov developed the world's first laser in 1964. Academicians S. Vavilov, A. Yoffe, L. Landau, I. Pavlov, A. Fersman, S. Chaplygin, O. Shmidt, M. Keldish and many others have made historical contributions to world science.

Over the years of Soviet power science has made all-round progress in every Republic. The establishment of the Siberian department of the USSR Academy of Sciences in 1957 and the Far Eastern and Ural research centres were important events.

The Academy is a member of 130 international scientific organizations, many prominent foreign scientists have been elected to it. A considerable amount of scientific research is carried out in cooperation with foreign scientists.

COMMENTARY

[1] **to meet ... needs** удовлетворять потребности
[2] **to concentrate on research** сосредоточить внимание на научных исследованиях
[3] **a nation-wide concern** всенародным делом

DIALOGUE

A: The Siberian Department of the USSR Academy of Sciences has contributed in many ways to implementing scientific, technical and technological innovations.

B: The impact of Siberia and Far East on the national economy is constantly growing. The state plans for the next five-year period and for the near future envisage accelerated development of regional production forces.

A: Experts of the Siberian Department of the USSR Academy of Sciences together with party and Soviet bodies have elaborated a comprehensive research programme called «Siberia».

B: What are the major tasks of the programme?

A: One of the major tasks of the programme is to transform the region into the key major national fuel and energy base.

B: What does the «Siberia» programme include?

A: The «Siberia» programme includes not only scientific, industrial and ecological aspects, but socio-economic ones as well.

B: Siberia's fuel and energy complex plays an important role in the development of country's economy, doesn't it?

A: Yes, it does. Siberia will be producing three-forths of the nation's oil and gas, more than half of its coal and 18—20 per cent of the country's electricity output. Siberia's industries have been developing at high rates.

B: The «Siberia» programme embraces all aspects of the further development of this vast region of the country.

EXERCISES

I. Define to what part of speech the following words belong: economic, national, academical, peaceful, nuclear, considerable, progressive, establishment, improvement, vibration, investigation, organizer, scientist, scientific.

II. State which words in the left column are synonyms for the words in the right column:

1. research	1. scientific work
2. basic	2. to end
3. to finish	3. fundamental
4. to get	4. to continue
5. to go on	5. to begin
6. to start	6. to obtain
7. prominent	7. famous
8. enormous	8. huge

III. State which words in the right column are antonyms to the words in the left column:

1. before	1. to begin
2. linear	2. fruitful
3. to finish	3. able
4. fruitless	4. to unite
5. unable	5. non-linear
6. to separate	6. after
7. best	7. worse
8. new	8. old

IV. Write English equivalents for the following expressions and use them in the sentences of your own:

центр науки и образования, закон сохранения энергии, тесные контакты, выдающиеся представители науки, ядерная физика, запуск спутников земли, делать вклад в развитие науки, важное событие.

V. Explain the use of tenses in the following sentences and translate the sentences into Russian:

1. Research institutes of the USSR Academy of Sciences obtained valuable results in the study of the processes of control. 2. Scientists have solved many problems of the linear and nonlinear theory of automatic control, and the theory of optimum control systems. 3. Control of vast systems has been computerized and new computers have been developed. 4. The Lomonosov Medal is the Academy's highest award. It is awarded every year to one Soviet and one foreign scientist for outstanding research in the natural and social sciences. 5. Scientists are searching for ways of solving the problem of controlled thermonuclear fusion. 6. Much progress has been made in nuclear power engineering. 7. The Academy has more than 250 scientific institutions, with a staff of 40,000. 8. The first Soviet electronic computer was built in 1952. 9. New and more efficient computers were developed in subsequent years. 10. Research in science knows no end, but it is especially fruitful when scientists are inspired by ideals of social progress and peace. 11. The first atomic clock was developed by Soviet Nobel Prize winners Basov and Prokhorov. 12. The clock improved the accuracy of the time standard 10,000 fold, and provided an interesting discovery, namely that the Earth's rotation slows down in spring and quickens in autumn. 13. When the great number of experiments and researches had been done, the sputnik was launched. 14. The discovery of radioactive substances took place towards the very end of the 19th century. Less than fifty years later, man's mind had developed ways of using nuclear reactions, created atomic piles, and produced radioactive isotopes.

VI. Translate the following sentences into Russian, paying attention to the Modal Verbs with the Passive Infinitive:

1. Metals can be electrified by friction. 2. It is believed that plasma may be used in rockets flying from planet to planet. 3. The robots can be sent out by human beings to distant worlds, they will then return to Earth bringing with them the priceless results of these scientific experiments. 4. A moving body maintains its motion. To be stopped, a moving body must be acted on by some other body. 5. Interesting information may be obtained by observing our planet from the Moon. 6. Water containing salt in solution must be cooled below 0° C to make it freeze. 7. These materials must be classified according to their chemical properties. 8. These machines must be tested in different conditions of loading.

VII. Translate the following sentences into English using verbs in the Passive Voice:

1. Научные достижения связаны с государственными планами развития народного хозяйства. 2. Советские ученые внесли значительный вклад в развитие мировой науки. 3. Большая научная работа проводится в содружестве с зарубежными учеными. 4. Много точных механизмов установлено на борту атомных ледоколов. Работой этих механизмов управляют квалифицированные специалисты. 5. Новые исследования планет солнечной системы будут продолжаться учеными с помощью спутников. 6. Классические работы К. Циолковского о космических полетах были изучены только после Октябрьской революции. 7. Эти научные исследования будут завершены к концу года.

VIII. Translate the following sentences into Russian, paying attention to Passive Constructions:

1. The economic might of Siberia is dependent upon the development of its natural resources. 2. They were informed that great work had been carried out at the plants on introducing automation. 3. These young engineers were given the opportunity to see the work of the new machinery which had been tested in different conditions of loading. 4. When a body is acted upon by powerful outside forces it is broken. 5. In order to stop a moving body it must be acted upon by some other body. 6. The instruments working on board the sputniks can be relied upon because they are very sensitive and accurate. 7. The experiments in laboratories were followed by many other researches and practical work.

IX. Translate the following sentences into Russian, paying attention to the meaning of the words in bold type:

1. Academician Keldysh has done a **complete** analysis of various vibrations occurring in aircraft. 2. They will **complete** these interesting researches and introduce them into practice. 3. The use of different automatic **means** increases the productivity of labour. 4. It **means** that the problem of automation of industrial processes is very important. 5. A man has tried to make his work easier investigating different kinds of machines since old **times**. 6. When these instruments had been tested many **times** they were installed in the laboratory. 7. Man has learnt to use different **forms** of energy and transform one form of energy into another. 8. Freezing water **forms** a hard mass known as ice.

X. Answer the following questions:

1. On whose initiative was the Russian Academy of Sciences founded? 2. What Russian scientists made a great contribution to world science? 3. Is the development of science a nation-wide concern? 4. Is research connected with the state plans for national economic development? 5. What big scientific centres do you know in our country? 6. What outstanding Soviet scientists do you know? 7. Do our scientists cooperate with foreign scientists in scientific research? Give some examples of such cooperation.

XI. Make a plan of the text.

XII. Retell the text according to your plan.

LESSON 13

Grammar: Direct and indirect speech. Sequence of tenses.

READING DRILLS

I. Read the words with the stress on the first syllable:

flexible, second, method, evident, language, native, labour, vivid, issue, foreign, knowledge, German, publish, Russian.

II. Read the words with the stress on the second syllable:

effect, collect, accept, express, remain, explain, exchange, arrange, surprise, acquire.

III. Read many-syllable words:

classical, dictionary, influence, policy, practical, vocabulary, significant, inexhaustible, representative, theoretical.

IV. Fluent reading:

learning foreign languages, to supply him with dictionaries, to master English pronunciation, eighteen issues of the Iskra, the very important concepts of Marxism, with faith in the inexhaustible power of the people, the library of the British Museum.

LENIN ON FOREIGN LANGUAGE STUDY

Lenin knew many foreign languages. He knew German, French and English well, studied them and translated from them. He read in Polish and Italian. He could pick up a dictionary and study it «for recreation» for hours.

Learning foreign languages *makes one's use of native tongue richer*[1], more vivid, flexible and expressive. Those who have studied Lenin's vocabulary know how rich and expressive it was.

What languages did Lenin learn at school? He graduated from so-called classical secondary school where the pupils studied Russian, Old Slav, Latin, Greek, French and German — altogether six: three living and three dead languages.

When Vladimir Ilyich was put in jail, in January 1896, he asked his sister Anna to supply him with dictionaries to improve his knowledge in foreign languages.

He recommended the method of «both ways» translation — first to do a written translation from the foreign language into Russian, then to translate it back from Russian into the foreign language. Lenin wrote that it was the most rational way of learning a language.

When Lenin and Krupskaya came to London they started to master English pronunciation little by little visiting meetings where they listened to speeches in English.

At present there is a tremendous urge to learn foreign languages[2] in our country. That's why the way Lenin used to study them is of special interest.

COMMENTARY

[1] **makes one's use of native tongue richer** обогащает родной язык
[2] **at present there is a tremendous urge to learn foreign languages** в наше время существует большое стремление к изучению иностранных языков

LENIN IN LONDON

(After N. K. Krupskaya)

V. I. Lenin and N. K. Krupskaya came to London from Munich. In 1902 it had become evident that it was no longer possible to publish the Iskra in Munich which had done so much to build up the Party. A new place had to be found and London was chosen.

Friends helped them to find *a temporary flat in one of the furnished «bedrooms»*[1]. *They rented two small rooms*[2] in the workers' district of Finsbury.

Lenin made a thorough study of the life of British workers, the labour movement, the policy, science and culture of the country.

Krupskaya wrote that he studied «the living London». Lenin went everywhere where workers gathered, listened to the

speakers in Hyde Park. Lenin, wishing to be closer to the working class, accepted an invitation *to conduct classes*[3] with a group of Russian emigrant-workers in London. The topic was the draft programme of the Russian Social Democratic Labour Party.

In 1902 and 1903 Lenin addressed workers in White Chapel, a working-class district. He spoke at the club of English workers in 107 Charlotte Street, attended meetings of the Irish who fought for the freedom and independence of the «Green Island».

On his arrival in London V. I. Lenin quickly arranged the printing of the *Iskra* in London.

The London period of Lenin's work was very fruitful. Lenin worked vigorously for the creation of a party of a new type. In London during 1902—1903 Lenin produced eighteen issues of the Iskra. Here in the library of the British Museum he wrote the pamphlet «To the Rural Poor» in which he developed the very important concepts of Marxism on the alliance of the working class and peasantry, on the development of the bourgeois-democratic revolution into a socialist revolution, on the hegemony of the proletariat, and many other important articles.

Lenin and his comrades-in-arms came to the Second Congress of the Party in July-August 1903 with faith in an inexhaustible power of the people and of its finest representatives.

When the Congress moved from Brussels to London, the first meeting was held at the British workers club in 107 Charlotte Street, in the city centre, a short distance from the British Museum.

The third time V. I. Lenin lived in London was during the work of the Third Congress of the RSDLP in April-May 1905.

The fourth time Lenin came to London was in April-June 1907 when the Fifth Congress of the Russian Social Democratic Labour Party met in London.

Lenin's last visit to London was in 1908 when he wrote his famous book «Materialism and Empirio-Criticism». Writing this work Lenin worked in the library of the British Museum.

COMMENTARY

[1] **a temporary flat in one of the furnished bedrooms** временная квартира в меблированных комнатах

[2] **they rented two small rooms** они снимали две маленькие комнаты

[3] **to conduct classes** проводить занятия

EXERCISES

I. Give synonyms for the following words:

to study, to get, to finish, to begin, to hear, to fight, to wish, to attend, big, work.

II. Make sentences using the following expressions:

no longer possible, the first impression, a thorough study, the labour movement, to accept an invitation, the creation of a party, to rent the rooms, the alliance of the working class and peasantry, an inexhaustible power of the people, a short distance from the centre of the city, to master pronunciation, a practical knowledge of English, the method of «both ways» translation.

III. Translate the following sentences into English using the words from the text:

1. В. И. Ленин знал несколько иностранных языков. 2. В. И. Ленин свободно говорил на английском, немецком и французском языках, он читал на польском и итальянском языках. 3. Изучение иностранного языка обогащает родной язык, он становится более ярким и выразительным. 4. В. И. Ленин принимал активное участие в международном рабочем движении. 5. В. И. Ленин изучал жизнь британских рабочих, рабочее движение, политику, науку и культуру Великобритании. 6. Приехав в Лондон, В. И. Ленин организовал выпуск газеты «Искра». 7. Газета «Искра» сыграла огромную роль в создании Партии.

IV. Translate the following sentences into Russian:

1. The librarian explained that the Lenin State Library in Moscow included the collection of Lenin's works. 2. Then he added that all library books might be borrowed with the exception of extremely rare editions. 3. The most precious volums are given out to be read in special rooms, where the temperature and humidity are carefully controlled. 4. It is known that mathematical analysis is an important division of higher mathematics. 5. It was stressed that mathematical methods were penetrating deeply into different sciences and economics.

V. Transform the sentences from direct into indirect speech:

1. The engineer explained to us, «In the age of scientific and technological revolution, power supply is one of the primary factors of progress». 2. The engineer asked, «What branch of radio engineering are you interested in?». 3. He asked me, «Do you know who launched Europe's first cyclotron?» 4. It

was informed, «A new space sputnik has been launched in the USSR». 5. The reporter stressed, «There has been a great progress in astronomy and astrophysics in our country». 6. He answered, «This work is very interesting but it will take much time».

VI. Transform these sentences into indirect questions using the words given in brackets:

> *Pattern:* Do your scientists work at that problem? (Can you tell) Can you tell us whether your scientists work at that problem?

1. Do your scientists work at the solution of the main problem of nuclear power production? (Can you tell). 2. How big is the Moon? (Do you know). 3. Where is the radiant energy used? (Please tell me). 4. What natural resources have been discovered in Siberia? (Do you know). 5. Will Western Siberia become the biggest source of oil supply in the country? (Can you tell).

VII. Explain the use of tenses in the following sentences and translate the sentences into Russian:

1. Lenin was still quite a young man when he realized that the working class was the most revolutionary class of all, and was the class that would lead the struggle against the old system. 2. The scientists stated that the Soviet Union had adopted the general line of exploring outer space by means of orbital stations and automatic probes for studying the Moon and the planets of the Solar System. 3. Lomonosov said that the might of Russia would be increased by using natural resources of Siberia. 4. It was reported that a huge work had been done before they obtained these results. 5. We learnt that electronic computers had become reliable assistants of economists, researchers and engineers. 6. The newspapers reported that the regular launching of space vehicles had made it possible to extend our knowledge of the physics of near-Earth space, and get a better understanding of the numerous phenomena taking place in the neighbourhood of the Earth and the interactions of these regions with the phenomena of the Sun. 7. It was found that quantum generators could focus light in extremely narrow beams. 8. It was noticed that with the increasing use of atomic energy for peaceful purposes the demand for uranium would grow from year to year.

VIII. Translate the following sentences into Russian:

1. We know that mathematical analysis is an important division of higher mathematics. 2. He said that he was solving an interesting problem. 3. The lecturer said that the classification of mathematics into «elementary» and «higher» was rather conventional and had no exact criteria. 4. Mechanics and hydrostatics deals with measurements, force, weight and friction, work, energy and power, pressure in liquids and gases, and so on. 5. It is known that for measuring the diameter of a piece of wire and similar small distances, a micrometer screw gauge is used. 6. We know that mathematical analysis is one of the most important divisions of higher mathematics. 7. It was assumed that atom had the shape of a sphere. 8. It is well-known that the two main physical sciences are physics and chemistry.

IX. Translate the sentences into Russian; paying attention to the words in the Possesive Case:

1. Today's newspapers inform about the life and work of cosmonauts on orbit. 2. The Mono's surface is studied by means of different sputnicks and automatic vehicles. 3. Mendeleyev's contribution to chemical science is tremendows. 4. Students' works are regularly checked by theachers. 5. They spent a month's holiday in mountains. 6. We covered two miles distance in an hour. 7. Science has become the main source of the world's progress.

X. Answer the following questions:

1. How many languages did Lenin know? 2. How did Lenin study foreign languages? What methods did he use? 3. What was Lenin's and Krupskaya's first impression of London? 4. What was Lenin's aim when he came to London in 1902? 5. What works did Lenin write in London? 6. How many times did Lenin visit London?

XI. Make a report on the topic «Lenin on Foreign Language Study».

XII. Retell the text «Lenin in London».

LESSON 14

Grammar: Types of subordinate clauses.

READING DRILLS

I. Read the following words:

peace, teacher, team, sea, feat, feast; head, heavy, ready, weather; round, proud, without; down, how, town; snow,

show, window; main, rain, brain, train; kind, mind, find, blind.

II. Read the following groups of words of the same root:

to electrify — electrification — electric —electrician — electricity; to develop — development — developed —undeveloped; to create — creative — creation; to generate —generator — generation; to interrupt — interruption — interrupted — uninterrupted; to produce — product — production — productive — productivity.

III. Fluent reading:

powerful technical installations, scientifically grounded nation-wide programme,material foundations of socialism, strengthening the defence potential of the country, mapped out measures, to develop light industry, magnificent scientific and engineering achievement.

LENIN'S PLAN FOR THE ELECTRIFICATION OF RUSSIA

«If Russia is covered with dense network of electric power stations and powerful technical installations, our communist economic development will become a model for future socialist Europe and Asia», said Lenin at the 8th All-Russian Congress of Soviets, which discussed the «Plan for the Electrification of Russia».

The significance of the GOELRO Plan lies, above all, in that it was the first ever scientifically grounded nation-wide programme for the building up of the new material foundations of socialism.

Some 200 outstanding scientists,engineers and economists took part in compiling the «Plan for the Electrification of Russia» which was calculated over a period of 10—15 years.

It envisaged the creation of large-scale Soviet heavy industry, which was to form the basis for the development of the economy and for strengthening the defence potential of the country and mapped out measures to develop light industry.

The production of fuel and metals and the development of machine building, which were extremely necessary for modern manufacture, occupied a special place in the Plan.

Lenin highly appraised the GOELRO Plan. Making the report on the work of the Council of Peoples' Commissars at the 8th All-Russian Congress of Soviets, he called the Plan the second programme of the Party. «Communism is Soviet power plus the electrification of the whole country».

The assignments of the GOELRO Plan were exceeded in all its aspects[1] in the first five-year plan. The district power stations reached their planned capacity in 1931. The Dnieper Hydroelectric Station, named after Lenin, is a magnificent scientific and engineering achievement even by modern standards.

The Soviet state ensures the uninterrupted growth in electricity production by building thermal, hydro-and atomic power stations. Electric power is supplied to all areas in the country. Special attention is paid to the development of the power engineering and electrical-engineering industries — the technical basis of electrification.

The Bratsk and Krasnoyarsk hydroelectric power stations became *a launching point*[2] for the industrial attack on East Siberia. They were joined by other stations. Today Siberia is «flooded» with electricity. Many millions of kilometres of high-tension transmission lines have been built over the vast expanses of our land.

The Sayano-Shushenskaya Hydropower Station on the Yenisey is one of the world's biggest power plants. The Ust-Ilimsk Hydroelectric Power Station — among the world's biggest — transmits the electricity from the Soviet East to the Siberian unified electric power system.

COMMENTARY

[1] **the assignments of the GOELRO Plan were exceeded in all its aspects** задания плана ГОЭЛРО были перевыполнены по всем параметрам
[2] **a launching point** отправная точка

DIALOGUE

Q. Why did Lenin consider the GOELRO Plan to be of great importance for Russia?

A. The founder of the Soviet state regarded electrification as one of the two main requisites for the building of a new society. That is why the young republic drew up the State Plan for the Electrification of Russia in 1920 when the Civil War and the battle against foreign armed intervention continued.

Q. What was the main aim of the GOELRO Plan?

A. The three main principles underlying the GOELRO Plan were: construction of big district power plants, construc-

tion of transmission lines to link up plants into grids; all-round utilization of local fuel and of water power resources.

Q. How much was the country's power output to increase?

A. Under the programme the country's power output was to increase to 8,800 million kwh a year. But the GOELRO Plan was actually completed in 1931, four years ahead of time.

Q. What are power capacities in the Soviet Union now?

A. Installed power capacities in the Soviet Union are today over 100 times greater than half a century ago when the plan was adopted. We now produce nearly four times as much electricity per a single day as for the whole of 1921. However, the main GOELRO principles continue to underlie the expansion of our power industry. We are building the largest thermal and hydroelectric power stations in the world.

A. The Krasnoyarsk Hydroelectric Power Station in Siberia has turbines of 500,000 kw. Turbine generator units of 300,000, 500,000 and 800,000 kw have been developed for thermal plants. The next stage will be a generating unit of 1,200,000 kw. That is, with as big a capacity as that of all pre-revolutionary Russia's power stations put together.

A. Siberia has emerged as a major power producer which generates the cheapest electricity in the world.This will make it possible to employ electrical technology on a still wider scale in the economy, to accelerate mechanization and automation of production, and to raise even more the power consumption per worker in industry and agriculture. All this will create more favourable conditions for the life and work of the Soviet people.

EXERCISES

I. Find in the text nouns corresponding to the following words, translate them into Russian:

to install, to develop,to create, to strengthen, to defend, to measure, to manufacture, technical, to operate, planned, electrical, industrial, basic, product.

II. Find in the text adjectives corresponding to the following words and translate them into Russian:

power, significance, creation, economy, production, importance, electricity, agriculture, atom, density.

III. Write verbs corresponding to the following words, translate them into Russian:

calculation, creation, electrification, defence, measure, construction, production, name, growth.

IV. Translate the following groups of words of the same root:

electric — electrical — electrify — electrification; to expand — expansion; to produce — product — production; to create — creative — creation; to measure — measure — measurement — measurable; special — specialist — speciality — specially; to generate — generator — generation; to define — definition — definite — definitely — indefinitely.

V. Find in the text subordinate clauses and state their types.

VI. Translate the following sentences into English:

1. Советский Союз покрыт густой сетью электростанций. 2. Ленинский план электрификации страны — первая научно обоснованная общенародная программа построения материальной базы социализма. 3. Электрификация способствовала развитию тяжелой промышленности и оборонного потенциала страны. 4. Огромное внимание уделяется строительству электростанций в Сибири. 5. Советский Союз занимает ведущее место в Европе по выработке электроэнергии. 6. Электроэнергия поступает в самые отдаленные уголки нашей страны.

VII. State the types of the subordinate clauses:

1. The task which faces us now is to increase many times the capacity of the power plants and the production of electric and thermal power. 2. Many new buildings were built in this village. The farmers have their own club, where they may go in the evenings to see wide-screen films, listen to interesting lectures or watch performances. 3. One of the biggest rooms in the club is a museum which is dedicated to the revolutionary wartime and labour feats of the local people. 4. Soviet foreign policy which ensures favourable conditions for constructive work in our country is based upon the Leninist principles of peaceful coexistence of countries with different economic systems. 5. The problem which greatly interested world science was how construction of manned orbital scientific stations would be performed. 6. That space research is a powerful factor for technological progress providing rich experimental material for all the scientists studying the Earth and the Universe is a well-known fact. 7. The thing

that drew the attention of scientists was that building large orbital stations is of great importance and demands considerable preparatory work and complex experiments. 8. It has been noticed that the climate in the northern areas of our planet is growing warmer.

VIII. Transform the sentences from direct into indirect speech, pay attention to the use of tense-forms of the verb:

1. The monitor said, «Our group will take part in the work of the conference». 2. The reporter informed, «The workers of the plant have overfulfilled the plan». 3. The student said to the teacher, «We are ready to start our work». 4. She asked, «Where will you spend your holiday?». 5. She said to us, «The plan was worked at and discussed by the workers».

IX. Define what conjunctions can be inserted in the following joined clauses:

1. Soviet scientists discovered some polymers possessed truly remarkable properties. 2. Modern research in the atom indicated under certain conditions matter itself may be transformed into energy. 3. It is well known an atom of hydrogen consists of a positive nucleus — the proton and a negative electron. 4. The newspapers reported the first automatic apparatus had finished its work on the Moon's surface. 5. They cannot define the properties of the material we choose for the construction. 6. The teacher says he will give consultation to the students during their practical work. 7. Scientists have calculated the internal temperature of the Sun is about 9,000,000 F.

X. State the functions of the words in bold type, translate each sentence into Russian:

1. **That** the Soviet Union took the first place in Europe for the scope of electric power production is a well-known fact. 2. It was after long experiments **that** scientists had discovered **that** man could withstand weightlessness for a long time without suffering any essential disorders. 3. It is a well-known fact **that** when a single coil rotates at a constant speed in a uniform field, an alternating emf is generated. 4. Some of the best colleges have already set excellent examples of **how** to introduce active research into a teaching process. 5. **How** Lunokhod-1 worked on the Moon's surface was published in press. 6. Scientists did not know for a long time **how** to observe the other side of the Moon hidden from man's view. 7. **What** was done and **what** results were obtained remained unknown for us for a long time. But **when** the data accumulated had been processed the results were published. 8. They asked

the scientist what the programme of his further researches was. 9. What we know an electric current is a flow of electrons.

XI. Translate the following sentences into English:

1. Ученые многих стран работают над проблемой использования атомной энергии в мирных целях. 2. В Советском Союзе есть атомный центр Дубна, где работают выдающиеся ученые многих стран. 3. В нашей стране уделяется большое внимание использованию энергии рек и строительству гидроэлектростанций. 4. Использование запасов газа, открытых в Западной Сибири, имеет большое значение для экономики страны. 5. Успехи, достигнутые в областях науки и техники, сыграли большую роль в космических исследованиях. 6. Студентам созданы хорошие условия для научно-исследовательской работы. 7. На конференции ученые рассказали, где используют изотопы. 8. О достижениях нашей страны в исследовании космоса много пишут во всем мире.

XII. Answer the following questions:

1. What is the significance of the GOELRO Plan? 2. How many scientists took part in compiling the Plan for the Electrification of Russia? 3. What did Lenin say about the electrification of Russia? 4. What place does our country take in generating energy? 5. Where are new hydroelectric stations built in our country? 6. What is the capacity of the largest hydroelectric stations in our country?

XIII. Ask questions on the text and answer them.

XIV. Retell the text.

LESSON 15

Grammar: Attributive clauses.

READING DRILLS

I. Read the words with the stress on the first syllable:

ancient, cover, margin, special, section, friend, brilliant, scholar, volume, novel, problem, portrait, also, author.

II. Read the words with the stress on the second syllable:

contain, available, compare, affair, repeat, museum, compile, adviser, develop, development, concern.

III. Read many-syllable words:

national, personal, century, democrat, prominent, library, theory, history, economy, philosophy, philosopher, imperialism, capitalism, permission, political, edition, fiction, attention, relation.

LENIN'S PERSONAL LIBRARY IN THE KREMLIN

Lenin loved books, he read much and studied all his life. He liked to repeat Marx's words: «Books are my slaves but they are also my best friends».

Lenin was not only a politician and revolutionary but a scholar. In writing his books he referred to a vast number of books, checking and comparing facts. Before the revolution he *made good use of*[1] public libraries. He worked in the Library of the British Museum, the French National Library and libraries of Copenhagen, Geneva and Bern. Lenin often requested permission to work in private libraries as well.

After the October revolution he continued to develop theories which concerned the building of socialism in our country and the world communist movement, and was in need of economic and political literature. Lenin himself compiled the first list of books he needed and they later filled two bookcases in his office. By 1920 his personal library had so expanded that a special room had to be found for it.

There are 88 sections in Lenin's library which cover different fields of knowledge.

There are almost 200 volumes of Marx and Engels, Lenin's constant advisers and companions.

The biggest sections of the library are devoted to philosophy, sociology and religion.

There are marginal remarks in red and blue pencil which Lenin made in some books.

The library also contains all the available material on the history of the Communist Party. Moreover, there are books about Party work and the life and work of prominent Party members.

There are about 200 Russian history books in the library as Lenin *devoted much attention to*[2] the history of social relations in Russia. Lenin, who brilliantly characterized imperialism as the highest stage of capitalism and did much fruitful work on the problems of Russia's economic and political development, was highly competent in economics and political economy and was an expert in international affairs. It is not surprising, therefore, that the sections of the library devoted to these subjects are extensive.

Two book-cases in Lenin's office are filled with fiction — Lermontov, Pushkin, Chekhov, Lev Tolstoi and Turgenev, the now rare editions of the novels by Dostoevsky and Gorky; the poems by Fet, books by Griboedov and works by Russian revolutionary democrats, Chernyshevsky among them.

Among foreign authors one will find Ibsen, Chinese poets of the 7th — 9th centuries, Schiller, Hoffmann, Homer, Upton Sinclair.

As a rule, Lenin read foreign political books and fiction in the original. Most of his books are in German, English, French and Italian. He also knew Latin, ancient Greek, Czech, Swedish and Polish.

A special section is devoted to the nearly 1,000 books Lenin received as presents from workers, Party functionaries, writers, scientists, publishing houses and comrades.

Every book in the library adds a new facet to the portrait[3] of the great philosopher and revolutionary.

COMMENTARY

[1] made good use of часто пользовался
[2] devoted much attention to уделял большое внимание (*чему-л.*)
[3] every book in the library adds a new facet to the portrait каждая книга в библиотеке дополняет новым штрихом портрет

EXERCISES

I. Translate the following groups of words of the same root:

to permit — permission — permissive; literature — literary — literate — literacy — illiterate — illiteracy; policy — political — politician; to expand — expansion; to measure — measure — measurement — measurable; to accumulate — accumulation; attentive — attention.

II. Find in the text English equivalents for the following words and expressions; make up sentences with these words:

ссылаться на, составить список книг, пометки на полях, уделять внимание, художественная литература, редкие издания, читать в оригинале.

III. State what words in the right column are synonyms for the words in the left column:

1. to request	1. also
2. as well	2. to ask
3. to continue	3. to go on
4. movement	4. to be dedicated to
5. field	5. famous
6. almost	6. labour
7. to be devoted to	7. to obtain
8. prominent	8. nearly
9. work	9. branch
10. to receive	10. motion

IV. Translate the following sentences into English:

1. Ленин был не только политиком и революционером, но и ученым. 2. До революции Ленин пользовался публичными библиотеками Англии, Франции, Германии и Швейцарии. 3. У Ленина была личная библиотека, которая охватывала различные области знаний. 4. В личной библиотеке Ленина 88 отделов. 5. В ней около 200 томов произведений Маркса и Энгельса, постоянных советчиков и спутников Ленина. 6. На полях книг есть пометки, сделанные Лениным. 7. Ленин уделял большое внимание истории социальных отношений в России. 8. Два шкафа в библиотеке Ленина заполнены художественной литературой. 9. Ленин говорил, что книги — это могучая сила.

V. Translate into Russian, paying attention to the meaning of the words in bold type:

1. **One** of the sections in Lenin's library is devoted to fiction. 2. **One** can see marginal remarks in red and blue pencil made by Lenin in some books. 3. Lenin read foreign books in the original **because** he knew foreign languages. 4. **Because of** his knowing several foreign languages he could read many foreign books and magazines in the original. 5. We must accumulate knowledge **in order** to become highly qualified specialists. 6. He always keeps his books **in order** in a book-case.

VI. Translate the following sentences into Russian, paying attention to the sequence of tenses:

1. Lunacharsky recollected Lenin's words that books were a mighty force and that as a result of the revolution more and more people would be drawn to them. 2. Lenin said that books had to be made accessible to the masses as soon as possible. 3. Lenin repeated Marx's words that books were his slaves and added that they also were his best friends. 4. Lenin devoted much attention to the public libraries. He said that they had to be spread all over Russia in the greatest possible number. 5. V. Stasov and other progressives working in the Saltykov-Shchedrin Library went on carefully adding to the stock of materials from the Russian free press. They knew that the time would come when what was once forbidden would be spoken in full voice.

VII. Translate into Russian and state the type of the subordinate clauses:

1. Lenin always looked for and found opportunities to make use of libraries. This was so important to him that his opinion of a town was often formed on the basis of how good the library was. 2. In the article, entitled «What Can Be Done

for National Education», which he wrote in 1913, Lenin stressed that «the pride and glory of a public library should be seen not in the number of rare books it has..., but in the scope of book circulation among the people, the number of new readers. 3. An extensive network of evening schools for young workers and farmers has been set up in the Soviet Union, where many thousands of people are able to raise the level of their general education while at work. 4. The house where Vladimir Ilyich was born is now a museum. 5. Everyone who is acquainted with Lenin's biography can understand how much he has done to realize his ideas concerning the social reconstruction.

VIII. Find attributive clauses in the text and translate them.

IX. Put questions to the main parts of the sentences:

1. The distinguishing feature of Soviet libraries is their multinational character. 2. They play an important part in the exchange of cultural values among the various peoples and contribute to the mutual spiritual enrichment of socialist nations. 3. Each of our republics participates in the work of organizing library services.

X. Answer the following questions:

1. What did Lenin say about books? 2. In what European libraries did Lenin work? 3. What are the biggest sections of Lenin's library devoted to? 4. Why are the books devoted to economics and political economy widely represented in Lenin's library? 5. What was Lenin's attitude to libraries? 6. How did Lenin appreciate libraries? 7. What did Lenin say about the role of libraries in the life of people? 8. Name the largest libraries in the Soviet Union.

XI. Make short reports about the USSR Lenin State Library.

Laboratory Work

Work with the Tape-recorder

I. Listen to the text and say what the text is about:

THE ROLE OF MATHEMATICS AND MATHEMATICAL ANALYSIS

In mathematics and, in particular, in mathematical analysis practical work and observation of nature are, as in other sciences, the main source of scientific discoveries. In their

turn, mathematical methods play a very important role in natural sciences and engineering. Mathematical methods lie in the foundation of physics, mechanics, engineering and other natural sciences. For all of them mathematics is a powerful theoretical and practical tool without which no scientific calculation and no engineering and technology are possible. Mathematical analysis which treats of variables and functional relationships between them is particularly important since the laws of physics, mechanics, chemistry, etc. are expressed as such relationships.

An important feature of the application of mathematics to other sciences is that in enables us to make scientific predictions, that is to draw, on the basis of logic and with the aid of mathematical methods, correct conclusions whose agreement with reality is then confirmed by experience, experiment and practice. Here is one remarkable example illustrating what has been said.

As is known, the modern science of aviation was created by the famous Russian scientist Professor N. E. Jukovsky (1847—1921). He derived by means of mathematical methods certain formulas and laws which enabled him to predict the possibility of aerobatics, and, in particular, of looping the loop. Soon the loop was performed by the Russian pilot, captain P. N. Nesterov. The possibility of looping the loop was discovered mathematically before it was realized physically.

In recent years the role of mathematics has still increased especially in connection with the appearance of modern high-speed electronic computers. Realization of space flights, launching rockets to other planets and establishing radio and television communication with them require extremely complicated and precise mathematical calculations which cannot be performed without computers. Mathematical methods are penetrating deeply even into such traditionally «non-mathematical» sciences as economics, biology, medicine, etc. It can be said that no modern scientific and technical project can be realized without mathematics and its methods.

LESSON 16

Grammar: Conditional clauses.
Asyndetic clauses.
Should, would.

READING DRILLS

I. Read the words with the stress on the first syllable:

atom, matter, distant, pulse, also, heavy, talent, whole, solar, system, physics, motion, moving.

II. Read the words with the stress on the second syllable:

equipment, idea, observe, observer, declare, electron, award, atomic, surprise.

III. Read many-syllable words:

theory, energy, tragedy, century, academy, absolute, relative, telescope, quantity, relativity, universe, circumstance.

IV. Memorize the pronunciation of the following words.

earth [ə:θ], weight [weɪt], bomb [bɒm], Albert Einstein ['ælbət 'aɪnstaɪn].

ALBERT EINSTEIN
(1879 — 1955)

V. I. Lenin called Einstein one of the «great reformers of natural science».

Russian scientists highly appreciated Einstein's contribution to physics and mathematics. In 1922 he was elected foreign member of the Russian Academy of Sciences for his outstanding scientific merits. In 1927 Einstein was elected *honorary member*[1] of the USSR Academy of Sciences. A fundamental four-volume collection of Einstein's research papers was published in the Soviet Union in 1965—1967.

His Theory was published in 1905. Einstein declared there was nothing absolutely *at rest*[2] on the Earth or anywhere in the whole Universe. Everything is *in motion*[3] from atoms to stars.

When one is on a moving train, the seats and passengers *appear to be stationary*[4] while the trees appear to fly past the windows. A boy standing near the railway sees the train flying by while the trees stand motionless. As the train speeds on, the Earth goes round the Sun.

At the same time[5], the Earth, the Sun and the whole Solar System move together in the direction of a distant star. If a man could stand on the Sun and look through a telescope, he would see the Earth and the train moving below.

Another observer on the nearest star, which is so far that *it takes four years for its light to reach us*[6], would four years later see the Sun, the Earth and the moving train flying along together through space. All these motions of the train, the Earth and the Sun are relative to the position of the observer. In such a Universe, where all is in motion and nothing fixed, everything is «relative», depending on the circumstances under which it is observed. In this changing Universe only light always has the same speed. And more: the speed of light is the only constant quality.

And what about[7] *relativity of time*? Newton had taught time was absolute. The world changes but time goes on and on unchanged. Einstein gives us a new picture. Time and space change relative to the position and speed of the observer. If we could travel with a speed close to the speed of light our clocks would slow down and show time different from the time on the Earth. Not only clocks, but also our pulses, even the electrons inside the atom would move slower and slower.

The mass or weight of a body also depends on how fast the body is moving. As it moves faster and faster, it grows heavier and heavier.

Einstein gave an entirely new idea of the world we live in. *All over the world*[8] scientists read the work with great surprise. In those days Einstein was an unknown patent office clerk in Bern. His fame grew *slowly but surely*[9]. He was invited to work as a professor first in Prague and then in Zurich. In 1913 he was invited to the Academy of Sciences in Berlin. For his great contribution to theoretical physics he was awarded the Nobel Prize in 1921.

In 1933 Hitler became dictator of Germany. Einstein's house was destroyed. His books on relativity were burnt in the streets, but at that time Einstein was already in America, where he lived for 22 years, *that is*[10], the rest of his lifetime. His statement that energy can be turned into matter, and *vice versa*[11] opened the way for research on atomic energy. Einstein took part in the construction of the most terrible weapon — atomic bomb. When the war was practically over, atomic bombs were dropped on Japan. Many scientists, including Einstein, felt responsible for the tragedy and protested against the use of atomic energy for destruction.

Einstein was a talented man, a great thinker. His ideas completely changed physics and produced a revolution in natural science of the twentieth century.

COMMENTARY

[1] **honorary member** почетный член
[2] **at rest** в состоянии покоя
[3] **in motion** в движении
[4] **appear to be stationary** кажутся неподвижными
[5] **at the same time** в то же время
[6] **it takes four years for its light to reach us** ее свет достигнет нас спустя четыре года
[7] **and what about ...** а как же об ...
[8] **all over the world** во всем мире
[9] **slowly but surely** медленно, но уверенно
[10] **that is** то есть
[11] **vice versa** наоборот

EXERCISES

I. Translate into Russian the following groups of words of the same root:

to test — test; to equip — equipment; to use — use — useful — useless — usefulness; motion — motionless; to observe — observer — observatory; to change — change — changeable; to weigh — weight; to discover — discoverer discovery.

II. Group up the words with the same meaning (synonyms):

to use, whole, movement, speed, distant, to utilize, entire far, close, all over the world, motion, velocity, near, all over the globe, to receive, to turn into, completely, to get, to transform into, entirely, to be stationary, to be fixed.

III. Group up the words that are contrary in meaning (antonyms):

distant, below, changed, inside, to be in motion, near, above, outside, slow, heavy, to open, unchanged, to be fixed, fast, known, first, light, unknown, to close, then.

IV. Translate into English the following groups of words, make up sentences with these words:

находиться в состоянии покоя, быть в движении, в то же время, зависеть от, быть избранным почетным членом, во всем мире, вносить вклад в..., получить Нобелевскую премию, принимать участие.

V. Translate into English using the words from the text:

1. Эйнштейн утверждал, что и на Земле, и во Вселенной ничто не находится в состоянии абсолютного покоя. 2. Все движется — от атомов до звезд. 3. В то же время вся Солнечная система движется в направлении далекой звезды. 4. Самая близкая звезда находится так далеко, что ее свет доходит до нас только через четыре года. 5. Масса и вес

тела зависит от того, с какой скоростью движется тело. 6. Только свет имеет постоянную скорость.

VI. Translate the following sentences into Russian, paying attention to the meaning of the words in bold type:

1. Einstein's **only** equipment for working out his theories was his fountain-pen. The speed of light is the **only** constant quality. He tested his ideas **only** with more thinking. 2. When **one** is on a moving train, the seats and passengers appear to be stationary while the trees appear to fly past the windows. **One** must always remember about the theory of relativity. **One** thing must always be remembered: atomic energy should be used only for peaceful purposes, for it is extremely dangerous if it falls into criminal hands. 3. **As** the train speeds on, the Earth goes round the Sun. He was invited to work **as** a professor first in Prague and then in Zurich. Einstein was awarded a Nobel Prize not **as** a discoverer of relativity. 4. He received his award **for** physics. Many scientists felt responsible **for** the tragedy in Japan and protested against the use of atomic energy **for** destruction. Scientists worked at this problem **for** many years. In America Einstein lived **for** 22 years, that is, the rest of his lifetime.

VII. Define the parts of asyndetic clauses, translate the sentences into Russian:

1. We know Einstein published his Theory in 1905. 2. He declared there was nothing absolutely at rest on the Earth or anywhere in the whole Universe. 3. It is known everything is in motion from atoms to stars. 4. The only equipment he used for working out his theories was his fountain-pen. 5. Einstein gave an entirely new idea of the world we live in. 6. We know everything is relative, depending on the circumstances under which it is observed. 7. Newton had taught time was absolute. 8. Einstein says time and space change relative to the position and speed of the observer. 9. Most of the energy we use comes from below the ground in the form of coal, oil and gas. 10. The number of electrons the cathode emits par second depends on its temperature and on the material the cathode is made of. 11. The poles of the steel needle are opposite to the poles of the magnet they were in contact with. 12. Faraday made notes of everything he heard, bound these notebooks himself and kept them all his life.

VIII. State the type of the conditional clauses; translate the sentences into Russian:

1. If one is on a moving train, the seats and passengers appear to be stationary while the trees appear to fly past the

windows. 2. If one stands near the railway he sees the train flying by while the trees stand motionless. 3. If a man could stand on the Sun and look through a telescope, he would see the Earth and the train moving below. 4. Could a man stand on the nearest star, he would see the Sun, the Earth and the moving train flying along together. 5. If we could travel with speed close to the speed of light, our clocks would slow down and show time different from the time on the Earth. 6. If it were so, that is, if we could travel with a speed close to the speed of light, our pulses would move slower and slower. 7. If a current is run through a copper wire around a piece of iron, the iron becomes a magnet. 8. Had he not used this method, he wouldn't have got good results. 9. All bodies will remain at rest unless they are moved by a force.

IX. Translate the following sentences into Russian:

1. If a solid body is heated, it expands. 2. If a body is exposed to the sun, it absorbs heat. 3. If computers were not used, many important problems could not be solved. 4. The work will not be completed unless you sum up the results. 5. It would be impossible to make precise measurements in case you did not use his new invention. 6. They would start the experiment in case they got all the necessary equipment. 7. Had you followed his instructions, the experiment would have been a success. 8. Had the microscope been powerful enough, it would be possible to observe the tiniest particles. 9. You will not be able to solve this problem unless you join the research team. 10. Had the measurements been more accurate, they would have provided the desired information. 11. He would get better results provided he applied a new method.

X. Use the necessary form of the verb instead of the Infinitive; use inversion where possible:

1. If it (to be) cold, we put on warm clothes. 2. If the weather (to be) fine, we shall go for a walk. 3. He will come to you unless he (to be) busy. 4. If he (to be) familiar with this problem, he would solve it. 5. If there (to be) no light waves the cosmic cold would freeze everything. 6. If all energy consumed by human beings (to be increased) 30 times over, that would make only one thousandth of the total energy that the Sun supplies free of charge. 7. The air (to be) unsuitable for breathing if it does not contain enough oxygen. 8. The air would be unsuitable for breathing in case it (to be purified) by plants. 9. He would have made his report if he (to have), the necessary data.

XI. Translate into Russian, pay attention to «should» and «would»:

1. I said that I should do this work to morrow. 2. We knew that he would make a report at the conference. 3. You should pay much attention to your work. 4. You should have paid much more attention to this experiment, it is not done as it should be. 5. If I had enough data, I should make an interesting report. 6. Had he known about our experiment before, he would have helped us. 7. If there were not enough oxygen in the air, it would be unsuitable for breathing. 8. I would like to listen to his reading.

XII. Find Verbals in the following sentences, translate the sentences into Russian:

1. Einstein had no laboratory for testing his theory. 2. He used his fountain-pen for working out his theories. 3. When one is on a moving train, one thinks the seats and passengers are stationary. 4. A boy standing near the railway sees the train flying by while the trees stand motionless. 5. A man standing on the Sun would see the Earth and the train moving below. 6. In this changing Universe only light always has the same speed. 7. We know the speed of light being the only constant quality. 8. We know that the body moving faster and faster grows heavier and heavier.

XIII. Answer the following questions:

1. When was Albert Einstein born? 2. When did he die? 3. When was his Theory published? 4. What is the core of the theory of relativity? 5. What is the only constant quality in this changing Universe? 6. What did Newton say about time? 7. And what did Einstein say? 8. When was he awarded the Nobel Prize? 9. What did he receive his award for? 10. What statement of Einstein opened the way for research on atomic energy? 11. Did he protest against the use of atomic energy for destruction?

XIV. Retell the text.

LESSON 17

Grammar: The Participle.
Verbs of obligation.

READING DRILLS

I. Read the words with the stress on the first syllable:

arrow, chemical, element, negative, simple, minus, plus, circuit, thermal, voltage, positive, load, motor, coincide.

II. Read the words with the stress on the second syllable:

electric, respect, external, express, possess, potential, directly, proportional, inversely, mechanical, material, receiver, resistance.

III. Read many-syllable words:

energy, brevity, generator, terminal, magnitude, quantity, primary, accumulator, direction, dimension, relation, calculation, relationship, engineering.

IV. Fluent reading:

a source of energy, an electric circuit, an uninterrupted ream of electric charges, with respect to the source, in electrical engineering, according to this law, in the circuit as a whole, in the same system of units.

THE ELECTRIC CIRCUIT AND ITS ELEMENTS

The simplest electric circuit consists of a source of energy, or power source (*e.g.*[1], a primary cell, accumulator, or generator), a receiver of energy (e. g., an electric lamp, electric-heating device, or electric motor), and two conductors connecting the receiver and power source terminals. The power source (or, *for short*[2], the source) transforms mechanical, chemical, thermal, or other energy into electromagnetic energy, which, for brevity, is often simply called electric energy, the energy receiver (or simply receiver), on the contrary, transforms the electric energy to other forms of energy: radiant, thermal, mechanical and so on. The power source together with the conductors and receiver (load) connected to it form a closed loop, along which an uninterrupted stream of electric charge (an electric current) flows. This is called an electric circuit. *With respect to*[3] the source, the conductors and receiver (load) form the *so-called*[4] external circuit.

The direct cause of flow of electric current in a circuit is the electromotive force (emf) of the power source. Conventionally, the direction of the current in the circuit is taken to coincide with the direction of the emf. The terminal of the source through which the current «leaves» for the external circuit is called positive (+) and the terminal through which the current enters the source from the external circuit, the negative (—). The direction of the current is thus from + to — in the external circuit and from — to + inside the source. *Both* the external circuit *and*[5] the source possess resistance, the value of which depends upon the material, shape and dimensions of the conductors composing these parts of the

electric circuit. The magnitude or the intensity of the current (or, simply, the current) in the circuit depends on the magnitude of the emf and the resistance of the whole circuit. The relationship between these three quantities is expressed by Ohm's law, which plays a very important role in electrical engineering, being the basis of many practical calculations. According to this law, the current I in the circuit is directly proportional to the emf E and inversely proportional to the resistance R of the whole circuit:

$$I = \frac{E}{R}$$

Ohm's law can be applied to the circuit *as a whole*[6] and separately to any portion of the circuit outside the power source.

COMMENTARY

[1] **e. g.**= for example например
[2] **for short** сокращенно
[3] **with respect to** по отношению к
[4] **so-called** так называемую
[5] **both ... and** как ..., так и
[6] **as a whole** в целом

EXERCISES

I. State which words in the left column are synonyms for the words in the right column:

1. value	1. to apply
2. all	2. to join
3. to use	3. form
4. device	4. is called
5. to connect	5. instrument
6. shape	6. quantity
7. is named	7. whole

II. State which words in the right column are antonyms to the words in the left column:

1. positive	1. minus
2. internal	2. jointly
3. outside	3. negative
4. separately	4. inside
5. to leave	5. external
6. plus	6 to come

III. Translate the following word-combinations into English, make up sentences with them:

электрическая цепь, состоять из, например, электродвижущая сила, играть роль, и так далее.

IV. Translate the following sentences into Russian, paying attention to the meaning of the words in bold type:

1. The energy receiver transforms the electric energy to other **forms** of energy: radiant, thermal, mechanical and so on. 2. The power source together with the conductors and receiver connected to it **forms** a closed loop, along which an electric current flows. 3. With respect to the source, the conductors and receiver **form** the so-called external circuit. 4. The direct **cause** of flow of electric current in a circuit is electromotive force of the power source. 5. The electromotive force of the power source **causes** the flow of electric current in a circuit. 6. Can Ohm's law be applied to **any** portion of the circuit outside the power source? 7. Ohm's law can be applied to the circuit as a whole and separately to **any** portion of the circuit outside the power source. 8. **Any** misuse of some terms may sometimes result in a complete misunderstanding of the whole text.

V. Translate into Russian, paying attention to different meanings of the word «one»:

1. The electronic proportional control circuit requires more equipment than the electric one. 2. Synthetic diamond production is one of the youngest branches of our industry. 3. The discovery of one more particle of matter is a sensation in science and is one step more towards a real understanding of the secrets of matter. 4. One of the important aspects of electric power generation is the development of large atomic electric stations. 5. The Soviet scientists and engineers have many achievements in the field of electronics. One of the outstanding examples is space exploration. 6. One cannot do this work without using a computer for very accurate calculations. 7. One of the most important characteristics of this device is its high accuracy.

VI. Find Participles, state their functions, translate the sentences into Russian:

1. The power source together with the conductors and receivers connected to it form a closed loop along which an electric current flows. 2. The simplest electric circuit consists of a source of energy, a receiver of energy and two conductors connecting the receiver and power source terminals. 3. Both the external circuit and the source possess resistance, its

value depends upon the material, shape and dimensions of the conductors composing these parts of the electric circuit. 4. Ohm's law being the basis of many practical calculations plays a very important role in electrical engineering. 5. The current in the given portion of the circuit is directly proportional to the resistance of the portion. 6. An uninterrupted stream of electric charges flows along a closed loop. 7. Friction reducing the efficiency of our machines is considered to be undesirable. 8. Measuring power, we generally use such units as watts, kilowatts, and kilogram-meters per second. 9. The efficiency of a machine is the ratio of the useful work performed to the total work expended. 10. The distance required for stopping a moving body is proportional to the square of speed. 11. A combination of mechanisms designed to transform energy into the form required and thus to do useful work is called a machine.

VII. Translate the following sentences into Russian, paying attention to the Participles:

1. The superconductive alloys widely applied in the development of conductive magnets are of particular interest for investigation. 2. It was demonstrated that many substances when subjected to a high degree of purification begin to display new and wonderful properties. One of the most interesting examples is silicon. 3. Thin films of highly purified silicon can replace bulky electronic circuits. 4. All matter consists of building blocks called atoms. 5. Radio, electronics, automation, telemechanics and cybernetics are the branches playing the decisive role in engineering. 6. The experiment carried out was of great importance for the solution of this problem. 7. The plant built produces electric power for this large region. 8. This device will considerably increase the reliability of the work done by the station's instruments. 9. When finished the plant will produce steel for industry.

VIII. Find the verbs of obligation and translate the sentences into Russian:

1. According to Lomonosov, science and literature should serve the people. 2. To the end of his life Lomonosov had to struggle alone against the countless enemies of Russian science. 3. Out-of-date equipment is to be replaced and modernized. 4. One should remember that an object can be in equilibrium not only when it is standing motionless but also when it is moving in a straight line at constant speed. 5. Being an experienced engineer you ought to be able to design this device. 6. In this case the emf in equation (1) must be replaced by the

voltage across the portion U. 7. In the formulas (1) and (2) all the quantities must be expressed in the same system of units.

IX. Translate the following sentences into English:

1. Относительно источника энергии проводник и приемник образуют так называемую внешнюю цепь. 2. Электродвижущая сила является непосредственной причиной появления электрического тока в цепи. 3. Направление тока в электрической цепи совпадает с направлением электродвижущей силы. 4. И внешняя цепь, и источник тока имеют сопротивление, величина которого зависит от материала, формы и размеров проводников, из которых состоят части электрической цепи. 5. Закон Ома играет важную роль в электротехнике. 6. Согласно закону Ома, ток в электрической цепи прямо пропорпионален электродвижущей силе и обратно пропорционален сопротивлению всей цепи. 7. Закон Ома может быть применен к цепи в целом и отдельно к каждой части цепи вне источника энергии.

X. Put questions to the words in bold type:

1. **The power source** transforms **mechanical energy** into electromagnetic energy. 2. **The conductors and receiver** form the so-called **external circuit.** 3. **Ohm's law** plays a very important role **in electrical engineering.** 4. **The current** *I* in the circuit is inversely proportional **to the resistance** *R*.

XI. Answer the following questions:

1. What does the simplest electric circuit consist of? 2. What does the power source transform? 3. What does the energy receiver transform? 4. What is called an electric circuit? 5. Which terminal of the source is called positive and which is the negative one? 6. What does the magnitude of the current depend on? 7. What is expressed by Ohm's law? 8. To what can Ohm's law be applied?

XII. Do a written translation of the second paragraph of the text «The Electric Circuit and Its Elements».

XIII. Translate the text back from Russian into English.

XIV. State which sentence «a» or «b» is the translation of the given sentence:

1. Out-of-date equipment is to be replaced.

а) Устаревшее оборудование нужно заменить. б) Устаревшее оборудование заменяют новым.

2. Science should serve the people.

а) Наука должна служить людям. б) Наука служит народу.

3. He had to use a dictionary as he did not know some words.

а) Он вынужден был пользоваться словарем, так как не знал некоторых слов. б) Он должен пользоваться словарем, так как не знает некоторых слов.

4. One should know how to do this work.

а) Нужно знать, как выполнить эту работу. б) Один человек должен выполнить эту работу.

XV. State which sentence «a», «b» or «c» is the question to the word-combinations in bold type:

1. The power source transforms **mechanical energy** into electromagnetic energy.

a) What does the power source transform? b) What transforms mechanical energy into electromagnetic energy? c) What energy does the power source transform into electromagnetic energy?

2. The conductors and receiver form the so-called **external circuit.**

a) What do the conductors and receiver form? b) What forms the so-called external circuit? c) What circuit do the conductors and receiver form?

3. The magnitude of the current in the circuit depends **on the magnitude of the emf** and the resistance of the whole circuit.

a) On what does the magnitude of current in the circuit depend?

b) What depends on the magnitude of the emf?

LESSON 18

Grammar: Participle I and Participle II (forms and functions).
The Gerund.
The Verbal Noun.

READING DRILLS

I. Read the words with the stress on the first syllable:

matter, classical, century, mention, energy, ancient, famous, various, history, period, publish, follower, modern.

II. Read the words with the stress on the second syllable:

mechanics, discovery, attempt, conduct, phenomena, until, enrich, intensive, development, position, contribute, beginning, appear.

III. Read many-syllable words:

explanation, foundation, contribution, mechanization, conservation, academician, mathematician, equilibrium, aerodynamics, justifiably.

IV. Fluent reading:

from the history of mechanics, based on the discoveries of ancient scientists, thousands of years, in the field of mechanics, to the level of a science, among other scientists, at the turn of a century, the founder of a new science, with the beginning of.

FROM THE HISTORY OF MECHANICS

The history of modern mechanics being based on the discoveries of ancient scientists goes back to the 4th century, when the first known attempts *of the kind*[1] were conducted.

It took thousands of years[2] for man to find scientific explanations for mechanical phenomena.

There was little advance in mechanics until the 15th century when it began developing intensively. Following the discoveries in the field of mechanics, during this period, we should mention the name of Leonardo da Vinci (1452—1519).

In the 17th century mechanics was further enriched by Galileo Galilei (1564—1642). Being the follower of Galilei Isaac Newton developed mechanics to the level of a science. The mechanics of Galilei and Newton, now known as classical mechanics, made the foundation for the intensive development of that science.

Mechanics, *thanks to*[3] its outstanding discoveries, took the *leading position*[4] among other sciences having enriched them at the turn of the 18th century. Russian scientists made a great contribution to world science.

Academician *L. Euler*[5] (1707—1783) was the founder of a new science called analytical mechanics.

M. Lomonosov (1711—1765), known for his contribution to various branches of science including mechanics, stated his famous law of the conservation of matter and energy.

With the beginning of the 19th century there appeared a trend of practical application of mechanics. The foundation of a branch of mechanics called the «Theory of Mechanisms and Machines» belongs to the Russian scientist P. Chebyshev (1821—1894).

Among the eminent Russian scientists having contributed to the mechanics of liquids and gases N. Zhukovsky (1847—1921) was the greatest. He was justifiably called the «Father of Russian Aviation». He created the Russian theoretical school in the field of aviation. His works form the basis of the general science of aerodynamics and aviation as a whole.

COMMENTARY

[1] of the kind такого рода
[2] It took thousands of years прошло много лет
[3] thanks to благодаря
[4] leading position ведущее положение
[5] L. Euler [' ju : lə] Л. Эйлер

EXERCISES

I. Group up the words with the same meaning (synonyms) and translate them into Russian:

basis, ancient, advance, discovery, eminent, foundation, old, to call, progress, invention, outstanding, to name, matter, substance, to occur, to take place, field, to make a contribution, branch, to contribute.

II. Group up the words that are contrary in meaning (antonyms) and translate them into Russian:

definite, acceleration, short, the whole, part, modern, indefinite, retardation, long, ancient, great, small.

III. Define the suffixes and translate the following words into Russian:

variety, explanation, intensively, development, outstanding, mathematician, academician, contribution, equilibrium, justifiably, aerodynamics.

IV. Translate the sentences, paying attention to Participle I, Participle II, the Gerund and the Verbal Noun:

1. In the 15th century mechanics began developing intensively. 2. Following the discoveries in the field of mechanics, we should mention some names. 3. Having enriched other sciences at the turn of the 18th century, mechanics took the leading position among them. 4. Academician L. Euler was the founder of a new science called analytical mechanics. 5. With the beginning of the 19th century there appeared a trend of practical application of mechanics. 6. Talented Russians skilfully achieved practical solutions of complex mechanical problems especially at the time of Peter the Great, who encouraged many outstanding inventors in work. 7. Beginning with the end of the 18th century engineering mechanics began progressing rapidly in Russia.

V. Find in the text non-finite forms of the verb, define their functions and translate the sentences into Russian.

VI. Read the following sentences. Find Participle I, Participle II and the Gerund, define their functions and translate the sentences into Russian:

1. The first problem is determining the trajectory described by the points of a moving body. 2. The second problem is determining the nature of motion of a body as related to the forces acting on the body, or conversely, determining the forces causing the motion. 3. Here we seek the conditions under which forces acting on a body are brought into equilibrium. 4. The part of kinetics dealing with equilibrium of forces and the consequent state of rest of a body is known as statics. 5. Every point of a moving body describes a path of a definite form relative to a basic system, this path is called a trajectory. 6. In investigating mechanical motion of bodies and their state of rest, another quantity is met with, it is called force. 7. Oxygen can be converted to a liquid boiling at 183° C. 8. There are only few elements not attacked by oxygen. 9. Radioactivity is the property uninfluenced by any known catalyst. 10. Passing through a hot tube hydrogen arsenide deposited arsenic in the form of metallic film.

VII. Define the tense-forms of the verb and translate the sentences into Russian:

1. Mechanics deals with a variety of problems. 2. This type of problem is dealt with in mechanics. 3. Mechanics also treats of terrestrial bodies in a state of rest, that is, a state of equilibrium. 4. A trajectory may be either of straight or curved lines, in accordance with which the motion of a point is then described either as rectilinear or curvilinear. 5. The rotation of the electric motor is transmitted to the spindle of the lathe. 6. By setting the lathe properly we might obtain the required rotating speed of the spindle. 7. We shall study in detail the first compound of chlorine. 8. Its compounds with hydrogen will be represented by formula HCl.

VIII. Translate the following sentences into English using the words from the text:

1. История современной механики базируется на открытиях древних ученых. 2. Механика заняла ведущее место среди других наук в начале XVIII столетия. 3. Русские ученые внесли большой вклад в развитие мировой науки. 4. Русский математик, физик и механик академик Леонард Эйлер — основатель новой отрасли науки, которая называется аналитической механикой. 5. Работы Н. Жуковского, известного русского ученого, являются основой общей аэродинамики и авиации.

IX. Define the functions of the words with the suffix -ed and translate the sentences into Russian:

1. In 1668 Newton devised a new type of telescope that concentrated light by reflection from a parabolic mirror rather than by reflection through a lens. In 1671 this telescope was demonstrated to King Charles II and then it was presented to the Royal Society. 2. This great scientist was respected in his lifetime. 3. Natural stone is used for footing and foundations for external walls of buildings. 4. The coverings or upper parts of buildings are called roofs.

X. Underline the Verbals and translate the sentences into Russian:

1. It seemed to Newton that there was no way of preventing spectrum formation when light passed through prisms of lenses. 2. By introducing a number of relays, the weak current from the original batteries can be sent a long distance. 3. Robert Fulton, American inventor, was an artist. Travelling in England he made friends with engineers and his own interest in engineering and inventing was stimulated. 4. It was the great age of canal building in England and Fulton investigated methods of improving canal navigation. 5. Getting water into the house is of great importance for the people living there. 6. The buildings being erected now can be divided into two broad classifications; they are either for housing or for industrial purposes. 7. Gas producers may be divided into two types as to the method of supplying air and steam.

XI. Give the answers to the following questions:

1. What is modern mechanics based on? 2. How long did it take man to find scientific explanations for mechanical phenomena? 3. What can you say about advance in mechanics until the 15th century? 4. Who enriched mechanics in the 15th century? 5. Why did mechanics take the leading position among other sciences at the turn of the 18th century? 6. Who is the founder of analytical mechanics? 7. Whom does the «Theory of Mechanisms and Machines» belong to? 8. Whom do we call the «father of Russian aviation»?

XII. Retell the text.

LESSON 19

Grammar: Participial Constructions. The Nominative Absolute Participial Construction.

READING DRILLS

I. Read the words with the stress on the first syllable:

pressure, consequent, instance, question, magnitude, opposite, static, system, necessary, primary, gravity, constant, friction, possible, problem.

II. Read the verbs with the stress on the second syllable:

attract, effect, exert, depend, deform, resolve, resist, replace, remove, require.

III. Read many-syllable words:

magnitude, consequent, mechanical, phenomenon, component, experience, curvilinear, rectilinear, equilibrium.

IV. Fluent reading:

with a variety of problems, is determining the trajectory, its speed and acceleration, the forces causing the motion, the branch of mechanics called kinetics, in a state of equilibrium, are of primary importance, may be either of straight orcurved lines, either as rectilinear or curvilinear, the motion is called non-uniform, another quantity is met with.

THE SCIENCE OF MECHANICS

Mechanics dealing with a variety of problems, they fall under one of the following classifications:

1. The first problem is determining the trajectory described by the points of a moving body, the position of any one of the points in its trajectory, its speed and acceleration.

2. The second problem is determining the nature of motion of a body as related to the forces acting on the body, or conversely, determining the forces causing the motion. This problem *is dealt with*[1] in kinetics.

In mechanics, the action exerted by one body upon another is called a force.

Mechanics also treats of terrestrial bodies in a state of equilibrium. Here we seek the conditions under which forces acting on a body are brought into equilibrium.

That part of kinetics dealing with equilibrium of forces and the consequent state of rest of a body is known as statics, the investigation of motion of bodies under the action of

forces applied to them constitutes another branch of kinetics called dynamics.

Statics dealing with the equilibrium of forces, the laws of composition of forces are of primary importance in statics.

FUNDAMENTAL ELEMENTS OF MECHANICS

The motion of a body occurs in space, space being one of the fundamental elements in mechanics. Time is likewise such an element in mechanics.

Every point of a moving body describes a path of definite form relative to a basic system; this path is called a trajectory. A trajectory may be either of straight or curved lines, in accordance with which the motion of a point is then described either as rectilinear or curvilinear. A moving point traverses a definite distance, the length of which as covered in a definite interval of time will depend upon the speed of the moving point. If the point travels equal distances in equal intervals of time, its speed will be constant and its motion is then called uniform. In other cases the motion is called non-uniform, or variable.

If speed changes at an equal rate in equal intervals of time the motion is called either uniformly accelerated or uniformly retarded, change in speed being called acceleration.

In investigating mechanical motion of bodies and their state of rest, another quantity is met with which determines the action of one body upon another; that quantity is called force.

COMMENTARY

[1] **is dealt with** занимается

EXERCISES

I. Define the suffixes and translate the following words into Russian:

mechanical, deformation, instance, mechanics, interaction, magnitude, equilibrium, condition, importance, important, resistance, attraction, friction, variety.

II. Give synonyms for the following words:

instance, earth, road, thanks to, hence, body, case, strength, value, to influence, illustration, to remove, differ, big, power, significant.

III. Give antonyms to the following words and translate them into Russian:

rectilinear, under, unequal, without, unnecessary, to be insignificant, never, impossible, unimportant, small, light.

IV. Analyse the forms of the verb and translate the sentences into Russian:

1. Let us see some examples of mechanical phenomena. 2. Imagine what would happen if the friction decreased. 3. Suppose, the friction is decreased, then the speed of the object will increase. 4. Consider the influence of some other factors. 5. Remember that the force of gravity and the force of friction are very important factors in solving a great variety of problems.

V. State the forms and functions of the Participles; translate the sentences into Russian:

1. Some examples of mechanical phemomena are a stone falling to the ground, a tramcar passing from a rectilinear to a curvilinear stretch of track due to pressure on the sides of the wheels by the rails. 2. In mechanics, action exerted by one body upon another is called a force. 3. It must be noted that these are instances of the interaction of two bodies (the Earth and a stone, rails and wheels, the body being weighed). 4. Among all forces acting on a body there is always one which is manifested by an attraction towards the centre of the Earth; that force is weight, or gravity. 5. The quantity of work a moving body can do is the kinetic energy of the body (the energy of motion). 6. Since attractive force during a given interval exceeds the resistance to motion, the train will move with increasing speed. 7. The motive force, expressing itself as the difference between the attractive force and the force of resistance, is expended on increasing the speed of the train.

VI. Define the Nominative Absolute Participial Constructions and the Participial Constructions, state what adverbial relations they express and translate the sentences into Russian:

1. If we are to shift an object along the ground, the action will depend upon a number of conditions, one of the most important being the resistance of the surface of the ground, i. e. the force of friction. 2. All other conditions being equal, friction will vary directly with the weight of the object; the heavier the body, the greater will be the friction. 3. A Daniel cell consists of metallic zinc immersed in a solution of zinc sulphate and metallic copper immersed in a solution of

copper sulphate, the zinc being charged negatively and the copper positively. 4. The equipment having been received, we began the experiments from the very beginning. 5. Our laboratory having been built, we could continue our research work there. 6. The speed of light being extremely great, we cannot measure it by ordinary methods. 7. The satisfactory measurements having been obtained, they could finish their research. 8. Having been tested under different conditions the device was put into operation. 9. The gas being colourless, we did not notice its formation. 10. Chlorine is easily soluble in water, the solution having the same colour as the gas. 11. Having obtained the necessary compound we could finish our experiment. 12. Solving the problems connected with the investigation of cosmic rays scientists develop our science. 13. Being used in different branches of industry semiconductors are of great importance. 14. An electron current is a stream of electrons flowing along a metal wire or conductor.

VII. Write English equivalents for the following words and expressions and make up sentences with them:

скорость и ускорение, состояние равновесия, или прямолинейное... или криволинейное, состояние покоя, зависеть от, определенный промежуток времени, под действием сил, проходить одинаковое расстояние.

VIII. Translate the following sentences and analyse ing-forms:

1. Every day thousands of people go straight from work to their local health centres where, without interrupting their jobs, they can receive the complete range of medical treatment. 2. The initiative in establishing workers health centres belongs to the management at the place of work and to trade union branches. 3. The centres are generally built in pleasant country surroundings not far from the patients places of work. 4. Those staying at the centre receive three meals a day and a cost of this medical care is paid by trade unions from the state social insurance funds at their disposal. 5. There are health centres in every industrial city, these centres being equipped with every modern comfort. 6. All these means are an important factor in raising the general level of public health, preventing illness and increasing labour productivity.

IX. Translate the sentences, paying attention to the expressions „no matter", „not only . . . but also":

1. A mole represents a definite number of molecules, no matter what substance is concerned. 2. Neither of the opposi-

tely directed reactions in a chemical equilibrium can ever become complete, no matter how long the materials are left in contact. 3. Careful study of pure water has led to the conclusion that its composition is always the same, no matter by what method it has been purified. 4. Not only does hydrogen peroxide act as a strong oxidizing agent but strangely enough it also acts as a reducing agent. 5. Nitric acid is decomposed not only when heated but also when exposed to the action of light. 6. The transformation of metal into iron rust is a chemical reaction in which not only metal but also air takes place.

X. Find in the text Participial Constructions and translate them.

XI. Translate the following sentences into English using the words and expressions from the text:

1. Механика — наука о движении и силах. 2. Динамика изучает движения тел под действием приложенных к ним сил. 3. Статика — раздел механики, который изучает равновесие сил. 4. Траектория — линия, которую описывает движущаяся точка. 5. Движения точки разделяются на прямолинейные и криволинейные в зависимости от вида траектории.

XII. Answer the following questions:

1. Can you give any examples of mechanical phenomena? 2. What is mechanical position brought by? 3. What is a force in mechanics? 4. What does statics deal with? 5. What can you say about the resistance? 6. When does friction vary directly with the weight of the object? 7. Are the force of gravity and the force of friction important factors in solving a great variety of problems in equilibrium of forces? 8. What is of primary importance in statics? 9. What is friction?

XIII. Translate the following sentences into Russian, paying attention to the words in bold type:

1. **It** was formerly believed that all heavy objects fell faster than light objects. 2. **It** should be noted that a substance is composed of tiny particles called molecules. 3. **One** can obtain better results if the solution is slightly heated. 4. **One** could hardly expect such a turn of circumstances. 5. **One** can easily decompose mercuric oxide at high temperature. 6. One must be careful when handling gas. 7. **They** say the results of the experiment will be better this time. 8. **They say** that the motion of a body occurs in space, therefore space is one of the fundamental elements in mechanics.

DIALOGUE

Q. What is the kinetic energy of the body?
A. The quantity of work a moving body can do is the kinetic energy of the body (the energy of motion).
Q. Can you illustrate this phenomenon?
A. Certainly, we can. Let's take up the following illustration. When steam is released into the cylinders of a locomotive, the train starts and then begins to gather speed. We have already learnt that the attractive force of the locomotive accomplishes work while it is moving under its steam.
Q. What is this work expended on?
A. Since attractive force during a given interval exceeds the resistance to motion, the train will move with increasing speed. Thus the motive force, expressing itself as the difference between the attractive force and the force of resistance, is expended on increasing the speed of the train.
Q. Is there any trace left on this work?
A. Yes, there is. Let's assume that steam has been cut off; the train will move but at a diminishing speed and continue to overcome the force of resistance directed against its motion. Therefore work expended on imparting velocity to a body is not lost, for it enables the body to continue doing work without the application of further motive force.

So the quantity of work moving body can do is the kinetic energy of the body (the energy of motion).

LESSON 20

Grammar: The Gerund.

READING DRILLS

I. Read the following words with the stress on the first syllable:

famous, nature, solar, problem, modern, water, order, harness, mirror, heater.

II. Read the following words with the stress on the second syllable:

direct, effect, exist, convert, suppose, provide, divide, describe, produce, construct, prepare, appear.

III. Read the following many-syllable words ending in -tion, -sion:

consumption, combustion, conversion, communication, illumination, accumulation, radiation, concentration, utilization.

SOLAR ENERGY AND ITS UTILIZATION

Annually the Sun supplies the Earth with 6×10^{17} kilowatt hours of radiant energy, more than 20,000 times greater than the world's total power consumption. In other words, only a very small fraction of solar energy reaching the Earth is utilized. One of the main problems is the discovery of ways and means of making more effective use of solar radiation, the energy of which is practically unlimited.

The Sun is the source of all main forms of energy. It gives warmth and life. From very ancient times man has made attempts to harness the solar energy.

Today solar energy can be converted into electricity at an efficiency rate of about 10 per cent. This is not much of course.

Sunlight does not produce high temperatures. It may heat metal so as to make it uncomfortable to the touch, *but this is obviously not enough to power an efficient motor*[1]. For this, powerful concentrators of solar energy have to be created.

Much has already been done to promote the industrial uses of solar energy. Thus in many countries solar water heaters are used. One square metre of such a heater saves as much as 200 kilograms of fuel a year. Solar energy is utilized in Britain, Algeria, Italy and other countries.

Systematic work on the utilization of solar energy began in the Soviet Union in 1926. At present there are four centres concerned with solar power problems in this country. In Moscow, the Research Institute of Power Sources and the Power Institute are engaged mainly in direct conversion of sunligh into electricity. The Turkmen Academy of Sciences *is working on solar desalinators*[2] and air conditioner; workers in Uzbekistan are studying high temperature physics, the concentration of solar energy and its conversion to mechanical energy; in Armenia the prospects for large scale solar power production are being investigated. The reason why so much work on solar energy utilization is being conducted in Central Asia and Armenia is simple enough: at Tashkent or Ashkhabad the amount of solar energy that hits the ground at noon is nearly equal to the capacity of the famous Dnieper Hydroelectric Station.

Special solar installations are used in deserts to produce distilled water.

The sun is also used for producing low temperatures, solar air conditioners cost only about one-fifth or one-sixth as much as electric conditioners.

There already exists a project of a solar electric station for generating 2,500,000 kwh of electricity and 20,000 ton of steam a year.

On the order of the day are power stations employing principles of direct conversion of solar energy into electricity.

COMMENTARY

[1] but this is obviously not enough to power an efficient motor но этого, вероятно, недостаточно, чтобы запустить мощный двигатель

[2] is working on solar desalinators работает над установками для опреснения воды

EXERCISES

I. Find in the text nouns corresponding to the following words, translate them into Russian:

to radiate, to help, to utilize, to communicate, to develop, to concentrate, to power, to demand, to produce, to conduct, to construct.

II. Give synonyms for the following words, translate them into Russian:

to provide, to invent, to do, to support, not long ago, field, to light, to use.

III. Give antonyms to the following words; translate them into Russian:

limited, new, long ago, to name, to finish, low, complex, quantity, little, cold.

IV. State the forms and functions of the Gerund and translate the sentences into Russian:

1. Using solar energy and converting it into any useful form of energy is very important. 2. One of the main problems is the discovery of ways and means of making more effective use of solar radiation. 3. Tsiolkovsky suggested taking a mirror on a space flight for using sunlight as a reliable means of communication with the Earth. 4. The Sun is also used for producing low temperatures. 5. There already exists a project of a solar electric station for generating 2,500,000 kwh of electricity and 20,000 tons of steam a year. 6. Scientists are working much on settling major problems of utilizing solar energy.

V. Translate the dialogue into English using the words and expressions from the text:

(Два студента беседуют о проблемах использования солнечной энергии.)

Студент 1: Солнце дает нам свет, тепло и энергию. Сколько энергии посылает Солнце на Землю?

Студент 2: Ежегодно Солнце посылает на Землю 6×10^{17} киловатт-часов энергии.

Студент 1: Это очень много. Используют ли люди всю солнечную энергию?

Студент 2: Да, это действительно очень много энергии, но люди используют только незначительную ее часть.

Студент 1: Почему же? Люди не знают, как использовать солнечную энергию?

Студент 2: Ученые знают несколько способов ее использования, но этого недостаточно. Одной из главных проблем человечества является открытие путей более эффективного использования солнечной энергии.

Студент 1: Как люди используют солнечную энергию? Какие есть источники использования солнечной энергии?

Студент 2: Солнце — источник всех основных форм энергии. Одна форма энергии, как известно, превращается в другую. Зная этот закон, люди превращают солнечную энергию в полезную энергию, которая им нужна.

Студент 1: Я знаю, что солнечную энергию превращают в электрическую, но это только первые шаги в этом направлении. Как используют солнечную энергию для исследования космического пространства?

Студент 2: Солнечные батареи используют на космических ракетах. Луноходы работали на Луне с помощью этих батарей.

VI. State the forms and functions of the Gerund and translate the sentences into Russian:

1. The work of turning villages into comfortable and well-organized settlements is being done. 2. It is hard to repair the bridge without stopping the heavy railway and motor traffic over it. 3. Docking the space vehicles was done in two stages. At the first stage the approach was done automatically. The final approach and docking were handled by the crew. 4. Today the young people participate actively in settling major problems of the scientific and technological progress. 5. During the five years of training our students cover a variety of subjects, including history, philosophy and a foreign language. Besides this there is a wide range of social and political sciences assisting the future specialists in forming a proper world outlook. 6. This machine, besides combining a series

of operations, makes the work of an operator much easier but demands greater skill and knowledge. 7. Welding and cutting metals is an important component of modern production.

VII. State the functions of the Gerund and Verbal Noun in the following sentences and translate the sentences into Russian:

1. Studying the microworld increases the possibilities of science to struggle with different diseases. 2. The Great October Socialist Revolution was the beginning of a new era in the history of mankind. 3. By putting into practice the improved methods of work the team got good results. 4. Installed on the Mars 3 is a complex of scientific instruments intended for exploring the planet Mars and the space near it, and apparatus for studying the radio emission of the Sun. 5. Lomonosov dedicated his whole life to serving science. 6. The cosmonauts tested the functioning of onboard systems. 7. The task of transporting the raw materials, oil and gas from Siberia is very important. 8. Post-graduate training (including extra-mural) is the main method in the system of providing research workers for scientific centres and higher schools. 9. The students attend lectures on the use of computing technology and mathematical methods in the given field, on scientific and technical teaching aids, on programmed teaching and on scientific organization of work.

VIII. State whether the word in bold type is a Gerund or a Participle and translate the following sentences into Russian:

1. **Constructing** cosmic rockets became possible after engineering had reached a high level of its development. 2. **Constructing** a highly sensitive device an engineer used different materials. 3. **Building** houses we improve the living conditions of people. 4. **Building** hydroelectric stations in Siberia is of great importance for the economy of the country. 5. **Training** specialists is of great importance for the further development of science, engineering and economy. 6. **Training** specialists the country creates its own intelligentsia. 7. **Experimenting** is closely connected with theory. 8. **Experimenting** with different alloys the engineer discovered valuable properties of metals. 9. **Studying** we increase our knowledge. 10. **Studying** is free of charge in our country.

IX. Answer the following questions:

1. What is solar energy used for? 2. What are the means of converting solar energy into useful forms of energy? 3. What are the solar batteries used for? 4. Where are the solar batteries used? 5. In what branches of science and engineering is solar energy utilized? 6. When did the work on the utilization

of solar energy begin in the Soviet Union? 7. Are there special research centres in our country which deal with the problems of solar energy? 8. Are there any means of converting directly solar energy into electricity? 9. What progress was made in utilizing solar energy?

X. Retell the text.

LESSON 21

Grammar: Gerundial Constructions.
Participial Constructions.

READING DRILLS

I. Read the words with the stress on the first syllable:

planned, landing, transport, basic, latest, oxide, body, common, always, orbit, study, distant, nearly, human.

II. Read the words with the stress on the second syllable:

develop, inspect, expanse, celestial, attain, reveal, repair, surprise.

III. Fluent reading:

an important part of the human life, at the first space velocity, artificial satellites of the Earth, exploration and mastery of the cosmos, the first famous orbital voyage, man's first walk in space, tremendous technical difficulties, direct exploration of the planets, technical experimentation in designing a new spacecraft.

SPACE, SCIENCE, TECHNOLOGY AND MAN

Man's having penetrated into outer space is a natural and logical step in world progress. Having conquered his own planet, its land mass, waters and air, he turned his attention to outer space, the unknown environment of his planet. Together with its numerous celestial bodies it plays no less an important part in the life of the human race than the huge land, sea and air expanses. Exploring the space beyond our planet has always been the dream of a man. All this seemed a thing of the distant future. *The first Sputnik, which was a complete surprise to most people*[1], revealed the high level science and technology had attained in the more developed countries.

For the first time in history a man-made vehicle was travelling at the first space velocity, circling the Earth as its artificial satellite.

This was the first step in planned exploration and mastery of the cosmos.

April 12, 1961, is a memorable date in history. It was on that day that Yuri Gagarin, the Soviet aviator, made his first famous orbital voyage. Gagarin's flight was *a historic breakthrough*[2], a leap into the unknown. But before the leap could be made tremendous technical *difficulties had to be surmounted*[3] in designing and building the powerful rockets, the spacecraft and *its life sustaining system*[4].

A dream has become reality.

Man's having walked in space was another landmark. And not only because of its daring, but also because of its practical applications. Many problems of space flight — work outside the space ship to assemble orbital stations, inspect and repair the spaceship, carry out technical experiments and landing on the Moon and on other planets — are of great importance.

Soviet cosmonaut Alexei Leonov is the first man who proved that man could live and work outside his ship.

In space automatic devices play especially great role.

Automatic devices are our explorers of the Universe. Their usefulness and effectiveness increase with every passing year. They are our only means of direct exploration of the planets and will remain so for the near future. They are equally valuable for scientific and technical experimentation in designing a new spacecraft and the instruments needed for unmanned and manned flights and for probing the conditions in which such flights take place.

Steady progresss in space technology and space research programmes prepared the conditions for man's first flight to the Moon.

Technical achievements and scientific discoveries are now yielding practical results.

Communication and television satellites, weather forcasting, navigation-guiding, study of ice areas — these are only part of a much larger list of practical uses of artificial Earth satellites.

COMMENTARY

[1] **the first Sputnik, which came as a complete surprise to most people** первый Спутник, появление которого явилось полной неожиданностью для большинства людей

[2] **a historic breakthrough** историческое достижение

[3] **difficulties had to be surmounted** пришлось преодолеть трудности

[4] **its life sustaining system** система жизнеобеспечения

EXERCISES

I. Form adjectives from the following words and translate them into Russian:

effect, use, history, application, reality, automation, importance, scientist, increase, value, result, distance, progress.

II. Give synonyms for the following words; translate them into Russian:

apparatus, sputnik, to receive, each, travelling, glorious, to wonder, speed, way, man-made, large.

III. Give antonyms to the following words and translate them into Russian:

never, known, inside, uselessness, past, decrease, close, old.

IV. Translate the following sentences into Russian, paying attention to the meaning of the words in bold type:

1. Mankind cannot **progress** without electric power resources. 2. Soviet science has made great **progress** in space exploration. 3. Chemists produce a **number** of new synthetic materials. 4. Today there is a steadily growing **number** of workers who have completely mastered their trade and who, having a secondary education, continue their studies and are mastering the advanced achievements of science and culture. 5. Everybody knows that **light** moves at the rate of 300, 000 kilometres per second. 6. More than 150 **light** industry enterprises were put into operation in the period of five years and more than 140 were reconstructed. 7. **Natural** resources of our country are rich and varied. 8. It is **natural** that radio and television play a more and more important role in our life. 9. Soviet **watch** factories are found in many cities and towns, and their annual output exceeds 32 million pieces. 10. We **watch** television programmes with great interest. 11. Open the window and **air** the room. 12. **Air** is a mixture of gases, surrounding our planet. 13. Scientific equipment occupied almost all the **space** of the laboratory. 14. The study of the microflora inside the spaceship is of great importance for future **space** duration flights.

V. State the forms and functions of the Gerund and translate the following sentences into Russian:

1. Man's penetrating into outer space is a natural step in world scientific and technical progress. 2. The Soviet Union's launching the world's first artificial Earth satellite aroused wide interest everywhere. 3. We know of mechanics speeding up the rates of technological progress in shipbuilding,

aviation, rocket and space technology, power engineering, atomic industry and so on. 4. We know of large d. c. generators being employed in certain manufacturing processes, such as steel making. 5. The problem of the Moon's surface being explored by means of automatic self-propelled laboratories is very interesting. 6. The news of Lunokhod having been descended from Luna 17 on the Moon's surface excited the world. 7. Semiconductors are widely used because of their having different valuable properties so important for industry and science. 8. Rocketry and space engineering being developed at a fast rate is of great importance for science.

VI. State the functions of the ing-forms and translate the following sentences into Russian:

1. The methods of controlling the self-propelled vehicle from the Earth were worked out. 2. Exploring the space beyond our planet has always been the dream of philosophers and science fiction writers. Now it has become a reality. 3.Soviet scientists have opened a fundamentally new road in space exploration by placing it in the service of mankind's early needs without putting human life at risk. 4. Soviet specialists have developed methods of obtaining new kinds of rubber just as good as natural rubber. 5. The housing conditions of the working people have been improving since the very first days of the existence of Soviet power. 6. Using the mechanical energy of falling water turbines convert it into electricity. 7. School must play the leading role in the harmonious spiritual development of children, in acquainting them with the great achievements of science, technology and culture, and in preparing them for work. 8. Technique having reached a high stage of development, new methods of work became possible. 9. Since the dawn of history man has dreamed of learning more about the Moon. 10. The direct study of the lunar surface began with Moon landings by automatic space stations.

VII. Define Participial and Gerundial Constructions in the following sentences:

1. His having worked much helped him to pass his exams successfully. 2. Having worked much he passed his exams successfully. 3. The fact of professor Novikov's having made a new discovery is valuable. 4. The discovery having been made by professor N. is valuable. 5. We learnt of his having been sent to the power station for practice.

VIII. Translate into English using the Gerund or Gerundial Constructions:

1. Полет Гагарина в космос был значительным событием в истории человечества. 2. Программа космических исследований включает запуск спутников, оснащенных научной аппаратурой. 3. Нам сообщили, что этот ученый сделал интересное открытие. 4. Учеба — процесс приобретения знаний. 5. В нашей стране широко используются новые методы строительства. 6. Преподаватель позаботился о том, чтобы студентов обеспечили оборудованием и материалами для исследовательской работы. 7. Он выбрал некоторые материалы для работы в лаборатории. 8. То, что лазеры используются в различных областях науки, техники и медицине, известно всем. 9. Открытие методов производства синтетических материалов имеет большое значение для промышленности. 10. То, что они провели много опытов, помогло им успешно сдать экзамен по химии.

IX. Find in the text sentences with the Gerund, state their functions and translate the sentences into Russian.

X. Translate the following dialogue into English:

Вопрос: Когда запустили первый спутник Земли?

Ответ: Первый спутник Земли был запущен в 1957 году.

В. Какое значение имеют космические исследования для науки?

О. Космические исследования имеют большое значение для науки. Они обогащают наши знания не только о планетах Солнечной системы, но и о нашей собственной планете.

В. Для чего ученые используют спутники?

О. Спутники используются для многих целей; я назову только некоторые из них. Они используются для связи и телевидения, для прогноза погоды, изучения атмосферы нашей планеты и других планет.

В. Какое значение имеет первый выход человека в открытый космос?

О. Первый выход человека в космос, осуществленный советским космонавтом Леоновым, имеет большое практическое значение.

В. Можете вы рассказать, какое практическое значение имеет выход человека в космос?

О. Да, могу. Во время космического полета может возникнуть необходимость ремонта корабля в космическом пространстве, сборки орбитальной станции, контроля функционирования корабля и т. д. Поэтому человек должен изучить условия работы в космосе.

В. Что вы знаете об исследованиях Луны?

O. Люди собрали много ценных данных о Луне с помощью космических спутников, а также благодаря тому, что сами побывали на Луне.

XI. Make short reports about space researches of the Moon, Venus and Mars.

XII. Put some questions on the text and answer them.

XIII. Retell the text using words and expressions from the text.

LESSON 22

Grammar: The Infinitive.

READING DRILLS

I. Read the words with the stress on the first syllable:

problem, object, distant, principle, vacuum, radar, science, progress, process, rarefied, cathode-ray (tube).

II. Read the words ending in -ic:

electric, photoelectric, electronic, ionic, economic, magnetic, scientific.

III. Read many-syllable words:

automation, application, communication, solution, television, emission, conversion, obligatory, preparatory, primarily, principle, relative, filament, technology, phenomena, mercury, microscope, to utilize, incandescent.

THE DEVELOPMENT OF ELECTRONICS

Electronics is the science that studies the principles and technology of devices based on the phenomena of electric currents in a vacuum (electronic devices) and in rarefied gases (ionic devices).

Electronics is the basis of modern automation, because it solves the most complicated problems in automation and production processes by relatively simple means. It is not possible even briefly to list the industrial and scientific problems that find solution in modern electronics.

The development of electronics in the Soviet Union is particularly rapid. The progressive role of electronics in all branches of technology *makes it obligatory*[1] for engineers in all fields to learn the basic principles of this science.

The preparatory stage in the development of electronic devices was laid primarily by the profound researches of the Russian physicist Stoletov who first formulated the law of electron emission by a heated body (1839—1896). Next,

the discovery of the vacuum device (the electron valve) was prepared by Lodygin's invention of the first vacuum device to be widely used — the incandescent lamp (1847—1923). The thermionic emission effect was observed in the incandescent lamp already in 1881 by T. A. Edison: when a galvanometer is connected between the filament and a special auxiliary electrode in the lamp, there passes through the galvanometer a small current from the filament to the electrode. This current is caused by the transfer of electrons from the hot filament to the cold electrode.

However, it was only the discovery of radio by A. S. Popov that gave a powerful stimulus to the development of electronics. The first two-electrode valves (detectors for wireless communication receivers) were made in 1904 soon after this discovery. The use of a grid made it possible to use the three-electrode valve first as an amplifier (1911) and then as a vacuum tube alternating current oscillator (1913).

The first ionic power device was the mercury rectifier — a device for economical conversion of alternating current into direct current.

The development of electronic amplifiers has made it possible to utilize a number of familiar physical phenomena. Especially important was the use in electronics of the photoelectric effect, *i.e.*[2], the emission of electrons by a metal under the action of light. This effect was discovered by Stoletov in 1888. He made the first photocell (phototube). However, photocells became widely used only in conjunction with electron valves. With these, photocells were first used in sound films and afterwards in the solution of a very wide range of technical problems.

Many technical problems can be solved by applying the principle of an electric or magnetic field acting on the direction of an electron beam in a vacuum or rarefied gas. This principle is employed in cathode-ray tubes which found application in television sets, electron microscopes, radar (for locating objects at a distance), and *so forth*[3].

COMMENTARY

[1] **makes it obligatory** делает обязательным
[2] **i. e. (that is)** то есть
[3] **so forth** и так далее

EXERCISES

I. Translate the following groups of words into Russian:

current — direct current, alternating current, d. c., a. c.; to mean — mean — means; list — to list; to solve — solution — to solve a problem; physics — physicist — physical; to heat — heat — hot; to use — use — useful — useless; power — powerful — powerless; to rectify— rectifier — rectification; to amplify — amplifier — amplification; special — specialist — speciality — especially.

II. Group up the words with the same meaning (synonyms):

basis, modern, because, simple, foundation, up-to-date, as, plain, first, to utilize, rapid, to employ, quick, to use, fast, to solve, field, profound, to connect, to find solution, branch, deep, to join, important, significant, for the first time.

III. Give English equivalents to the following words and word-combinations, make up sentences with these words:

решать самые важные вопросы, найти решение, по крайней мере, подготовительный этап, сформулировать закон, вспомогательный электрод, прибор для преобразования переменного тока в постоянный, то есть, под действием света.

IV. Translate the following sentences into Russian:

1. Electronics solves the most complicated problems in automation and production processes by relatively simple means. 2. A lot of problems find solution in modern electronics. 3. The Russian physicist Stoletov was the first to formulate the law of electron emission by a heated body. 4. The first two-electrode valves were made in 1904. 5. The development of electronic amplifiers has made it possible to utilize a number of familiar physical phenomena. 6. Photocells became widely used only in conjunction with electron valves. 7. The preparatory stage in the development of electronic devices was laid primarily by the profound researches of the Russian physicist Stoletov. 8. The mercury rectifier is a device for economical conversion of alternating current into direct current. 9. Especially important was the use in electronics of the photoelectric effect, i. e., the emission of electrons by a metal under the action of light.

V. Translate into Russian, pay attention to the emphatic construction it is (was) ... that (who):

1. It was only the discovery of radio by A. S. Popov that gave a powerful stimulus to the development of electronics.

2. It was the Russian physicist Stoletov who first formulated the law of electron emission by a heated body. 3. It is due to electronics that the most complicated problems in automation and production processes can be solved by relatively simple means. 4. It was Stoletov who made the first photocell. 5. It is the force of attraction that holds the atoms together. 6. It was in conjunction with electron valves that photocells were first used in sound films. 7. It was our Russian scientist Lodygin who invented the incandescent lamp. 8. It was D. Mendeleyev who formulated the Periodic Law.

VI. State the functions of the Infinitive and translate the following sentences into Russian:

1. To solve this problem is rather difficult. 2. To solve this problem, it is necessary to know the principles of modern electronics. 3. It is not possible even briefly to list the industrial and scientific problems that find solution in modern electronics. 4. The progressive role of electronics in all branches of technology makes it obligatory for engineers in all fields to learn the basic principles of this science. 5. The discovery of the vacuum device was prepared by Lodygin's invention of the first vacuum device to be widely used — the incandescent lamp. 6. The use of a grid made it possible to use the three-electrode valve first as an amplifier and then as a vacuum-tube alternating current oscillator. 7. The development of electronic amplifiers has made it possible to utilize a number of familiar physical phenomena. 8. The Russian scientist Stoletov was the first to formulate the law of electron emission by a heated body. 9. He decided to solve this complicated problem by relatively simple means. 10. Many technical problems can be solved by applying the principle of an electric or magnetic field acting on the direction of an electron beam in a vacuum or rarefied gas.

VII. Use the verbs in brackets in the necessary tense-form:

1. Electronics (to be) the science that (to study) the principles and technology of electronic and ionic devices. 2. Electronics (to be) the basis of modern automation. 3. It (to solve) the most complicated problems in automation. 4. It (to be) possible to use this method. 5. It (to be) necessary to solve this problem long ago. 6. The discovery of radio by A. Popov (to give) a powerful stimulus to the development of electronics. 7. The first two-electrode valves (to be made) in 1904. 8. The use of a grid (to make) it possible to use the three-electrode valve as an amplifier. 9. The development of electronic amplifiers (to make) it possible to utilize a number of familiar phy-

sical phenomena. 10. The photoelectric effect (to be discovered) by Stoletov. 11. Photocells (to be used) in sound films. 12. Great progress (to be achieved) in the field of electronics.

VIII. State which sentence «a» or «b» is the translation of the given sentence:

1. To solve this problem is rather difficult.

а) Решить эту задачу довольно трудно. б) Чтобы решить эту задачу, нужно много работать.

2. We know photocells to be used in sound films.

а) Мы знаем, что фотоэлементы используются в звуковых фильмах.

б) Мы знаем фотоэлементы, которые используются в звуковых фильмах.

3. Electronics is known to be the basis of modern automation.

а) Известно, что электроника является основой современной автоматики. б) Электроника является основой современной автоматики.

4. The device to be tested is of great importance.

а) Прибор, который нужно испытать, имеет большое значение. б) Прибор, который испытывают, имеет большое значение.

IX. State the forms and functions of the Infinitive and translate the following sentences into Russian:

a) 1. Present day standards of experimental techniques make it possible to obtain antiparticles in laboratory conditions. 2. Scientists have set up a centre for launching meteorological rockets in the Antarctic to cover an extensive programme of research into the upper layers of the Antarctic atmosphere. 3. Construction of iron and steel works is to be completed in the current five-year-plan period. 4. People of all ages use the reading room. They come here to prepare for exams, work on a thesis for a degree, keep up with the latest publications in their field or look at rare editions. 5. The piece of metal to be tested is in the laboratory. 6. This experiment is too serious to be explained in a few words.

b) 1. To irrigate deserts we build canals. 2. To drive a car in a big city is very difficult. 3. The pieces of metal to be joined were white-hot heated. 4. To use welding for joining metal parts means to obtain products which possess higher strength, better quality and lower cost. 5. Much is being done to develop methods of automating tractor driving with the aid of radio, cable remote control and mechanical devices.

6. M. Lomonosov was the first to find that heat, light and electricity are different forms of motion. 7. Academician Petrov was the first scientist in the world to observe the phenomenon known later as the electric arc.

X. State the forms and functions of the Infinitive and translate the sentences into Russian:

1. To understand the importance of this invention, you should know thermodynamics. 2. The velocity of light is too great to be measured in simple units. 3. The problem to be solved was discussed at the meeting. 4. There are stars too remote from us to be studied from the Earth. 5. To solve this problem means to study the properties of these materials in different conditions of loading. 6. We intended to process the data obtained during our numerous experiments by means of a computer.

XI. Translate the following sentences into Russian, paying attention to the Modal Verbs. Define the form of the Infinitive:

1. These materials can be classified into 3 groups. 2. The investigation of cosmic space must be continued on an ever increasing scale. 3. The operator ought to have explained to you the operation of these electronic devices. 4. The methods of work must have been improved, the workers obtained better results. 5. The engineer should have controlled the work of the computer, processing the results of our important investigation. 6. The electrician may have turned off the light, we could not continue our experiments in the darkness. 7. Professor had to give detailed answers to each question. 8. We must hurry if we want to catch the train. 9. They had to be informed about his latest achievements in this field of engineering.

XII. Answer the following questions:

1. What does electronics study? 2. Why is electronics the basis of modern automation? 3. Is it possible to list the industrial and scientific problems that find solution in modern electronics? 4. Who formulated the law of electron emission by a heated body? 5. What discovery gave a powerful stimulus to the development of electronics? 6. What made it possible to use the three-electrode valve as an amplifier? 7. What was the first ionic power device? 8. Who made the first photocell? 9. Where are photocells used? 10. What principle is employed in cathode-ray tubes? 11. Where are cathode-ray tubes used?

XIII. Retell the text.

LESSON 23

Grammar: The Objective Infinitive Construction.
Emphatic phrases.

READING DRILLS

I. Read the words with the stress on the first syllable:

metal, energy, chemistry, service, practice, blacksmith, training, valuable, genius, brilliant, compound, constant, modern, quantitative.

II. Read the verbs with the stress on the second syllable:

divide, discover, invent, employ, develop, indebt, allow, attend, assist, occur, reduce, provide, impress, become, devise, astonish.

III. Read many-syllable words:

electrochemistry, transformation, discovery, invention, immediately, hydroxide, enunciation, practically, ultimately, application, enormously.

ELECTROCHEMISTRY

We know electrochemistry to deal with the relations between the transformations of chemical and electrical energy. We know it to *owe its birth*[1] to the discoveries of Volta. *It culminated in*[2] the invention of the voltaic pile towards the end of the eighteenth century. This important tool was almost immediately employed by Sir Humphry Davy to study the chemical action of electric currents and to isolate potassium and sodium from the molten hydroxides of these elements. Everybody knows this work *to have paved the way*[3] towards the development of modern electrochemical industry of large proportions. But Davy's most significant service to science was his finding and training Michael Faraday to whom more than anyone else electrochemistry is indebted. Not only the discovery and enunciation of the two laws upon which so much of electrochemistry is practically based are due to this experimental genius but also the principle of electromagnetic induction which led ultimately to an economical means of generating energy, essential for the industrial application of electrochemistry.

Faraday (1791—1867) was one of the ten children of a blacksmith. There was no question of an education for young Faraday and he was apprenticed to a bookbinder.

It was *a stroke of luck*[4] that his employer knew him to

have desire for learning and allowed him to read books and to attend scientific lectures.

In 1812 a customer gave Faraday tickets to attend the lectures of Humphry Davy at the Royal Institution. Soon Faraday sent Davy his notes and an application for a job as his assistant.

Davy was enormously impressed by clear ability of the youngster and offered the young man the job.

Almost at once Davy *left for*[5] his grand tour of Europe and took Faraday with him as secretary.

Faraday became director of the laboratory in 1825, and soon the one-time bookbinder's apprentice became professor of chemistry at the Royal Institution.

In chemistry Faraday made his first mark in 1823, when he devised methods for liquefying gases under pressure.

In 1825 he discovered benzene.

In addition Faraday carried on Davy's great work in electrochemistry. Davy had liberated a number of new metals by passing an electric current through molten compounds of those metals. Faraday named this process electrolysis. He named a compound or solution that carry an electric current an electrolyte. Everybody knows all these names to exist unchanged and to be used constantly in science.

In 1832 Faraday further reduced the matter of electrolysis to quantitative terms by announcing what are now called Faraday's laws of electrolysis.

Faraday's laws put electrochemistry on its modern basis.

COMMENTARY

[1] **to owe its birth** берет начало
[2] **it culminated in** завершилась
[3] **to have paved the way** проложили путь
[4] **a stroke of luck** удача
[5] **left for** уехал в

EXERCISES

I. Read the following groups of words, define their suffixes; translate the words into Russian:

chemistry — chemist — chemical; to divide — division; electrical — electricity — electrochemistry; to culminate — culmination; industry — industrial; science — scientist — scientific; to apply — application; to assist — assistant — assistance; to contribute — contribution; to liberate — liberation.

II. State which words in the left column are synonyms for the words in the right column:

1. transformation	1. to free
2. work	2. important
3. significant	3. desire
4. wish	4. to occur
5. to liberate	5. to train
6. to happen	6. change
7. to teach	7. job
8. to name	8. to call

III. State which words in the left column are antonyms to the words in the right column:

1. end	1. unimportant
2. important	2. beginning
3. always	3. with
4. without	4. never
5. to take	5. old
5. young	6. poor
7. significant	7. insignificant
8. rich	8. to give

IV. Give three forms of the following verbs:

to know, to deal, to be, to read, to become, to have, to put, to find.

V. Find in the text sentences with Verbals. Translate them.

VI. Find the Complex Object with the Infinitive in the following sentences and translate them into Russian:

1. We know electrochemistry to owe its birth to the discoveries of Volta. 2 Everybody knows these terms to exist unchanged and to be used constantly in science. 3. It was a stroke of luck that his employer knew him to have desire for learning and allowed him to read the books and to attend scientific lectures. 4. Faraday expected electrochemistry to be widely used in industry. 5. All progressive mankind wants atomic energy to be used for peaceful construction. 6. Soviet scientists consider Far East to be the main source of energy and mineral resources. 7. The members of this scientific group want the new device to be tested immediately. 8. They wanted this apparatus to be adjusted carefully by the operator. 9. We often watched the operator adjust the apparatus. 10. We know industrial electronics equipment to play a very significant role in the modern world.

VII. State the functions of the Verbals and translate the following extract into Russian:

Having looked through his notes young Faraday sent them to president of the Royal Society, in the hope of getting a job that would bring him into closer contact with science. Getting no answer he sent other notes to Davy himself, along with an application for a job as his assistant.

Davy did not oblige Faraday at once but when an opening as his assistant occurred, he offered the young man the job.

Faraday took it in 1813 at the age of twenty-two at a salary that was smaller than the one he had been earning as a bookbinder.

Being the first to produce temperatures in the laboratory that were below the zero mark on the Fahrenheit scale, he may be viewed as a pioneer in the modern branch of physics, called cryogenics (the studying of extreme cold).

Faraday discovered benzene, a compound that was to play a key role in the development of a means of representing molecular structure.

We know the quantity of electricity required to liberate 27 grams of sodium, or 108 grams of silver or 32 grams of copper (that is to liberate an «equivalent weight» of an element) being called a faraday in his honour. Also, the unit of electrostatic capacitance being called the farad is known to everybody.

Faraday's giving enormously popular lectures in science for the general public was the proof of his workability.

VIII. Translate the following sentences into Russian, paying attention to emphatic phrases:

1. It was D. Mendeleyev, a famous Russian chemist, who was the first to discover the law of dependence of the properties of elements upon their atomic weights. 2. It was A. Popov who invented the radio in 1895. 3. It was M. Lomonosov who first stated that heat phenomena were connected with the motion of molecules. 4. It is the sun that steadily sends out a great amount of radiant energy. 5. It was Faraday who first produced temperatures in the laboratory that were below the zero mark on the Fahrenheit scale.

IX. Answer the following questions:

1. What does electrochemistry deal with? 2. What discoveries gave birth to electrochemistry? 3. What can you say about the voltaic pile? 4. For what purpose did Humphry Davy immediately use this important tool? 5. What paved the way towards the development of modern electrochemical industry

of large proportions? 6. What was Davy's most significant service to science? 7. What can illustrate Faraday's experimental genius? 8. How did Faraday get acquainted with Davy? 9. What were Faraday's successes in different fields of science? 10. What can you say about the scientific heritage of the nineteenth century?

X. Retell the text.

LESSON 24

Grammar: The Subjective Infinitive Construction.

READING DRILLS

I. Read the words with the stress on the first syllable:

calculate, nature, strange, sentence, sensitive, specimen, interest, criticism, scientist, brightness, childish, lifetime, human, curious, ornament.

II. Read the words with the stress on the second syllable:

device, design, detect, retire, remain, already, began, according, inverse, appear, observe, conduct, experiment, resign, elect, produce, society, ridiculous.

III. Read the following words, pay attention to the suffix -ed:

worked, watched, produced; pulled, seemed, proved, urged, remained, resigned, retired, appeared, honoured; studied, interested, detected, graduated, conducted, elected.

NEWTON, ENGLISH SCIENTIST AND MATHEMATICIAN

(1643 — 1727)

Newton was born in the year in which Galileo died. At school he was a strange boy, interested in constructing mechanical devices *of his own design*[1], curious about the world around him, but showing no signs of unusual brightness. He seemed to be rather slow in his studies *in his teens*[2].

In the late 1650s[3] he was taken out of school to help on his mother's farm, where he was clearly the world's worst farmer. His uncle detecting the scholar in the young man, urged that he be sent to Cambridge.

In 1660 this was done and in 1665 Newton graduated.

The plague hit London and he retired to his mother's farm to remain out of danger. He had already worked out the binomial theorem in mathematics.

At his mother's farm something greater happened. He watched an apple fall to the ground and began to wonder if the same force that pulled the apple downward also held the Moon in its grip. The story of the apple has often been thought a myth, but according to Newton's own words, it is true.

Newton theorized that the rate of fall was proportional to the strength of the gravitational force and that this force fell off according to the square of the distance from the centre of the Earth. (This is the famous «inverse square» law).

He made his calculations which appeared to be wrong and did not prove his observation.

He was dreadfully disappointed and put the problem of gravitation aside for fifteen years.

In this same period 1665—1666 Newton conducted startling optical experiments.

Newton's prism experiments made him famous. In 1669 his mathematics teacher resigned in his favour and Newton at twenty-seven found himself a professor of mathematics at Cambridge. He was elected to the *Royal Society*[4] in 1672.

His famous «Principia Mathematica» was published in 1687. It is generally considered to be the greatest scientific work ever written.

Newton was respected in his lifetime as no scientist before him. When he died he was buried in Westminster Abbey along with England's heroes. The great French literary figure Voltaire, who was visiting England at that time, commented with admiration that England honoured a mathematician as other nations honoured a king. The Latin inscription on his tomb ends with the sentence, «Mortals! Rejoice at so great an ornament to the human race!»

Newton *had the great virtue of modesty*[5]. He is reported to have said, «If I have seen further than other men, it is because I stood on the shoulders of giants».

COMMENTARY

[1] **of his own design** собственной конструкции
[2] **in his teens** в возрасте от 13 до 19
[3] **in the late 1650s** в конце пятидесятых годов
[4] **the Royal Society** Королевское общество
[5] **had the great virtue of modesty** был очень скромным

EXERCISES

I. Translate the following groups of words of the same root into Russian:

to construct — constructor — construction; mechanics — mechanical — mechanize; to design — design — designer; to detect — detector; bright — brightness; to calculate — calculation; to consider — consideration.

II. State what words in the left column are synonyms for the words in the right column:

1. to construct	1. outstanding
2. a device	2. to carry out
3. to help	3. to assist
4. famous	4. to occur
5. to conduct	5. an instrument
6. to happen	6. to build

III. State what words in the left column are antonyms to the words in the right column:

1. slow	1. untrue
2. late	2. quick
3. true	3. early
4. usual	4. downward
5. upward	5. disproportional
6. proportional	6. unusual

IV. Translate the following expressions into Russian and make up sentences with them:

of his own, unusual brightness, in his teens, in the late 1650s, to put the problem aside, to make somebody famous, the great ornament to the human race, had the great virtue of modesty.

V. Translate the sentences from Russian into English using the words and expressions from the text:

1. Ньютон — великий английский физик, астроном и математик. 2. Он открыл основные законы классической механики и закон всемирного тяготения. 3. В возрасте 27 лет Ньютон становится профессором математики в Кембридже. 4. Работа Ньютона «Математические начала натуральной философии» считается его самым выдающимся научным трудом. 5. В этом труде он обобщил опыт своих предшественников и свои собственные исследования в области астрономии и физики. 6. Ньютон был очень скромным человеком.

VI. Define the functions of the Infinitive and translate the sentences into Russian:

1. To keep a constant temperature during the experiment is of prime importance. 2. There is another task to be tackled in more distant future and it is to master chemical nuclear synthesis. 3. Chemists penetrate into the secrets of new polymer structure in order to produce new materials with planned properties. 4. To make hydrogen we put zinc into the flask and add sulfuric acid. 5. To make hydrogen is rather simple in the laboratory. 6. The substance to be extracted must be more soluble in the extracting solvent than in the initial solution. 7. The substance to be formed in our experiment is not mixed with water. 8. The examination of uranium minerals by Marie Curie has shown some of them to emit radiations of greater intensity than uranium itself. 9. Gold and platinum do not gain weight when heated in air because they are too inactive to unite with oxygen. 10. Lebedev was the first to study synthetic rubber-like compounds. 11. To measure any quantity is to compare it with something already known taken as a standard.

VII. Translate the following sentences into Russian:

1. Newton's «Mathematical Principles of Natural Philosophy» is generally considered to be the greatest scientific work ever written. 2. Newton is reported to have said, «If I have seen further than other men, it is because I stood on the shoulders of giants». 3. He seemed to be rather slow in his studies in his teens. 4. He was known to be extremely sensitive to criticism and childish in his reaction to it. 5. A body is said to weigh one kilogram if the mass of the Earth exerts upon it a pull equal to one kilogram. 6. A non-ionized clean air is considered to be a good insulator. 7. Hydrogen does not appear to form any compounds with uranium. 8. Electrons are thought to lie in different groups about the nucleus. 9. The rays from uranium compounds were found to differ from X-rays. 10. Potassium and sodium which are known to belong to the alkali metals are rather soft. 11. A steam turbine is known to operate by means of heat which it derives from steam and which it converts into mechanical work. 12. Atomic energy is likely to become the main source of power supply in the years to come. 13. The force of gravity is known to play an important part in many common phenomena of mechanics, as well as in everyday life. 14. Plastics are known to be used in a variety of ways.

VIII. Define the Complex Subject and the Complex Object with the Infinitive and translate the sentences into Russian:

1. We consider radioactive atoms to be very valuable in all sorts of ways because we can use them to do things that are not possible with ordinary atoms that are not radioactive. 2. Such radioactive atoms are known to be called tracers, they help us to trace where the atoms go. 3. An atom has been proved to hold a tremendous force, hidden in its tiny body. 4. Everything around us is known to be composed of atoms. 5. The common articles of the kitchen, bathroom, and cars are known to be made of plastics. 6. In general, plastics are known to be classified into groups according to their behaviour when they are heated. 7. The uses of plastics are many and varied; they have proved to be satisfactory alternatives to many other materials. 8. The 19th century is often considered to be the century of steam and electricity while our century can rightfully be called the century of atomic energy and synthetic materials. 9. The Greeks like the Egyptians and many other ancient people were known to have used ceramic articles in their household. 10. The production of plastics may be considered to be a triumph of chemistry, for here we have a class of materials not found in nature. 11. Diffusion shows molecules of any substance to be in motion. 12. We know two atoms of hydrogen to unite with one atom of oxygen when hydrogen burns. 13. We know the molecules of substances to be in continual motion.

IX. Translate the following sentences into English using the Complex Subject with the Infinitive:

1. Известно, что атомной энергии принадлежит будущее. 2. Говорят, что наша лаборатория получила новые приборы. 3. Считают, что полупроводники найдут разнообразное применение в будущем. 4. Известно, что раствор представляет собой однородную смесь двух или более веществ. 5. Было установлено, что торий, актиний и радий химически не отличаются друг от друга. 6. Известно, что почти половину поверхности земли, воды и воздуха составляет кислород. 7. Оказалось, что расчеты специалистов соответствовали ранее установленным теоретическим положениям ученого. 8. Известно, что магнит притягивает только металлические предметы. 9. Известно, что у полюсов магнита магнитное поле сильнее.

X. Translate the following sentences into English using the Complex Object with the Infinitive:

1. Мы знаем, что вода содержит 89 % кислорода. 2. Нам известно, что серебро и медь хорошие проводники электричества. 3. Диффузия показывает, что молекулы любого вещества пребывают в состоянии движения. 4. М. Кюри определила, что атомная масса радия 226. 5. Мы знаем, что элемент каждой батареи имеет 2 клеммы: одну отрицательную другую положительную.

XI. Translate the sentences into Russian, paying attention to the expressions «as well as», «as far as», «as fast as», «as long as», «as to», «as much as»:

1. As much as 80 volumes of sulphur dioxide will go to dissolve in one volume of water at room temperature. 2. As far as chemical properties of sulphur are concerned it unites directly with common metals except gold and platinum. 3. Radioactive elements are of great importance as to their use in many branches of industry. 4. In oxidizing many substances with a solution of iodine, the yellow or brown colour of the iodine fades away as fast as iodine is added. 5. Silicon resembles carbon in having crystalline as well as amorphous form. 6. As long as water evaporates in an open vessel, water vapour mixes with the atmosphere because of diffusion.

XII. Answer the following questions:

1. When was Newton born? 2. What kind of boy was he at school? 3. What kind of farmer was he on his mother's farm? 4. Who detected the scholar in the young Newton and urged him to be sent to Cambridge? 5. Why did he retire to his mother's farm? 6. Say a few words about his observations which he made at his mother's farm. 7. What did he theorize then? 8. Did his calculations prove his observation? 9. Why was he dreadfully disappointed? 10. What can you say about his optical experiments? 11. How did Newton become a professor of mathematics at Cambridge in 1669? 12. What work of his is generally considered to be the greatest scientific work ever written? 13. What did the great French literary figure Voltaire say about England honouring the scientist? 14. What sentence does the Latin inscription on his tomb end with? 15. What words of Newton can prove his great virtue of modesty?

XIII. Retell the text using expressions from the text.

Laboratory Work on the Topic «Science»

Work with the Tape-recorder

I. Listen to the text:

PEACEFUL ATOM IN THE SERVICE OF HUMANITY

1. Dubna is known to be the «peaceful atom» town where a large international group of physicists is continually researching matter's infinite depth. 2. Working at the Joint Institute for Nuclear Research is a great honour and joy for the scientists because of their making a contribution to overall scientific progress. 3. The atmosphere in Dubna being friendly, everyone feels at home. 4. The vast scale of cooperation helps the scientists to solve the scientific and technical problems the Institute faces. 5. The Institute is outstanding in preparing research personnel for the member-countries, many scientists from these countries having successfully presented their theses for Candidates and Doctors degrees. 6. Dubna is a tremendous scientific complex of six large institutes called laboratories. 7. The oldest one is the Laboratory of Nuclear Problems. 8. Here studies are being done on the synchrocyclotron-accelerator. 9. It is reported to be a huge installation several stories high, whose core is a magnet. 10. We know every laboratory to be staffed by young talented and distinguished scientists from several European participating countries, some of their works having won Lenin and State Prizes of the USSR. 11. The atom is increasingly invading our life. 12. The creation of atomic power stations, the application of the labelled atoms method in biology, medicine and agriculture is a far from complete list of the areas where the energy of the atomic nucleus is being used. 13. The scientists in Dubna are doing physics research for the benefit of the entire mankind.

II. Translate the text, paying special attention to Verbals.

III. State in what sentences the following grammar forms are used (write only the number of the sentences corresponding to the grammar form):

1. The Participle in the function of an attribute.
2. The Nominative Absolute Participial Construction.
3. The Gerund.

4. The Objective Infinitive Construction.
5. The Subjective Infinitive Construction.

IV. Listen to the following questions; tape-record your answers:

1. What is Dubna? 2. Why is Dubna called the «peaceful atom» town? 3. Why is it a great honour and joy for the scientists to work at the Dubna Joint Institute for Nuclear Research? 4. What can you say about the atmosphere in Dubna? 5. What helps the scientists to solve the scientific and technical problems the Institute faces? 6. Is the Institute outstanding in preparing research personnel for the member-countries? 7. What does Dubna scientific complex consist of? 8. Which Laboratory is the oldest one? 9. On what installation are studies being done there? 10. Is the synchrocyclotron-accelerator a huge installation? 11. What is a laboratory staff? 12. Name some areas where the energy of the atomic nucleus is being used. 13. Why is Dubna known as a town of international friendship?

V. Translate the following sentences into English:

1. В Дубне работает большая группа физиков из некоторых европейских стран. 2. Некоторые труды этих ученых отмечены Ленинской и Государственными премиями СССР. 3. Многие ученые защитили здесь кандидатские и докторские диссертации. 4. Дубна —это огромный научный комплекс из шести больших институтов, которые называются лабораториями. 5. В экологически безопасных лабораториях работают молодые талантливые ученые стран. 6. Самая старая лаборатория — лаборатория ядерных проблем. 7. Атом все больше проникает в нашу жизнь. 8. В Советском Союзе приостановлено строительство некоторых атомных электростанций. 9. Атомные электростанции, атом в биологии, медицине, сельском хозяйстве — вот далеко неполный перечень отраслей, в которых используется энергия атомного ядра.

VI. Make a report on one of the following topics, tape-record it:

1. Peaceful atom in the service of humanity.
2. Dubna — the «peaceful atom» town.
3. Atom — the builder.
4. Igor Kurchatov — the distinguished atomic scientist.

LESSON 25

Grammar: Modal Verbs with the Perfect Infinitive.
Review of Verbals.

READING DRILLS

I. Read the words with the stress on the first syllable:
active, accident, marry, metal, measure, village, woman, cycle, oxide, treatment, certain.

II. Read the words with the stress on the second syllable:
award, research, instead, success, corrupt, equipment, illegal, uranium.

III. Read many-syllable words:
element, doctorate, to organize, to circulate, to investigate, to isolate, discovery, activity.

IV. Memorize the pronunciation of the following words:
group [gru:p], youth [ju:θ], (to)wrap [ræp], Warsaw ['wɔ:sɔ:].

MARIE SKLODOWSKA-CURIE
(1867 — 1934)

Marie Sklodowska-Curie was the greatest woman scientist who has lived.

Marie Sklodowska was born in Warsaw in 1867. Her father was a teacher. When she was 17 years old she organized an illegal school for village children and circulated forbidden Polish books. She gave evening classes to Warsaw workers organized secretely by a group of Polish youth.

In November 1891, at the age of 24, *she left for Paris*[1]— like many other Poles. She won excellent degrees in physics and mathematics at the Sorbonne.

There she met Pierre Curie and married him in 1895.

For her doctorate[2] she decided to investigate the discovery by Henri Becquerel that compounds of the rare metal uranium fogged a photographic plate wrapped in thick black paper.

Pierre and Marie measured this radioactivity and found that pitchblende, the native uranium oxide ore, contained two hitherto-unknown elements. They were polonium, named after her native land, and radium.

With Becquerel, the Curies were awarded the first Nobel Prize in 1903 for the discovery of radioactivity and new radioactive elements.

In 1904 Pierre became a professor of physics of a newly created chair at the Sorbonne. In 1906 he was killed in a street accident.

Marie took his place as the first woman professor of physics at the Sorbonne, and with much teaching and the bringing up of her two daughters Irene and Eve, she continued research work.

By 1910 she isolated radium metal and the year after was awarded the second Nobel Prize.

During the First World War she organized *mobile X-ray units*[3] for the French Army and saved thousands of lives, often loading equipment on trains herself and driving an X-ray van with her daughter Irene.

Her greatest joy was the success of Irene and her husband Frederic Joliot — later to be a chairman of the World Council of Peace — in winning the Nobel Prize for the discovery of artificial radioactivity.

The Curies could have patented their discovery and possibly *made a fortune*[4], but they published everything and enjoyed their cycling holidays instead.

They were delighted that their discovery could be used for the treatment of certain cancer tumours.

The Curies were happy even with the old, leaking shed laboratory, and uneasy about their new public fame.

«Of all celebrated beings, she was *the only one*[5] whom fame had not corrupted», said Einstein.

COMMENTARY

[1] **she left for Paris** она уехала в Париж
[2] **for her doctorate** темой своей докторской диссертации
[3] **mobile X-ray units** передвижные рентгеновские установки
[4] **to make a fortune** разбогатеть
[5] **the only one** единственный человек

EXERCISES

I. State the prefixes in the following words:

illegal, illiterate, irregular, indirect, impossible, uneasy, unknown, unequal, unhappy.

II. Group up the words with the same meaning (synonyms):

to corrupt, celebrated, fame, joy, to use, much, to continue, motherland, to go on, native land, to spoil, famous, glory, a lot of, to utilize, delight.

III. Group up the words that are contrary in meaning (antonyms):

illegal, uneasy, thick, unknown, new, much, to continue, mobile, often, happy, artificial, natural, unhappy, seldom, legal, easy, thin, known, stationary, to stop, little, old.

IV. Translate the following word-combinations into Russian:
village children, Warsaw workers, World Council of Peace, a street accident, oxide ore, shed laboratory, evening classes.

V. Translate into English using the words from the text:
1. В 17 лет Мария Склодовская организовала нелегальную школу для сельских детей. 2. В 24 года она уехала в Париж. 3. Элемент полоний назван в честь родины М. Склодовской. 4. Супруги Кюри получили в 1903 г. Нобелевскую премию за открытие радиоактивности и новых радиоактивных элементов. 5. Эйнштейн сказал, что из всех знаменитых людей М. Склодовская была единственным человеком, которого не испортила слава.

VI. Translate the following sentences into Russian, paying attention to the meaning of the words in bold type:
1. At the age of 17 Marie Sklodowska organized an illegal school **for** village children. 2. The Curies worked **for** the good of people. 3. In 1891 Marie Sklodowska left **for** Paris like many other Poles. 4. **For** her doctorate she decided to investigate the discovery by Henri Becquerel. 5. The Curies were awarded the first Nobel Prize **for** the discovery of radioactivity and new radioactive elements. 6. Irene and her husband Frederic Joliot won the Nobel Prize **for** the discovery of artificial radioactivity. 7. They worked at it **for** a very long time, **for** they knew that it was **for** the good of people. 8. But **for** friction our world would be very strange. 9. **Only** talented hard working people could make such a great discovery. 10. Of all celebrated beings Marie Sklodowska-Curie was the **only** one whom fame had not corrupted.

VII. Translate the following sentences into Russian, paying attention to different meanings of the word «it»:
1. It is important to keep in mind that computers are useful aids in different spheres. 2. Quantum electronics has made it possible the manufacture of clocks which measure the time with an accuracy of one second per 3,000 years and even higher accuracy. 3. The Nuclear Research Institute in Dubna is an example of fruitful cooperation between scientists of the socialist states. It carries on a constant exchange of the results of its research with scientists in other countries, too. 4. In 1956 Frederic Joliot Curie visited Dubna and presented Soviet physicists with Marie Sklodowska-Curie's instrument. She used it for her experiments in splitting atomic nuclei. It is a small glass bulb containing a radioactive preparation.

VIII. Find in the text sentences with Verbals, translate the sentences into Russian.

IX. Define Verbals, state their forms and functions, translate the sentences into Russian:

1. The purpose of an amplifier is to increase the voltage or power of a weak input signal, at the expense of power from the current source supplying the amplifier to some value which is sufficient to operate some more or less powerful mechanism. 2. In most cases, signal amplification obtained by one valve is not sufficient to operate the output device, and so several stages are used. 3. Each stage introduces some distortion in the signal being amplified, this placing a practical limit on the number of stages. 4. Amplifier circuits are known to be classified according to the number of stages and according to the type of coupling between stages. 5. We know direct coupling to be the simplest form of coupling. 6. The direct current circuits of a stage being separated electrically by capacitors or transformers, this makes it possible to have a common direct current source for all valves of the amplifier. 7. The capacitance is known to pass only the alternating component of the anode voltage. 8. We know the mode of operation of an amplifier to be determined by the value of the constant negative grid bias. 9. We know amplifiers to be divided into classes A, AB, B and C, the mode of operation of an amplifier being determined by the value of the constant negative grid bias. 10. The efficiency of a class A amplifier is not above 25 %, it being able to attain 80 % in class C. 11. Voltage amplifiers mostly operate in class A, power amplifiers also operating in other classes.

I. State forms and functions of Verbals:

1. A measurement is the comparison of a given quantity by means of a physical experiment with some value taken as unity. 2. Electrical measurements are used to measure electrical quantities and to measure heat, light, mechanical and other nonelectrical quantities by electrical methods. 3. The use of electric measuring instruments permits a whole series of important problems in modern technology to be solved by relatively simple means. 4. We know the development of the electric instrument industry to be especially rapid after the Second World War. 5. The USSR is known to produce all types of precise electric-measuring instruments of the most modern construction. 6. The ordinary incandescent lamp is known to be an example of a nonlinear element. 7. The diode is known to have no grid. 8. Two-electrode valves are used to rectify alternating current. 9. We know valves to be often

provided with additional electrodes, these electrodes playing an auxiliary role in the operation of the valve.

XI. Translate into Russian:

1. The hotter the sun, the greater is the output of cold in electric conditioners. 2. The greater the permeability, the greater is the magnetic flux density. 3. The faster the rate of change of current, the greater is the voltage that will be induced in the coil. 4. The less current a voltmeter draws for full-scale deflection, the greater its sensitivity is. 5. The heavier the body, the greater its friction. 6. The longer the wire, the fewer electrons can pass through it in a given period of time. 7. The smaller the diameter of a wire, the greater the resistance. 8. The hotter the conductor, the greater is the resistance. 9. The faster the motion of the magnet, the stronger is the flow of induced current.

XII. a) Use Modal Verbs in the Past and Future Indefinite. b) Transform the sentences into the interrogative and negative forms:

1. He can speak English but he cannot speak French. 2. You may take the dictionary from the library. 3. You must do this work thoroughly. 4. You must not be late for your lectures.

XIII. Translate the following sentences into Russian, paying attention to the meaning of Modal Verbs with the Perfect Infinitive:

1. The Curies could have patented their discovery and possibly made a fortune but they published everything. 2. You could have made your report much better if you had collected all the necessary data. 3. He must have gone to the library, I can't find him anywhere. 4. He may have left already, it is rather late. 5. You should have helped your friend, he missed many lessons. 6. He can't have done such a thing. 7. Some of the ancient tools made from copper may have contained some impurities which contributed to its hardness.

XIV. Answer the following questions:

1. When and where was Marie Sklodowska born? 2. What did she organize when she was 17 years old? 3. When did she leave for Paris? 4. Where did Marie Sklodowska study? 5. What did she investigate for her doctorate? 6. For what were the Curies awarded the first Nobel Prize in 1903? 7. When did Marie Sklodowska-Curie become professor of physics at the Sorbonne? 8. When was Sklodowska-Curie awarded the second Nobel Prize? 9. What did she organize during the

First World War? 10. What did Einstein say about Marie Sklodowska-Curie?

XV. State what sentence («a» or «b») is the translation of the following sentences:

1. You could have made your report much better if you had been more attentive.

а) Вы могли бы сделать доклад гораздо лучше, если были бы более внимательны. б) Вы сможете сделать доклад гораздо лучше, если будете более внимательны.

2. Comrade Petrov must have left for Leningrad, he was going to visit Leningrad this year.

а) Товарищ Петров, вероятно, уехал в Ленинград, он собирался посетить Ленинград в этом году. б) Товарищ Петров должен поехать в Ленинград, он собирается посетить Ленинград в этом году.

3. You should have helped your friend, he missed many lessons.

а) Вам следовало бы помочь своему другу, он пропустил много лекций.

б) Вам следует помогать своему другу, он пропускает много лекций.

XVI. State in which sentence the equivalent of the Modal Verb «can» is used:

a) He had to speak English because he was talking to an Englishman. b) He will be able to speak English in two months.

State in which sentences the equivalent of the Modal Verb «may» is used:

a) He will be allowed to use a dictionary while translating the text. b) He had to use a dictionary while translating the text.

State in which sentences the equivalent of the Modal Verb «must» is used:

a) He had to take the dictionary from the library. b) He was allowed to use a dictionary while translating the text.

LESSON 26

Grammar: Review.

READING DRILLS

I. Read the words with the stress on the first syllable:

vanguard, southern, isle, island, textile, situate, tourist, industry, modern, structure, college, system, member, council, order.

II. Read the words with the stress on the second syllable:

commercial, inhabit, official, elect, consist, produce, compute, include, electric, industrial, develop, construct, employ, exist, observe.

III. Memorize the pronunciation of the following words:

Birmingham ['bə:mɪŋəm]	Liverpool ['lɪvəpu:l]
Glasgow ['glɑ:sgou]	Sheffield ['ʃefi:ld]
Manchester ['mæntʃɪstə]	Edinburgh ['ednbərə]
Newcastle ['nju:ˌkɑ:sl]	Scotland ['skɔtlənd]

IV. Fluent reading:

the most highly industrialized country in the world; the most thickly populated part of Great Britian; the largest industrial cities; heading the struggle of the working people; is in the vanguard of the struggle for peace all over the world; on the left bank of the Thames; the House of Commons; the House of Lords; the leader of the party; the extensive system of docks; a big centre of textile industry; electronic equipment.

GREAT BRITAIN

Great Britain is situated on the British Isles. They include two big islands — Great Britain and Ireland and many smaller islands. The total area is 244,000 square kilometers. Great Britain comprises England, Scotland, Wales and Northern Ireland (Ulster).

The climate of the British Isles is generally mild, not very cold in winter and never very hot in summer. The rivers do not freeze in winter. Snow never lies on the ground for long, except in the north. All parts of the British Isles have a lot of rain in all seasons.

The mild and damp climate is very good for agriculture.

There are many rivers in Britain, but they are not long. Many of them are joined by canals.

The population of Great Britain is more than 56 million. England is the most thickly populated part of Great Britain. The language spoken is English, but Welshmen, Scotsmen and Irishmen speak their own language in addition to English. Another official name of the country is the United Kingdom.

Great Britain is one of the most highly industrialized countries in the world. The largest industrial cities of Britain are: London, Birmingham, Glasgow, Manchester, Newcastle, Liverpool, Sheffield. The district around Birmingham is

a land of factories and mines. The Glasgow industrial region has many shipbuilding yards, extensive docks and textile factories. Sheffield is a big centre of steel industry, and in Manchester there are many textile factories. Liverpool is one of the biggest ports in the West. Edinburgh is the capital of Scotland. Oxford, Cambridge and Edinburgh are university towns.

Britain is one of the largest exporters of automobiles, textile machinery, electronic equipment.

Agriculture is one of the largest and most important activities in Great Britain. Four fifths of the land is devoted to it and it provides employment for over a million people.

Sheep-farming, cattle-farming and dairy-farming are still important branches in the British economy. Vegetables are grown in all parts of the country. The chief grain crops are wheat and barley.

Britain still does not produce enough food for its people, much is imported from other countries.

Now some words about the social system of Great Britain. Great Britain is a monarchy, the power of the Queen of Great Britain is not absolute, but constitutional. It is limited by Parliament, which consists of the House of Commons and the House of Lords. Members are elected only to the House of Commons. The Prime Minister is usually the leader of the party that has a majority in the House of Commons.

There are four political parties in Britain: the Conservative (or Tory), the Liberal, the Labour and the Communist Party.

The Conservative, the Liberal and the Labour Parties represent the class of capitalists.

The Communist Party of Great Britain was founded on the 31st of January 1920. It is heading the struggle of the working people for their rights and is in the vanguard of the struggle for peace all over the world.

EXERCISES

I. Translate the following groups of words of the same stem into Russian:

south — southern; north — northern; industry — industrial — industrialization — industrialized; to equip — equipment; to inhabit — inhabitant — inhabitable; to strengthen — strength — strong; to elect — election — elector.

II. Translate the following sentences into English using the words from the text:

1. Великобритания расположена на Британских островах. 2. Она состоит из таких основных частей: Англия, Уэльс, Шотландия и Северная Ирландия. 3. Великобритания одна из самых развитых промышленных стран мира. 4. Она экспортирует автомобили, электронное оборудование и текстильные машины. 5. Лондон — столица Великобритании. 6. Великобритания — парламентарная монархия, власть королевы ограничена парламентом. 7. В английском парламенте две палаты — палата общин и палата лордов. 8. Коммунистическая партия Великобритании была основана в 1920 году.

III. Translate the following sentences into Russian, paying attention to the verbs in the Passive Voice:

1. Northern England, South Wales, and Scotland are the busiest parts of the British Isles. They are covered with huge towns. 2. The main industrial centres are Sheffield and Birmingham where iron goods are made, and then Manchester, the cotton centre of Great Britain. 3. The district round Birmingham is called by English people the Black Country. People have given it this name because it is so foggy and dirty, because of the smoke which is poured out by the furnaces. 4. The district round Manchester is dotted for miles with factories; they are cotton mills. The most important weaving town is Leeds. 5. Westminster Abbey at which all British kings and queens are crowned, dates back to the 11th century. Many famous people are buried in the Abbey, among them Newton, Darwin, Dickens and Kipling. 6. The House of Commons was destroyed by bombing in 1941 but was restored after the war. 7. The British Museum was founded in 1753.

IV. Analyse the tense-forms in the following sentences, state what they are expressed by. Translate the sentences into Russian:

1. Trade Unions in Britain, which had been savagely repressed at the beginning of the 19th century, were at last recognized in 1824 but did not become really effective till 1867. 2. There are many traditions that are kept alive in the British Parliament. Parliament members are not allowed to enter the House with their hats on. If, however, a Parliament member wishes to speak, he puts on his hat. 3. People in Wales are not talking English, they are talking Welsh, and children learn it at school. 4. South Wales is the industrial part of the country. It is rich in coal, and the mining villages have grown into busy towns around iron, chemical and oil works. 5. During the Second World War London was

subjected to terrible bombing. The whole districts were destroyed. 6. After the war new buildings have been built, are being built and are going to be built. 7. The first underground railway in the world was opened in 1863 in London.

V. State the functions of the constructions with Verbals and translate the following sentences into Russian:

1. The British capital has 14 bridges, the famous London bridge being the biggest among them. 2. As a boy Darwin loved to walk in the country-side, collecting insects, flowers and minerals. He liked to watch his elder brother making chemical experiments. He spent much time watching birds and other animals. 3. Having made his first engine Stephenson found that it worked better than any engine that had been made before. 4. M. Faraday is known to have made experiments in the field of chemistry. About 1821 he began experimenting in electricity. 5. Year after year Faraday experimented in electricity discovering many of the laws of electricity and magnetism. 6. A. Bell having invented the telephone is a well known fact. 7. The Severn, flowing south-west into the Irish Sea, is the biggest British river. 8. The main thing manufactured in Britain up to the 17th century was woollen cloth. 9. The climate in Britain is known to be influenced by the warm Gulf Stream.

VI. Answer the following questions:

1. What do you know about the climate of Great Britain? 2. Name the main industrial towns of Great Britain. 3. What industries are developed in Britain? 4. What outstanding scientists and writers of Britain do you know? 5. What contribution to world's science did English scientists make? 6. Where are the famous people of Great Britain buried?

Laboratory Work on the Topic «Great Britain»

Work with the Tape-recorder

I. Answer the following questions and tape-record your answers:

1. How many islands belong to Great Britain? 2. What is the climate of the British Isles? 3. What is the population of Great Britain? 4. What languages are spoken in Great Britain? 5. What does Great Britain import from other countries? 6. What does Great Britain export to other countries? 7. Which are the biggest ports of Great Britain? 8. What does

Great Britain's industry produce? 9. Can British agriculture supply the population with agricultural products? 10. Who is the head of the state in Great Britain? 11. What Houses does the British Parliament consist of? 12. In whose hands is the power in Great Britain? 13. How many political parties are there in Great Britain? 14. When was the Communist Party of Great Britain organized? 15. What newspaper is the organ of the Communist Party of Great Britain? 16. What does the British Communist Party fight for? 17. What outstanding English scientists do you know? 18. What English writers do you know?

II. Listen to the tape-recording of the conversation. Make a dialogue of your own. Reproduce it. Work in pairs:

Teacher: You know well that Great Britain is one of the most developed industrial capitalist countries of the world. Let's speak about this country, whose language we study. What do you know about Great Britain?

Student 1: Great Britain is situated on 5,000 isles. The largest of them are — Great Britain and Ireland. The total territory of this country is 244,000 square kilometers. Its population is more than 56 million.

Student 2: I can add that the most thickly populated cities of this country are London, Glasgow, Birmingham, Manchester, Liverpool. These cities have enterprises of nearly all branches of industry.

Student 3: Britain sells industrial products to other countries of the world and imports food and other products. Seaports play a great part in the life of the country. London, Liverpool and Glasgow are the biggest English ports.

Student 4: I want to say some words about the political system of this country. Great Britain is a capitalist state. The queen is the head of the state but power in the country belongs to the parliament.

Student 5. The British Parliament consists of the House of Lords and the House of Commons.

Teacher: To what House of Parliament are members elected?

Student 5: The members are elected to the House of Commons.

Student 6: There are four political parties in Britain. Three of them represent the class of capitalists. State power belongs to the capitalists, because most of the land, banks, factories belong to them. Only the Communist Party of Great Britain stands for the interests of working people.

III. Listen to the text and tape-record the translation of the text:

THE PORT AND THE DOCKS OF LONDON

London, one of the world's biggest cities, situated on the River Thames, about forty miles from the sea, is the capital of Great Britain, a great industrial and cultural centre, and one of the Britain's most important ports.

London's port is probably the largest in the world, it is 100 kilometers long. It has a complicated system of docks. The London docks are large enough for 400 steamers. Different ships from many lands bring passengers and goods to its docks. They bring sugar and fruit, tea and coffee, copper and wood from the most remote corners of the planet. The port is always busy. Dozens of ships, steamers and barges are loaded and unloaded here. Many dockers are working in the port and docks day and night.

The port is the place for the unemployed, their only hope for a piece of bread. People of different nationalities and races can be seen here. They come here when it is still dark in a hope to get any job.

IV. Ask questions on the text and tape-record them.

V. Make a report on the topic «Great Britain».

Раздел III

ТЕКСТЫ ДЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ

1. SOVIET HIGHER SCHOOL

The scientific and technological revolution has made education decisive in economic and social life. Education and upbringing determine the rates of socio-economic and cultural progress.

The Soviet Government is always looking to improve the education system. New in teaching methods is the wide use of technological aids, the «industrialization of education». Educational cinema and TV advanced greatly, and more teaching and control aids are being used. There are more study films, and TV's education programmes are also used as widely as possible.

Electronics *has become part and parcel*[1] of modern higher school. Programming and electronic computer work have become compulsory for most higher school subjects. Many higher schools have computers or their own computer centres.

Most teachers do research which helps them to contribute to the advance of science and to create the necessary research atmosphere needed to train skilled specialists. This also allows to involve students in research which today is being done by about 60 per cent of full-time students. The organic combination of studies with work in science and production is becoming a rule for our higher schools.

The Soviet state is systematically improving the students' material and living standards. Education at Soviet higher schools is free. Students do not have to pay for anything — lectures, using lab equipment and libraries or taking exams.

Most students get state stipends, distributed by special commissions of administration and student representatives.

A number of higher schools have their own student hostels and stadiums, gyms, swimming pools and more and more *are under construction*[2].

All graduates receive jobs in their field. The jobs are distributed individually, by commissions. Young specialists have a one-month paid vacation before taking a job.

The Soviet Union has wide international cooperation in higher education. We are now cooperating with higher schools in more than 100 countries.

Tens of thousands of specialists of other countries who have studied at Soviet higher schools are now successfully working in their own countries. There are more than 50,000 people from abroad now studying in the USSR. There is an exchange of professors, teachers, post-graduate students and undergraduates between countries.

The Soviet higher schools' efforts to broaden international relations are a definite contribution to strengthening friendship and cooperation among the socialist countries, and to making their culture better known.

COMMENTARY

[1] **has become part and parcel** стала неразрывной частью
[2] **are under construction** строятся

I. Write a plan of the text.
II. Retell the text according to your plan.

2. RUSSIAN SCIENTISTS

Russia gave the world many outstanding scientists. Russian scientists *made a great contribution*[1] to world science. V. V. Petrov (1761—1834), the follower of Lomonosov in studying electricity, is called a pioneer of the world electrical engineering. Petrov made many discoveries of great importance. He published *a great number of*[2] articles on electricity. The electric arc discovered by Petrov became the first source of electric lighting. Petrov discovered the possibility of getting metals out of ores by means of electricity.

Academician E. Kh. Lenz (1804—1875) is one of the most prominent Russian physicists. He discovered the law of heat generation by an electric current and the law defining the direction of an induced electric current. He established the reversibility of electric machines.

P. M. Yablochkov (1847—1894) is a prominent inventor and designer. He did much to introduce alternating current. He is known for his invention of the «Yablochkov candle» (arc lamp) known abroad under the name of the «Russian Light».

A. S. Popov (1859—1906) is the inventor of the radio. He was offered *a lot of*[3] money for the commercial use of his invention abroad. But he was a true Russian patriot, he refused to leave Russia. He said that all his knowledge and his achievements belonged to his native land.

Dolivo-Dobrovolsky (1862—1919) is a Russian engineer. He is the inventor of three-phase generator, three-phase transformer. He proposed a number of original designs of measuring instruments.

We know many other names of great Russian scientists. We are proud of them.

Lobachevsky's non-Euclidean geometry brought about a revolution in science. Mendeleyev discovered the periodic law of elements. The Mendeleyev table of elements now hangs in lecture halls and classrooms throughout the world. Stoletov built the world's first photoelectric cell. Lebedev experimentally measured the pressure of light. Zhukovsky and Chaplygin worked out the theory of flight and the principles of aerodynamics. Vernadsky laid the foundations of geochemistry — the science of chemical elements.

The first atomic power station and Yuri Gagarin's flight into space, lasers, semiconductors and many other marvels of modern science and technology have been created and discovered by such prominent Soviet scientists as Tsiolkovsky and Kurchatov, Keldysh and Korolyov, Basov and Prokhorov and many others.

COMMENTARY

[1] **made a great contribution** внесли большой вклад
[2] **a great number of** большое количество
[3] **a lot of** много

I. Make a summary of the text.
II. Retell the text.

3. MIKHAIL LOMONOSOV (1711—1765)

Mikhail Vasilyevich Lomonosov was born on November 19, 1711 in the village of Denisovka. His father was a fisherman. A literate villager taught him to read and write, and he acquired a thirst for books. His supreme desire was to study, and one stormy winter night *at the age of*[1] 19 he left Denisovka for Moscow on foot.

Lomonosov entered the Slavonic-Greco-Latin Academy. *Instruction was in Latin*[2] and he had to start *from the very bottom*[3], but even so he finished a three-year course in one year.

Five years later, in 1735, he was one of the several top students selected to study at the Academy of Sciences, set up in

St. Petersburg by Peter I. A year later he went to Germany where he received instruction in physics, mathematics, philosophy, mining, metallurgy and mineralogy.

On his return home in 1741, Lomonosov became assistant professor of the physics class, and in 1745 professor of chemistry at the St. Petersburg Academy of Sciences and a member of the Russian Academy of Sciences. *He is justly regarded as*[4] the founder of physical chemistry, which emerged as an independent science only in the 19th century. He formulated and experimentally proved the law of conservation of matter in chemical transformations.

Lomonosov developed his theory of heat stating that it *was due to*[5] the motion of a body's particles.

He put forward his theory[6] of the existence of innumerable worlds and assumed that life was possible on other planets.

He built telescopes and other instruments, introducing important improvements. He studied atmospheric electricity, developed a theory of air motion in the upper atmosphere and laid the foundations of new meteorology. He was a historian, philologist and the writer of the first scientific grammar of the Russian language. Lomonosov was also a great Russian poet.

Belinsky considered him the father of Russian literature, a great scientist with encyclopedic knowledge. Lomonosov laid the foundations of different branches of science in Russia and initiated its democratic tradition.

In 1755 the first Russian University was founded in Moscow thanks to the efforts of Lomonosov. The University bearing his name became the centre of knowledge and science in Russia. Pushkin called Lomonosov «our first university». Lomonosov devoted all his life to one noble aim — to serve his Motherland and Russian people.

COMMENTARY

[1] **at the age of** в возрасте
[2] **instruction was in Latin** преподавание проводилось на латинском языке
[3] **from the very bottom** с азов
[4] **he is justly regarded as** его по праву считают
[5] **was due to** являлось результатом
[6] **he put forward his theory** он выдвинул теорию

Comment on Pushkin's words «Lomonosov is our first university».

4. THE BRITISH UNIVERSITIES

When people speak about higher education in Britain they are generally thinking of university education.

The two oldest universities in England are Oxford and Cambridge. These date from the Middle Ages. Each consists of largely self-governing, residential colleges. The teaching is based on *tutorial system*[1] as well as lectures. Each student has *a tutor*[2], who requires him to write essays and papers on the subjects he is studying and submit them to him regularly about once a fortnight for correction and discussion.

With the advance of industrialization in the 19th century and the growth of manufacture, technicians and scientists were needed. The older universities did not produce them. Therefore science classes were set up in industrial centres and they developed into either technical colleges or «Modern Universities», *e. g.*[3] London, Durham, Manchester, Birmingham, Leeds, Sheffield, etc.

The new so-called «red-brick» universities are divided into various faculties, e. g. Faculty of Arts, Faculty of Science, Faculty of Social and Economic Studies, etc., the number and type differing from university to university. In each faculty there may be a number of departments dealing with separate subjects.

Courses in arts and science are offered by most universities in Great Britain. Imperial College, London University, University of Manchester, Institute of Science and Technology and some of the newer universities concentrate on technology, although they may also offer a number of courses in social studies, modern languages and other non-technological subjects.

University degree courses generally extend over three or four years, though in medicine, dentistry and veterinary science 5 or 6 years are required.

The first degree of Bachelor (Master of Arts) is awarded on the completion of such a course, depending on satisfactory examination results. Further study or research is required at the modern universities for the degree of Master and by all the universities for that of Doctor.

Diplomas and certificates are awarded after shorter courses in some subjects.

[1] **tutorial system** прикрепление студентов к отдельным консультантам
[2] **tutor** руководитель группы студентов в английском университете
[3] **e. g.** — **for example**

I. Speak about university education in Great Britain.

5. SCIENTIFIC AND TECHNOLOGICAL PROGRESS

The current scientific and technological revolution has entirely changed the technology, procedure, organization and management of production and, consequently, the mode of people's lives.

Soviet science leads the world in some aspects. The general trend of development in modern science is the differentiation and deepening of sciences.

At the same time, many sciences tend towards mutual penetration, and formation of new sciences, such as chemical phycise, physical chemistry, biophysics, biochemistry, engineering psychology and mathematical linguistics. Most of the great 20th century discoveries were made on the borderlines of different sciences.

Cybernetics, a product of mathematics, physics and biology, achieved tremendous results in the field of automating various processes, including mental work; astrophysicists have discovered quasars — the most powerful energy generators in the Universe. No progress is possible in space exploration without close cooperation between various sciences.

Mechanics, thanks to its outstanding discoveries, took the leading position among other sciences and enriched them at the turn of the 18th century. In the 20th century physics has made a great contribution to the world science. This helped man *to break through into space*[1] and gave the world radio, television, electronic computers, the laser, isotopes, nuclear energy and so on.

Ever greater numbers of scientists in the world believe that the leadership in scientific progress now belongs to biology and biochemistry, *because of*[2] the strong influence which biology exerts on other sciences. Applying the laws of biology, physicists and chemists have designed an artificial eye, and other artificial organs.

Copper, nickel, zinc, uranium, cobalt and other substances are extracted from ores *by means of*[3] microbes.

COMMENTARY

[1] **to break through into space** проникнуть в космос
[2] **because of** благодаря
[3] **by means of** с помощью

I. Retell the text.

6. SPACE RESEARCH

The first book on space travel in world literature was the novel «True History», by Lucian, a Greek who lived in Syria in the 2nd century *A. D.*[1] The novel told of a ship *with fifty men on board*[2] which *had been tossed up by a hurricane as high as the moon and the sun*[3]. Stars have had a strong appeal for great scientists and thinkers, as well as for writers of fiction for centuries.

The history of space research is already decades old. The time of long manned space flights has come. Space research comes from man's eternal thirst for knowledge.

The pioneers of space exploration *thought about its immediate practical benefits to man*[4]. Konstantin Tsiolkovsky predicted that space would give man «*oceans of might and mountains of bread*»[5].

Space research gives us invaluable scientific information essential for fundamental natural studies, for the exploration of the Solar System's planets and remote objects in our Galaxy, and for the understanding of evolutionary process in the Universe. We obtain important information about the state of the atmosphere, *which comes in extremely useful to meteorologists*[6].

We must look for new energy sources because human civilization depends heavily on energy for its continued existence. Enormous solar energy resources are found in outer space.

The earth's mineral resources are giving out. The development of mineral deposits found on other planets *is an important long-term objective*[7].

Special automatic instruments and vehicles are produced and sent to various parts of the Solar System — *both to the earth's neighbours like Mars and Venus and further out to the peripheral planets*[8].

COMMENTARY

[1] **A. D.** ['eɪ'di:,'ænou'dɔmɪnaɪ] нашей эры
[2] **with fifty men on board** на котором находилось 50 человек
[3] **had been tossed up by a hurricane as high as moon and the sun** был поднят ввысь ураганом и достиг Луны и Солнца

[4] thought about its immediate practical benefits to man думали о тех благах, которые человек сможет получить в космосе
[5] oceans of might and mountains of bread бездну могущества и горы хлеба
[6] which comes in extremely useful to meteorologists которая является существенным подспорьем в работе метеорологов
[7] an important long-term objective важная задача перспективных исследований
[8] both to the earth's «neighbours» like Mars and Venus and further out to the peripheral planets и к планетам земной группы — Марсу, Венере — и к внешним планетам

I. Ask questions on the text, embracing the content of the text.

7. STATES OF MATTER AND ITS MOLECULAR AND ATOMIC CONSTITUTION

According to the law of conservation of matter, matter can *neither* be created *nor*[1] destroyed.

Matter can exist in three physical states, namely: solid, liquid or gaseous.

As a solid it has definite form and volume not easily changed by mechanical force.

As a liquid it has no definite volume, but being fluid it takes the shape of its container.

A gas has neither definite volume nor shape.

All matter — whether solid, liquid or gas — is made up of very small particles called molecules. Molecules *in turn*[2] are made up of atoms, which are still smaller particles. The history of the atom goes back to the time of the Greek thinker Democritus. He thought that all substances were made up of tiny particles or atoms which could not be further divided.

It was at the beginning of the nineteenth century that the scientists first established experimentally the atomic theory of the structure of matter. They found that the simple forms of matter were chemical elements which consisted of atoms — inivisible particles of very small size.

Then scientists discovered that the atom was further divisible and it was not the smallest thing in the world.

If people were the size of atoms, you could put all the people in the world on the head of a pin and you would still have space left over.

Because atoms are so very small their number must be extremely large. An atom holds a tremendous force hidden in its tiny body. That's why an atom is so important in our life.

Atom helps us to get more and more power. During recent years a number of atomic power reactors have been developed. In 1954 the first atomic power station was built in the USSR. Some others have been put into operation since then.

The Soviet scientists and engineers succeeded in building the first atomic ice-breaker in the world.

The atom helps us to fly through the vast outer space. Atomic energy is enabling scientists to study cosmic rays and other phenomena in outer space.

COMMENTARY

[1] neither ... nor ни ... ни
[2] in turn в свою очередь

I. Retell the text.

8. THE DEVELOPMENT OF TELEVISION IN THE SOVIET UNION

More than 300 powerful and 1400 other television transmitters are operating in the Soviet Union. Almost all these transmitters *rebroadcast*[1] programmes from Moscow and the capitals of the Union republics *as well as*[2] local programmes. Programmes are also exchanged within the Intervision and Eurovision systems *by means of*[3] a broad network of radio-relay lines and cable lines, the total length of which is more than 100,000 kilometres, and there are more than forty receiving and transmitting satellite ground stations.

Approximately 100 powerful and from 400 to 500 other transmitters, built according to standard models, are being added to the television transmitting network. The power of the transmitters of each of the relayed programmes is 50 kilowatts, while the height of towers is 350 metres. Transmitters of this kind ensure good-quality reception of colour television within a radius of 100 kilometres.

New radio-relay lines will extend the length of the television lines by many thousands of kilometres. The transistorized, fully automated equipment of these radio-relay lines will ensure the high quality colour transmissions to distances of up to 12,500 kilometres. As well as the construction of more Orbita ground stations, other ground stations of various types will be built, their main differences being in the size of their antenna installations and the composition of their radio-equipment.

The television reception network will also be further developed. Large cable systems intended to serve a wide-scale television audience are to be built.

Existing television stations are being rebuilt, and opportunities for videotaping and film recording are being extended in order to improve the quality of programmes and increase colour transmissions.

Mobile television stations for recording factual material and *videotape equipment*[4] are widely used in the making of current affairs programmes.

Programmes from the central television studios have to be broadcast at various times in order to take into account the different time zones within the Soviet Union.

Educational programmes are enjoying increasing popularity.

Regular colour transmissions began in 1967. Soviet specialists are already engaged in producing an efficient system of stereoscopic television, which will provide *both* colour *and*[5] three-dimensional pictures.

COMMENTARY

[1] **rebroadcast** ретранслируют
[2] **as well as** а также
[3] **by means of** с помощью
[4] **videotape equipment** оборудование для видеозаписи
[5] **both ... and** как ... , так и

I. Retell the text.

9. AUTOMATION

We live in the age of very interesting achievements of science and engineering. This is the age of space researches, the age of atomic energy, the age when electronics and automation occupy the most prominent place.

Automation reached the highest stage in the development of technology.

Modern man comes less and less in contact with nature. He lives more and more in an artificial world of his own making — the world of technological devices that greatly increase the productivity of his labour. And the prospects ahead are more breath-taking still. Transplantation of the organs of the human body and their replacement with artificial organs, general use of teaching machines and flights of earthlings to other planets are all a matter of the foreseeable future. It

is believed that controlled thermonuclear reaction which will release incalculable stores of energy will become possible before the century is out.

Now the automated machines can do work of hundreds of individual workers. Automation is very effective in continuous cycle production and operation of thermal and hydropower plants.

Application of automation and cybernetics to production increases greatly the labour productivity, makes it possible to release vast amounts of labour power from inefficient small-scale production branches. Automation not only makes labour productive but radically changes its nature.

The mechanization of house work is also important. The overall effect of the process is the release of millions of women for highly productive labour. Automatic equipment frees man from a number of difficult and dangerous production processes.

(By) accelerating the growth of labour productivity, automation paves the way to shorter working hours, and this in turn provides conditions stimulating the creative activity and intellectual development of the individual.

I. Write a summary of the text.

10. THE FAR-OFF LAND OF SIBERIA

Siberia is a land of tremendous riches. Many great men whose names are known throughout the world predicted Siberia to have a great future, although in their days the expanses beyond the Urals were poorly studied.

Electric power stations, ore and coal mines, big industrial complexes with towns and settlements around them are being built throughout Siberia, in its tundra and taiga regions. Siberia is one huge construction site, *where work is in full swing*[1] *in spite of*[2] frosts and long polar nights.

The *tapping*[3] of Siberia's natural resources began only in Soviet times. A giant of the non-ferrous industry, the Norilsk Mining and Metallurgical Combine, was erected in the wilds of the North. The big and quite modern town of Norilsk has arisen near the plant. A large mechanized river port, Dudinka, stands in the lower reaches of the Yenisei, in the Arctic circle.

Large scale electric power station has been built near Krasnoyarsk, and an even more powerful project, the Sayanskaya hydroelectric power station, has produced its electricity. A new town, Mirny, the capital of the diamond industry, has

grown up in Yakutia, together with the Vilyuisk Hydroelectric Power Station. The electric power stations — at Irkutsk and Bratsk have already been put into operation on the Angara. Hydroelectric power stations are built simultaneously with major industrial projects. In Bratsk, for examle, an aluminium *works*[4] and a timber complex are already in operation. The Irkutsk Aluminium Plant, built by young people, gives its production, which Siberia exports to 12 countries.

The construction of the Baikal Amur railway (BAM) is of great importance for our national economy. BAM has cut through the age-old taiga and come to the tremendous resources. The length of the new railway is more than 3,000 kilometres.

Science is not lagging behind[5] industry in Siberia, which now possesses dozens of research institutes.

There is a Branch of the USSR Academy of Sciences in Siberia. The first Siberian «science city» is in central Siberia, at Novosibirsk; the second one for Eastern Siberia is in Irkutsk. While the emphasis at the Novosibirsk centre is on technology, physics and mathematics, at Irkutsk chemistry and geology take the first place. For the young scientists Siberia is a land of great opportunities.

Much has been done in Siberia, but all this is just the begining. Real flowering is yet to come.

COMMENTARY

[1] **work is in full swing** работа идет полным ходом
[2] **in spite of** несмотря на
[3] **tapping** освоение
[4] **works** завод
[5] **science is not lagging behind** наука не отстает от

I. Read the text without a dictionary.
II. Retell the text in Russian.
III. Retell the text in English.

11. THE KIEV POLYTECHNIC INSTITUTE

The Kiev Polytechnic Institute is situated not far from the centre of the city in a shady park full of pines.

The Institute was founded in 1898.

Before the Revolution there were only four faculties at the Institute at which studied about three thousand students, most of them were from *well-to-do families*[1].

Under the Soviet power the Institute has made big progress. Today the Institute has about 35,000 students.

Every year more than 4,000 specialists graduate. Many of the Institute's graduates have become famous scientists. The names of many outstanding scientists can be mentioned *in connection with*[2] the history of the Institute. The *President of the Board of Examiners in the Chemistry Department when the first graduation class completed its course*[3] was Dmitry Mendeleyev, the creator of the periodic system of chemical elements. The father of aeronautics Zhukovsky, the distinguished naturalist K. Timiryazev, and many other famous Russian scientists devoted much effort to the development of the Institute helping it *to recruit good teacher*[4] and to do fruitful research and academic work. Sergey Korolyov, the creator of space rockets, studied at this Institute. Boris Paton, Director of the Institute of Welding and President of the Ukrainian Academy of Sciences, has graduated from the Kiev Polytechnic Institute.

The first rector of the Institute was Professor Kirpichov, a prominent Russian scientist in the field of mechanics and strength of materials.

The Kiev Polytechnic Institute is known for its revolutionary traditions. It was one of the centres of the revolutionary struggle of the progressively-minded students and professors against tsarist regime.

Like any higher school in our country, this one is doing its best to provide widest possible scientific and technical education. *Senior students*[5] do their *field training*[6] at plants and research centres in Kiev and in other cities.

Many students do independent research work and for this purpose they join the student scientific society *which is run entirely by the students themselves*[7].

The student design bureau at the Institute was established several years ago. The kind of work and research done by the students while still at the Institute gives an idea of the profound knowledge with which the Institute equips its graduates.

In 1948 the Kiev Polytechnic Institute was awarded the Order of Lenin, and in 1967 was named after the 50th anniversary of the Great October Socialist Revolution.

COMMENTARY

[1] well-to-do families зажиточные семьи
[2] in connection with в связи с
[3] President of the Board of Examiners in the Chemistry Department

when the first graduation class completed its course председателем экзаменационной комиссии химического факультета первого выпуска

[4] **to recruit good teachers** привлечь к работе хороших преподавателей

[5] **senior students** студенты старших курсов

[6] **field training** производственная практика

[7] **which is run by the students themselves** которым руководят сами студенты

12. SPUTNIKS IN THE SERVICE OF SCIENCE

Since the first Soviet sputnik launched in October 1957 artificial satellites have been used in scientific research.

The information yielded[1] by the first satellites was unique and occasionally sensational.

Sputnik-1 yielded data about the density, temperature and electron concentration of the upper atmosphere, Sputnik-2, which carried the dog Laika, paved the way for *the first manned space flight*[2] in April 1961. Sputnik-3, a space laboratory, provided more valuable data about the physics of the upper atmosphere. Its instruments discovered a zone of charged particles captured by the geomagnetic field surrounding the globe. Later this became known as the Earth's outer radiation belt.

Exploration of inner and outer space was continued by automatic Lunar, Venusian and Mars probes and manned orbital spaceships.

As data on the nature of inner and outer space were accumulated, scientists came to the conclusion that further progress required specialized and intergrated exploration.

Scientists obtained the data on the dynamics and structure of the Earth's radiation belts and on the distribution of electrons and protons, the temperature of these particles at various distances from the Earth.

The launching of the 12-ton Proton-1 orbital observatory meant that scientists could study the properties of elementary particles of super-high energies of several orders of magnitude.

The scientific and technological programmes of individual satellites in the series vary greatly. Geophysical satellites study the Earth's magnetic field, atmosphere, ionosphere and radiation belt.

Information from weather satellites goes day and night to the USSR Hydrometeorological Centre, one of the largest centres in the world, receiving weather data from all over the globe. On the basis of this information the central weather bureau compiles cloud, temperature and radiation charts.

Information provided by the meteor system is sent out through special channels to Washington, Warsaw, Prague and Sofia. The Soviet weather centre *in turn*[3] receives pictures taken by American weather satellites. This useful exchange is a fine example of international scientific cooperation.

Sputniks help to check the functioning of countless life-supporting systems and mechanisms before the new manned space flight is prepared.

Sputniks help to study the radiation of hot stars, ultra-violet and X-ray radiation of the Sun, interstellar space and the Earth's atmosphere.

COMMENTARY

[1] **the information yielded** собранная информация
[2] **the first manned space flight** первый космический полет с человеком на борту
[3] **in turn** в свою очередь

I. Retell the text.

13. THE NATURE OF PHYSICAL KNOWLEDGE

In physics, certain properties of matter are measured and the results examined to see if there is any mathematical relationship between them. It is important to understand the true meaning of the equations we find in a physics book. They do not tell us what things are in themselves, but are simple a convenient way of expressing the laws governing their behaviour. This is the main purpose of science, to seek out the laws of the universe and, if possible, to express them in precise mathematical form. Technologists use this information for such purposes as designing electric dynamos and motors, radio, television and radar installations, artificial satellites and spacecraft, nuclear power generators and so on, all of which have helped to make our material way of life so different from that of our forefathers.

Measurements in Physics

All measurements in physics, even of such things as electric current, are related to the three chosen fundamental quantities of length, mass and time. Until about the year 1800, workers in various countries used different systems of units. Thus, while an Englishman used inches, a continental scientist would measure lengths in centimetres.

Fortunately, this unsatisfactory situation has now been changed by the efforts of various international committees of scientists who have met for discussion regularly over many years.

In 1960, the General Conference of Weights and Measures recommended that everyone should use a metric system of measurement called the International System of Units (abbreviated SI in all languages). The SI units are derived from the earlier MKS system, so called because its first three basic units are the metre (m), the kilogramme (kg) and the second (s). These will be explained shortly.

At the present time, however, we still have to consult books and scientific and technical papers which use the older centimetre-gramme-second system (CGS units). Some mention of these units will therefore be made later on so that the reader may be enabled to understand scientific literature in which they have been used.

14. SOLAR ENERGY IN THE SERVICE OF MAN

Several new sources of energy are currently being explored, including controlled thermonuclear reactions, solar radiation, subterranean heat and wind, tide and seawave. But of them all, solar energy stands out as being extraordinary clean and available in enormous amounts. This explains the great interest in solar power and why a lot of research is going in the field in many countries.

In the Soviet Union solar energy is regarded as an important source of energy.

Research in the field of converting solar energy into electricity is being conducted in two directions: one for providing low-capacity solarpowerd electrical generators for specific consumers and the other for large-scale solar power stations.

Despite the high overall level of electrification in the USSR, there are still vast areas in the country — mainly deserts, semi-deserts and mountains—where supply from the electrical grid is impractical, economically speaking, owing to small quantities of electricity required. So solar power plants catering for the small number of consumers in such areas would be of great economic importance. Research in this field is already under way, aimed mainly at developing photoelectric systems.

Photocells — solar batteries— are widely used as sources of power suplly on board space vehicles and have also

been used in the Soviet Union by way of an experiment, to run sea and river navigational signs, means of communication, electric pumps, etc. At present the Soviet Union is using about 60 experimental photoelectric power sources with capacities ranging from 10 to 250 W. These installations are easy to operate and reliable but have proved quite costly so far.

I. Retell the text.

15. ACCESSIBLE TO All[1]

Pètrograd, 1917. Only 24 hours had passed since the capture of the Winter Palace. The Second All-Russian Congress of Soviets was still sitting in session in the Smolny Assembly Hall. It completed its work at 5 : 15 a. m., on the morning of October 27. From that moment, the People's Commissars, just appointed by the session, began their tremendous creative work.

At some point during that historic night V. I. Lenin, who carried the superhuman burden of leading the uprising and the fight against the enemies of the revolution, said to A. V. Lunacharsky, the People's Commissar for Education: «Try to give the libraries priority attention . . . Books must be made accessible to the masses as soon as possible... They must be spread all over Russia in the greatest possible numbers».

Lunacharsky later recalled Lenin's words: «Books are a mighty force. As a result of the revolution, more and more people will be drawn to them. We must provide the reader with big reading rooms, and we must make books mobile so that they make their own way to the reader...»

In the whole history of mankind few people valued books so much and knew so well how to work with them as Lenin did. Wherever he lived, Lenin always looked for and found opportunities to make use of libraries. Lenin not only wrote his books and accumulated knowledge in the dozens of Russian and foreign libraries he used, but also paid close attention to how the libraries were organized and operated. Long before the Great October Revolution he elaborated means of «making these huge libraries accessible not only to the scientists, professors and other specialists, but also to the masses, to the crowd in the street».

Lenin paid great attention to the former Imperial Library, now the Saltykov-Shchedrin State Public Library, bearing

the Order of the Red Banner of Labour. It is quite understandable, for it is a major book depository of Russia holding some of the greatest treasures of Russian and world culture.

Today the Saltykov-Shchedrin Library, together with the USSR Lenin State Library, the largest in the country, and the Library of the USSR Academy of Sciences are among the six largest book depositories in the world. It is not necessary to live in Leningrad or Moscow to become a reader of the Public Library. Books as Lenin once predicted make their own way to the reader.

COMMENTARY

[1] **accessible to all** доступны всем

I. Retell the text.

16. IGOR KURCHATOV (1903—1960)

I. Kurchatov was one of the most brilliant Soviet scientists of our age. He was a distinguished atomic physicist, outstanding organizer of research work. He united the forces of great scientific institutions for solving the essential scientific problems. He was responsible for the development of atomic industry in our country. He made a great contribution to the development of atomic nucleus investigation.

I. Kurchatov graduated from the Crimea University, physics and mathematics department. In 1925 he went to Leningrad and joined the Physico-Technical Institute of the Academy of Sciences of the USSR.

In the early thirties atomic research was conducted in the Soviet Union. Nuclear physics drew Kurchatov's attention in 1933. He headed a group of research workers. They were working at the problem of the development of powerful sources of fast particles inducing a nuclear reaction. Kurchatov *launched*[1] the first cyclotron in Europe at the Radio Institute.

At the age of scientific and technological revolution, power supply is one of the primary factors of progress. The search of new power sources is among the most important problems of modern science.

One of the problems Kurchatov worked at was the problem of mastering controlled thermonuclear reactions.

The first industrial nuclear power station in the world *put into operation*[2] in 1954 was his creation. Kurchatov always stressed that atomic energy should serve peace.

Kurchatov's knowledge and experience *are immortalized*[3] in Beloyarskaya nuclear power plant, named after him, atomic ice-breaker Lenin, in the Dubna Institute and in numerous atomic installations built in our country and abroad.

COMMENTARY

[1] launched создал
[2] put into operation введенная в эксплуатацию
[3] are immortalized увековечены

I. Retell the text.

17. NONLINEAR ELEMENTS IN ELECTRIC CIRCUITS

An electric circuit often contains elements *for which Ohm's law does not hold*[1], *that is*[2], the current is not proportional to the applied voltage. Such elements are called nonlinear.

An example of a nonlinear element is the ordinary incandescent lamp, since its resistance does not remain constant but varies greatly with the temperature of the filament and, hence, with the current.

Various types of rectifier elements whose resistance sharply changes with the direction of the current are also nonlinear. Electron valves, neon lamps and other widely used devices are also nonlinear elements.

There are two basic types of electron valves: the diode with two main electrodes and the triode with three. The triode consists of a highly-evacuated envelope housing a filament, an anode and the so-called grid. The diode has no grid.

Two-electrode valves are used to rectify alternating current. Their action is based on the fact that current can pass through the valve only from the anode to the cathode and not in the reverse direction. Valves with grids are used as amplifiers and also in high-frequency oscillator circuits. Valves are often provided with additional electrodes which play an auxiliary role in the operation of the valve.

COMMENTARY

[1] for which Ohm's law does not hold которые не подчиняются закону Ома
[2] that is то есть

I. Read the text without a dictionary.
II. Retell the text in Russian.
III. Retell the text in English.

18. HORIZONS OF MODERN MECHANICS

In the development of mechanics, we *can single out*[1] three main stages, three well-pronounced trends. In the 17th century, the great scientists Galilei and Newton laid the scientific foundations of classical mechanics and formulated the basic laws of particle mechanics and the mechanics of systems and bodies. The calculations of the movement and equilibrium of various machines are based on these laws; they are widely used in calculating the movement and designing the control systems of planes and rockets, Earth satellites and spacecraft.

In the 18th century, *through the efforts*[2] of the members of the Russian Academy of Sciences, the laws of classical mechanics were applied likewise to the motion of fluids and gaseous bodies and, later on, to the deformation of elastic media as well.

These gave birth to hydrodynamics — the science of motion of fluids in pipes, canals, seas and oceans. Finally came the theory of elasticity and strength of materials, which makes it possible to calculate the strength of all structures, and of aeronautical and space vehicles.

In the middle of the 19th century the laws of classical mechanics were substantially elaborated. They were united with the laws of the theory of probabilities — statics. This accounts for the appearance of statistical mechanics and the kinetic theory of matter, which made it possible to come close to a precise theory explaining the movement of plasma, a special form of matter.

The 20th century has placed new tasks before the science of mechanics, and led to the further expansion of its horizons.

The solution of important problems of mechanics speeds up the rates of technological progress in ship building, aviation, rocket and space technology, power engineering, the atomic industry and so on; its methods penetrate into related departments of science and technology, into physics, chemistry and biology, and into various branches of industrial production.

Nowadays, mechanics invades whole departments of knowledge as well as individual scientific and technological

fields. For instance, the methods of modern aeromechanics find a broad application in the solution of many biological problems. The laws governing blood circulation, the hydrodynamics of heart and blood vessels constitute the subject of a new branch of science — biomechanics. The latest advances in mechanics will be of great help in improving many production processes in industry and agriculture.

COMMENTARY

[1] **can single out** можно выделить
[2] **through the efforts** благодаря усилиям

I. Make a summary of the texts

19. THEORY AND PRACTICE IN THE MODERN WORLD

Modern science and technology show *an ever more pronounced trend*[1] towards mutual cooperation. Previously engineering and production depended largely on practical experience.

There was no theory of machines, the machines were built and operated on the basis of empirical knowledge. People referred to the art of engineering, the art of construction, etc.

Today technological progress is unthinkable without theoretical knowledge. Nevertheless *it would be wrong*[2] to speak about the independent role of science in the modern world, and about the decreasing role of technology. First of all many *problems facing science*[3] today relate to the field of technology. This is most important.

Secondly, technology uses the knowledge gained by science to give the latter technical tools, unique equipment, instruments and installations for intricate scientific research.

For example, modern biology owes its success to the optical microscope which helped to discover the living cell and many microorganisms, and to the electron microscope which is responsible for the latest achievements of biology, such as the discovery of the molecular structure of the living cell, the making of the simplest artificial gene, the synthesizing of new physiologically active substances — in short, for everything that has added up to produce the youngest and the most progressive branch of biology, molecular biology. The same applies to one of the oldest sciences — astronomy. This

branch has made a tremendous leap forward thanks firstly to the optical and, later, to the radio telescope. Space exploration and the solution of many fundamental problems of modern astronomy and geophysics are obviously impossible without rocket engines, earth satellites, spaceships, radio communication, and so on.

Apart from the interaction between sciences, on the one hand, and the interaction between science and technology, on the other, there is a trend toward increasing the mutual enrichment of various branches of technology.

Another clearly expressed tendency of modern scientific and technological progress is a much swifter realization of scientific discoveries. In the past, certain major scientific discoveries could find no practical use for decades — sometimes even for centuries. A steadily accelerating scientific and technological progress only began with the second decade of the 20th century. The rates of this progress are at their highest stage today.

COMMENTARY

[1] **an ever more pronounced trend** все более заметную тенденцию
[2] **it would be wrong** было бы ошибкой
[3] **problems facing science** проблемы, стоящие перед наукой

20. A SOLAR POWER STATION IN THE DESERT

The world's first photoelectric solar power station designed by Soviet scientists has been put into operation in Turkmenia.

Of the enormous amount of energy the Earth receives every year from the Sun (10 great calories), very little is actually used: 0.015 per cent is consumed by plants and 0.001 per cent by people in the form of food. Over the last million years of its existence the Earth has accumulated less than a hundredth part of the energy radiated by the Sun yearly.

To use solar energy installations *is expedient*[1] only where it is difficult or impossible to organize a centralized power supply — as it is, for instance, in the Kara-Kum Desert, where the first station has been built. Its capacity is small.

Designing efficient and reliable solar energy installations had been going on for years. In outer space, *phototransformers had proved their worth*[2] but the thing was to see how they would behave themselves on the Earth, how long they

would operate. It was necessary to design installations which would operate automatically and require no servicing, to study their electric power and operating characteristics in «natural» conditions. These tasks were solved by a team of scientists and engineers. They designed and built the first experimental watering installation using solar energy to raise and freshen water.

The station can raise 15 cubic metres of water a day from a twenty metre deep well. The rated capacity of the solar freshener is 10 cubic metres a day. Solar rays fall on concentrating mirrors which have batteries of photoelements. The mirrors automatically rotate with the batteries in the direction of the Sun. In the morning, with the first rays of the sun, the installation turns east by itself.

COMMENTARY

[1] **is expedient** целесообразно
[2] **phototransformers had proved their worth** фотопреобразователи оказались целесообразными

I. Retell the text.

21. MAN AND THE PLANET EARTH

Thanks to the Great October Socialist Revolution, there have been far-reaching changes in the study of the Earth and the exploitation of its resources. The only mining areas in prerevolutionary Russia were the Urals and Caucasus. In Soviet time, however, vast new mining territories have been opened up in Kazakhstan, the Kola Peninsula, Central Asia and Far East. The scientists have discovered something like fifteen thousand major deposits of various kinds.

A number of *towns and settlements have sprung up round*[1] these newly-opened deposits. The non-ferrous and rare metals industry has been developed.

Nearly all the known chemical elements up to and including[2] uranium are used in industry, agriculture and medicine.

The general demand for energy will rise steeply. There will be a greater need of uranium and, probably, thorium. Man will become familiar with a new and vast technology — the transmutation of elements. This will change the chemical composition of the Earth. And so a knowledge of the distribution of chemical elements and isotopes will acquire growing economic significance.

The extraction of oil and gas all over the world is increasing at a rapid tempo, and it is hard to say when natural deposits of these minerals will finally run out. By the year 2,000, iron extraction will have reached a thousand million tons from prospected deposits of about a hundred thousand million tons of ore. The situation with aluminium is rather special: in the next 30 years its mining will increase almost tenfold.

Research and exploration of the Earth's interior will be carried out by physical, chemical, mathematical and direct methods (e. g. Earth satellites will be used to prospect for «blind» deposits hidden below the surface).

Huge oil and gas deposits have been discovered in seas and oceans.

The biological resources of the ocean are of particular importance to man.

Man changes the face of the Earth, but he is also polluting the Earth crust, seas and rivers with oil and industrial wastes harmful to life. Man is likewise polluting the atmosphere.

As space exploration has shown, we have little hope of discovering life on any other planet in the Solar System. So our aim is to preserve life on our own planet.

COMMENTARY

[1] **towns and settlements have sprung up round** города и поселки выросли вокруг

[2] **nearly all the known chemical elements up to and including** почти все химические элементы, включая

22. ELECTRONICS

In our country *much attention is given*[1] to electronics, which *is playing a major part*[2] in the economic development. Soviet specialists and engineers have many achievements in this field. One outstanding example is space exploration, ranging from the first Soviet sputnik to cosmic flights. Electronics has been used to probe the Moon and Venus, and to study remote stars.

Electronics, however, has not only helped us to reach cosmic expanses but has given us an insight into the world of the most minute organisms — viruses.

Electronics is in many ways helping us *to solve the problem*[3] of the peaceful uses of atomic energy, and to study atomic nuclei and elementary particles. Most intricate installa-

tions have been developed for this work. Synchronizers, atomic installations would have been impossible without electronics.

Electronics has found broad application in industry as a means of automation, control and inspection, and as a direct means of fulfilling such operations as melting, cutting of superhard materials, welding.

Any material into which an electron beam about one micron in diameter is directed and accelerated by 100—150 thousand volts would evaporate *instantaneously*[4]. This idea is used in electron-beam machine-tools.

The electron beam in these machines acts like a microminiature instrument and can cut, bore, mill or plane any material including tungsten and diamond, with an accuracy to within microns.

Electronic beams are successfully used for welding.

Total absence of dust is required in many industries. There are many dust-control methods, but the best is provided by electronics. The dust is trapped by the magnetic forces of an alternating electric field. Special filters remove not only dust from the atmosphere but microbes too, and can be used to sterilize the air in medical institutions.

Soviet scientists opened up a new field of research in electronics — quantum electronics or atomic radio engineering. Tremendous prospects open up in this field for a great variety of scientific and technical applications.

Quantum electronics has made it possible to develop a clock which has *a margin of error*[5] of up to one second in three thousand years.

It has also been used in the development of instruments for the generation of a rather wide range of electromagnetic waves — from one-millimetre waves to waves shorter than those of light. Amplifiers based on this principle increase the sensitivity of radio receivers hundreds and thousands of times over.

Quantum generators can focus light in extremely narrow beams. These instruments are called lasers and they can be used for cutting, drilling, welding, and other treatment of materials.

Soviet scientists and engineers have made big advances in improving electronic instruments and their elements.

One of the basic properties of a radio instrument is reliability. The reliability of Soviet radio-engineering apparatus is born out by the flights of space vehicles.

Also important in modern electronics is miniaturization and super-miniaturization of electronic instruments and their elements.

Molecular electronics opens up absolutely new horizons.

Electronics has found its application in electronic computers and television which are now widely used in industry, science and economy.

This is not the limit of the uses of electronics, it will find still more wide and various applications in future.

COMMENTARY

[1] **much attention is given** большое внимание уделяется
[2] **is playing a major part** играет большую роль
[3] **to solve the problem** решать проблему
[4] **instantaneously** мгновенно
[5] **a margin of error** предел погрешности

I. Make a summary of the text.
II. Retell the text.

23. MICHAEL FARADAY (1791—1867)

Michael Faraday's family was very poor. His father was a blacksmith. At the age of thirteen Michael's schooling ended, and he got a job with a bookseller. The bookseller was also a bookbinder. Michael bound books and read many of them: these books taught him to think. He attended about a dozen lectures in natural philosophy and made his first acquaintance with Newton and other masters of science. He made notes of everything he heard, bound these notebooks himself and kept them all his life. He learned drawing, so that he might illustrate his notes with diagrams.

In 1813 Faraday was accepted as Sir Humphry Davy's assistant. After a few months of work in the laboratory, Sir Davy invited Faraday to go with him in his travels through Europe. Faraday made many acquaintances in the scientific world.

In 1815 he returned to England and worked in the laboratory in the Royal Institution for more than fifty years, that is to the end of his days.

Faraday succeeded in liquefying several gases by combining pressure and cold for the purpose. He produced several new kinds of optical glasses. His greatest chemical discovery

was benzene, which he separated from oil gas, and which since then *found world-wide application*[1].

Faraday's attention was turned to the relation between magnetism and electricity. In 1821 he placed a wire carrying an electric current from a battery round the pole of a magnet. When the wire began to move he also danced round the revolving circuit, his face shining with joy. Many years will pass before this discovery becomes the basis of the electric motor.

All that scientific world had known about electromagnetism by that time was that if current is run through a copper wire around a piece of iron, the iron becomes a magnet. Faraday asked himself: can electricity be made with the help of a magnet? For a long time he tried different experiments to solve the problem. He first produced a current in a wire by a magnet. In 1831 he showed that an electric current can induce another current in a different circuit. This discovery of the induction of electric currents later became the basis of all modern electrical engineering. Faraday founded the theory of electric and magnetic fields.

Faraday had no formal education, especially in mathematics. All his conclusions and theories were based on many experiments. He recorded and described in his diary 16,041 experiments he had made. He believed only the things which could be tested, shown and touched.

All his life Faraday remained poor. He believed that a scientist could not serve science for money.

He was a famous scientist but he remained a modest man. *Through*[2] his love for truth and untiring work he became one of the greatest men of science.

COMMENTARY

[1] **found world-wide application** начали использовать во всем мире
[2] **through** благодаря

I. Retell the text.

24. BENJAMIN FRANKLIN (1706—1790)

Benjamin Franklin lived a long life. He was born in 1706 and died in 1790. He was a journalist and statesman, diplomat and poet.

His most important scientific work was done in the field of electricity. He *brought into regular use*[1] the terms «electri-

cal battery», «conductor» and «nonconductor». His division of different states of electricity into «positive» or «plus» and «negative» or «minus» *still holds good*[2].

Franklin proved that the electric charge can be taken from a passing cloud and conducted harmlessly to the Earth.

Thus a rod placed above the highest part of a building or a ship and reaching the ground protects them from lightning. The *lightning rod*[3] was Franklin's greatest discovery. Lightning was a terrible and mysterious force. Nobody knew what could be done to prevent harm done by it. The lightning rod was tested and recognized although some years passed before its action and usefulness were understood properly.

The first lightning rod in England was used only in 1760. Lomonosov, the great Russian scientist, knew Franklin's works and valued him highly as a scientist. He was the first to use the lightning rod in Russia for the protection of his house and for experiments.

Franklin's studies of electricity and his inventions of the lightning rod brought him universal fame.

We have become so used to Franklin's rod that its value is often forgotten. But at his time its effect on the public mind was very great, it was much like the effect produced by the discovery of atomic energy in our time.

Franklin studied heat conductors, the origin of storms, medicine, natural history, political economy and mathematics.

He explained that clothes make the body warm by keeping the natural heat; that wool is warmer than cotton because it is much poorer conductor. In one of his experiments he proved that white clothes are better than black ones for a hot, sunny climate. He did not ask money for his inventions.

Franklin was a good writer. Everything he wrote— a philosophical work or just a letter to a friend — was clear and easy to read. We know some of his phrases that are widely used now; «Early to bed, early to rise, makes a man healthy, wealthy and wise», «Remember, that time is money», «A word to the wise is enough».

COMMENTARY

[1] **brought into regular use** *вд.*: ввел
[2] **still holds good** остается в силе и теперь
[3] **lightning rod** громоотвод

I. Retell the text.

25. FREDERIC JOLIOT CURIE, SCIENTIST AND CHAMPION OF PEACE

The name of Frederic Joliot Curie is known to millions throughout the world. *It is held in respect*[1] by scientists in their laboratories and by young men and women in college auditoriums. This name has become a symbol in the battle for peace and against the threat of another world war.

He was born on March 19, 1900. In his youth *he had the good fortune to make the acquaintance*[2] with the famous Franch scientist, Professor Paul Longevin, at the School of Physics and Applied Chemistry. On Professor Longevin's recommendation Marie Curie took the gifted youth on as a laboratory assistant at the Paris Institute. This played a key part in his life. It was here that he met Irene Curie, whom he later married.

At first he worked at the Radium Institute and then at the College de France. In 1944 he was appointed Director of the National Centre of Scientific Research, and later France's High Commissioner for Atomic Energy.

In 1935 Frederic and Irene Joliot Curie were awarded the Nobel Prize for their synthesis of new radioactive elements. He was one of the first to advocate the use of atomic energy for peaceful purposes.

Joliot Curie was elected a member of 17 academies *and awarded honorary doctorates*[3] by many universities. His contribution to uniting the scientists of the world was enormous. A great patriot he fought in the French Resistance during nazi occupation. At the risk of his life, he made weapons and delivered them to Resistance fighters. He hid the stock of heavy water from the nazis, and as a result they were unable to develop atomic weapon. The whole of his life and struggle led him to join the ranks of the French Communist Party. A great friend of the Soviet Union, Frederic J. Curie *rejoiced at the news*[4] that an international atomic energy research centre had been set up at Dubna, near Moscow, and he visited it several times. *He was on friendly term with*[5] many Soviet scientists, writers and other cultural personalities.

The French scientist had a high opinion of the Soviet peoples' efforts to prevent another war and of the peace-loving acts of the Soviet Communist Party and Government.

Frederic Joliot Curie was one of the founders of the peace movement. He opened the First Peace Congress in Paris in 1949, and was the first President of the World Peace Council,

He was one of the authors of the famous Stockholm Appeal calling for a ban on the manufacture and use of *weapons of mass annihilation*[6].

He was awarded the International Lenin Prize «For the Promotion of Peace Among the Nations». «The Lenin Peace Prize is a high honour», he said in his *speech of acknowledgement*[7] at the presentation ceremony in the Sverdlov Hall of the Moscow Kremlin. «This awareness becomes a tremendous joy when you know that the high honour accorded to you is shared by all your dear brothers-in-arms».

The inspiring name of the great scientist and courageous champion of peace lives on in the hearts of all the supporters of peace throughout the world.

COMMENTARY

[1] **it is held in respect** пользуется уважением
[2] **he had the good fortune to make the acquaintance** он имел счастье познакомиться
[3] **and awarded honorary doctorates** присвоено почетное звание доктора
[4] **rejoiced at the news** обрадовался известию
[5] **he was on friendly terms with** он поддерживал дружеские отношения с
[6] **weapons of mass annihilation** оружие массового уничтожения
[7] **speech of acknowledgement** ответная речь по случаю награждения

26. LONDON

London is one of the largest cities in the world. London is the capital of Great Britain. It was founded hundreds of years before our era.

London is situated on the river Thames about 40 miles from its mouth. The Thames is very deep, it is crossed by many bridges. London Bridge is the oldest among them.

London is the administrative, political, highly-developed industrial, commercial and cultural centre of England; it is also a seaport with the largest system of docks in the world.

«Great London» is nearly thirty miles wide. Its population is about 9 million. London consists of many parts and they differ from each other. There is the West End and the East End, the City and Soho, Kensington and many others.

The City is only a very small part of modern London. It occupies only one square mile. About ten thousand people live there. It is a centre of commerce and trade. The City is the business part of London. There are banks, offices, agencies there.

The West End is the place where rich people live. The best shops, clubs, restaurants, buildings, theatres and parks are there. The National Gallery, the British Museum and Hyde Park are in this part of the city.

Parks are very beautiful in London. They are planned to look as natural as nature itself. Londoners love their parks and are proud of them.

The East End is a great industrial area of London. Many factories and plants, various industrial enterprises are in this region. The working people live there.

There are many places of interest in London.

Trafalgar Square is in the centre of London. A monument to Admiral Nelson stands in it. The large platform of the monument is often used by the orators when there are large meetings or demonstrations for peace, disarmament, for better pensions which are often organized in the square. The National Gallery is in Trafalgar square. The national collection of pictures is kept there.

The Houses of Parliament is on the left bank of the Thames. «Big Ben» — the huge clock — is on one of the towers of the Houses of Parliament. The clock has four round faces. At nights the faces of the clock are seen from every part of the town.

Westminster Abbey is the place where many outstanding poets, writers and scientists of England are buried.

Tower of London was a fortress, then palace of kings; it was a prison and now it is a museum. It is visited by many foreign tourists.

There are many places in London associated with the name of Marx, Engels and Lenin. Lenin visited London several times. The British Museum contains a collection of unique manuscripts and rare books. Marx worked here on his «Capital». Lenin also worked there.

The streets of London seem all alike as well as the houses. They are the same in colour and style. There is a street of brown houses, the street of red houses, etc.

The traffic in London is heavy. There are many different cars, buses, motor-cars in the streets. The English buses are double-decked, they are high and red.

As London is situated not far from the sea it is famous for its fogs. Sometimes fogs are so thick that the traffic stops. But there are many days when the weather is fine and warm, the sun shines brightlyy and London looks beautiful. Really London is the city of contrasts.

THE INVENTION OF THE TELEGRAPH

The first practical telegraph was invented by the famous English scientist Charles Wheatstone in 1837. His telegraph was used in England for several years. But the telegraph invented by the American inventor Samuel Morse was more successful. Morse began work on his model in 1832, the same year as Wheatstone, and completed it in 1837. He proposed to put it in use in the United States. The first experimental telegraph line between Washington and Baltimore was built in 1844.

Many improvements have been made on the Morse telegraph, including one by Thomas Edison, who invented a method of sending four messages over the same line at the same time.

ALEXANDER BELL — THE INVENTOR OF THE TELEPHONE

Alexander Bell never planned to be an inventor. He wanted to be a musician or a teacher of deaf people. In 1863, when Alexander was only 16, he became a teacher in a boys' school in Scotland. But the wish to teach deaf people made him to read books about sound and he started to work on some of his own experiments. Reading scientific literature was not easy for him, but he worked hard and learned a lot about the laws of sound. He became interested in the telegraph, and he tried to find a way to send musical sounds through the wires. These experiments were not very successful.

At the age of twenty-five Bell became interested in finding a way to send the human voice through an electric wire. He found an assistant, Tom Watson, who knew a lot about building electric machines. They worked together to build a machine that people could use to talk to one another over long distances.

Two years later when two young men were working on a new transmitter, Alexander spilled some acid on himself. Tom Watson, who was alone in another room, heard a voice. The voice was coming through a wire to a receiver on the table. The voice was Alexander Bell's! It was saying, «Come here, Mr. Watson. I want you!» Tom and Alexander realized that their talking machine worked.

The first permanent telephone line was built in Germany in 1847. And in 1878, the first telephone exehange was established in New Jersey. By 1915, a coast-to-coast telephone line was opened in the United States — 5,440 km from New York to San Francisco.

ALFRED NOBEL (1833—1896)

Alfred Nobel, the great Swedish scientist and inventor, was a skilful chemist and excellent linguist, speaking Swedish, Russian, German, French and English. From his youth he had taken a serious interest in literature and philosophy. He was quick to see industrial openings for his scientific inventions. He combined the qualities of an original scientist with those of a forward looking industrialist.

He invented a new explosive, dynamite, to improve the peaceful industries in mining and road building, but saw it used as a weapon of war. His greatest wish was to see the end of wars, and thus peace among nations. He spent much time and money working for this cause until his death. His famous will, in which he left money to provide prizes for outstanding work in Physics, Chemistry, Physiology, Medicine, Literature and Peace, is a memorial to his interests and ideals. A lover of mankind he is remembered and respected long after his death.

КОНТРОЛЬНЫЕ ТЕСТЫ

МЕТОДИЧЕСКИЕ УКАЗАНИЯ К ВЫПОЛНЕНИЮ КОНТРОЛЬНЫХ ТЕСТОВ

Контрольные программированные тесты разработаны для студентов I и II курсов (первого, второго, третьего, четвертого семестров). Тесты составлены на основе лексического и грамматического материала учебника.

Выполняются тесты перед каждой аттестацией. Тесты 1, 2 выполняются в первом семестре на 7, 14 неделе. Тесты 3, 4 выполняются во втором семестре, 5, 6 — в третьем семестре, 7, 8 — в четвертом семестре.

Техника выполнения тестов:

На листе бумаги студенты пишут номер теста, номер варианта, номер задания и цифру-ответ.

Цель контрольных тестов — осуществить перед каждой аттестацией контроль степени усвоения студентами учебного материала согласно программе за данный период, за 10—15 минут.

Кроме контроля знаний студентов, тесты можно использовать для повторения и закрепления отдельных разделов грамматики и лексики.

Т1-1, I КУРС, 1-й СЕМЕСТР

I. Определите, какие слова или группы слов из подчеркнутых являются: 1) подлежащим, 2) сказуемым, 3) дополнением:

1. Students receive stipends and live in hostels.

II. Определите, в каком предложении глагол употреблен в 1) Present Indefinite, 2) Past Indefinite, 3) Future Indefinite:

1. An extramural student has the extra-paid leave during exams. 2. Last year this student entered the Polytechnical Institute. 3. Students will do practical work at the laboratory.

III. Определите, в каком предложении глагол-сказуемое употреблен в 1) Past Indefinite Active, 2) Past Indefinite Passive:

1. A persistent effort was made in the Soviet Union to further development of higher and secondary specialized education. 2. Lomonosov made a great contribution to the development of Russian science.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. Many houses . . . in our city last year. (a) built, b) were built). 2. His translation . . . by the teacher. (a) corrected, b) was corrected). 3. Our laboratory . . . with new equipment. (a) will provide, b) will be provided). 4. The study of kinematics . . . by the study of dynamics. (a) is followed, b) followed). 4. This method will . . . about. (a) be much spoken, b) speak).

V. Определите, какой из вопросов относится ко всему предложению:

Soviet scientists make great contribution to the development of world science.

1. Did Soviet scientists make...? 2. Do Soviet scientists make...? 3. Will Soviet scientists make... ?

VI. Определите, какие существительные имеют форму множественного числа:

datum, radius, nuclei, phenomena, bases, analysis, boxes, libraries.

VII. Определите, какие местоимения (anything,

something или nothing) следует употребить в данных предложениях:

1. There is . . . interesting on this subject in the library. 2. Is there . . . interesting on this subject in the library? 3. There is . . . interesting on this subject in the library.

VIII. Определите, какие предлоги (1), in, 2) of, 3) at) следует употребить в данных предложениях:

1. Lomonosov was born . . . 1711, . . . the village . . Denisovka. 2. . . . the age . . . 19 he went to Moscow on foot. 3. . . . Moscow he entered the Academy. 4. He was one . . . top students.

IX. Определите, какие слова являются 1) существительными, 2) прилагательными:

1. culture, 2. scientific, 3. establishment, 4. specialist, 5. cultural, 6. education.

Т1-2, I КУРС, 1-й СЕМЕСТР

I. Определите, какие слова из подчеркнутых являются 1) подлежащим, 2) сказуемым, 3) дополнением:

The doors of higher schools opened for workers and peasants after the Great October Socialist Revolution.

II. Определите, в каком предложении глагол употреблен в 1) Present Indefinite, 2) Past Indefinite, 3) Future Indefinite:

1. The extramural students posses everything necessary for studies. 2. Belinsky considered Lomonosov the father of Russian literature. 3. All these students will receive stipends and will live in hostels.

III. Определите, в каком предложении глагол-сказуемое употреблен в 1) Future Indefinite Active, 2) Future Indefinite Passive:

1. A number of new substances will be produced by chemists. 2. Chemists will produce a lot of new substances.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. Pre-revolutionary Russia . . . one of the last places in Europe in the development of education. (1) occupies, 2) 2) occupied). 2. The number of literates in villages . . . especially low. (1) is, 2) was). 3. Lomonosov . . . in 1711 in the village of Denisovka. (1) born, 2) was born). 4. The Russian language . . . to students and school-children in nearly a hundred of countries. (1) teach, 2) is taught). 5. The students . . . with everything necessary for doing research. (1) will provide, 2) will be provided).

V. Определите, какой из вопросов относится ко всему предложению:

In 1965 scientists discovered the omega-minus particle.

1. Do scientists discover... ? 2. Did scientists discover... ? 3) Will scientists discover... ?

VI. Определите, какие существительные имеют форму множественного числа:

language, men, women, nuclei, phenomenon, boxes, cities, phonetics.

VII. Определите, какие местоимения (1) any, 2) some или 3) no) следует употребить в данных предложениях:

1. There are . . . books on the table. 2. Are there . . . books on the table? 3. There are . . . books on the table.

VIII. Определите, какие предлоги (1) for, 2) of, 3) with, 4) in) следует употребить в данных предложениях:

1. . . . the convenience . . . students many educational institutes function at enterprises. 2. Extramural students can attend evening lectures and use all the necessary equipment and services . . . the scientific libraries. 3. Combining work . . . studies helps raise one's qualification more quickly. 4. They work . . . different branches of industry and science.

IX. Определите, какие слова являются 1) существительными, 2) прилагательными:

knowledge, country, educational, astronomical, instructor, illiterate.

Т1-3, I КУРС, 1-й СЕМЕСТР

I. Определите, какие слова из подчеркнутых являются 1) подлежащим, 2) сказуемым, 3) дополнением:

Extramural students attend evening lectures and use all the necessary equipment and services of the scientific libraries.

II. Определите, в каком предложении глагол употреблен в 1) Present Indefinite, 2) Past Indefinite, 3) Future Indefinite:

1. All graduates from higher schools get work according to their speciality. 2. Lomonosov formulated and experimentally proved the law of conservation of matter. 3. These students will be teachers after graduating from the Institute.

III. Определите, в каком предложении глагол-сказуемое употреблен в 1) Past Indefinite Active, 2) Past Indefinite Passive:

1. Many experiments were made in the laboratory. 2. The students made many experiments in the laboratory.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. University's laboratories . . . with the latest equipment. (a) fitted, b) are fitted). 2. The Peoples' Friendship University . . . on October 1, 1960. (a) opens, b) was opened). 3. The Soviet people . . . an active part in solving all problems in the life of our country. (a) is taken, b) take). 4. The students . . . the opportunity to see a computer centre. (a) will give, b) will be given).

V. Определите, какой из вопросов относится ко всему предложению:

All kinds of substances consist of very small invisible particles — atoms.

1. Did all substances consist . . .? 2. Do all substances consist . . . ?

VI. Определите, какие существительные имеют форму множественного числа:

basis, class, radii, data, classes, nucleus, men, newspapers.

VII. Определите, какие местоимения (any, some, no) следует употребить в данных предложениях:

1. There are . . . interesting articles in this journal. 2. Are there . . . interesting articles in this journal? 3. There are . . . interesting articles in this journal.

VIII. Определите, какие предлоги (in, for, after, of) следует употребить в данных предложениях:

1. Electronics has become part and parcel . . . modern higher school. 2. General educational schools are not the only way . . . the young people to get a secondary education. 3. . . . eight years at school they can enter a secondary vocational school or specialized secondary school. 4. A considerable increase . . . labour productivity can be achieved on the basis of accelerating scientific and technological progress.

IX. Определите, какие слова являются 1) существительными, 2) прилагательными:

independent, development, founder, scientific, famous.

Т1-4, I КУРС, 1-й СЕМЕСТР

I. Определите, какие слова или группы слов из подчеркнутых являются 1) подлежащим, 2) сказуемым, 3) дополнением:

The scientific and technological progress opens most promising prospects for humanity.

II. Определите, в каком предложении глагол употреблен в 1) Present Indefinite, 2) Past Indefinite, 3) Future Indefinite:

1. Higher school must give the young people an all-round education. 2. Lomonosov put forward the theory of the existence of innumerable worlds. 3. These students will graduate from the institute in five years.

III. Определите, в каком предложении глагол-сказуемое употреблен в 1) Present Indefinite Active, 2) Present Indefinite Passive:

1. Moscow University is named after M. V. Lomonosov. 2. The University regularly organizes refresher courses for school-teachers.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. The students . . . with a stipend, hostel accommodation and free medical services. (1) provides, 2) are provided). 2. The USSR . . . in 1922. (1) founded, 2) was founded). 3. This club . . . next summer. (1) opened, 2) will be opened). 4) Universities . . . sources of scientific knowledge and culture. (1) is, 2) are).

V. Определите, какой из вопросов относится ко всему предложению:

Higher school must give the young people an all-round education.

1. Must higher school give . . . ? 2. Does higher school give . . . ? Will higher school give . . . ?

VI. Определите, какие существительные имеют форму множественного числа:

analysis, radius, women, men, libraries, box, phenomena, classes.

VII. Определите, какие местоимения (any, some, no) следует употребить в данных предложениях:

There are . . . radio-active elements in our laboratory. — Are there . . . radio-active elements in our laboratory? — There are . . . radio-active elements in our laboratory.

VIII. Определите, какие предлоги (in, to, on) следует употребить в данных предложениях:

1. . . . 1736 Lomonosov went . . . Germany. 2. . . . his return home Lomonosov became assistant professor of the physics class. 3. Lomonosov devoted his life . . . his Motherland. 4. Physical chemistry became an independent science . . . the 19th century.

IX. Определите, какие слова являются 1) существительными, 2) прилагательными:

teacher, equipment, social, cultural, scientist, instructor.

Т2-1, I КУРС, 1-й СЕМЕСТР

I. Определите, в каком предложении глагол «to be» употреблен в качестве 1) смыслового глагола, 2) вспомогательного глагола:

1. Atomic icebreaker «Lenin» was launched in Leningrad on December 5, 1957. 2. It was one of our country's great achievements.

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. Last month our scientists . . a new satellite. — 1. was launched
2. Yesterday a new satellite... — 2. launched

III. Определите время и залог глагола-сказуемого в данных предложениях (1) Past Indefinite Active, 2) Past Indefinite Passive):

1. A number of new substances was produced by chemists. 2. Chemists produced a lot of new substances.

IV. Определите, какую форму глагола следует употребить в данных предложениях:

1. The substance formed . . . of two elements. (a) made up, b) was made up). 2. Several new elements . . . artificially. (a) produced, b) were produced). 3. This method can . . . (a) rely upon, b) be relied upon). 4. His first experiment . . . by a number of other important experiments. (a) followed, b) was followed).

V. Определите, какое время выражает глагол-сказуемое придаточного предложения в русском языке (1) настоящее, 2) прошедшее, 3) будущее):

If you go to the library, I shall join you.

VI. Определите, какая форма глагола является эквивалентом модального глагола «can»:

1. to be able (to); 2. to have (to); 3. to be allowed (to).

VII. Подберите соответствующую форму прилагательного:

1. Liquid nitrogen is . . . than water. (a) lighter, b) lightest). 2. There are . . . letters in the word«our» than in the word «institute». (a) fewest, b) fewer). 3. Copper is one of the . . . conductors of electricity, (a) better, b) best).

VIII. Определите, какие местоимения (much, many, little, few) следует употребить в данных предложениях:

1. He has . . . dictionaries, they are of different types. 2. She has . . . time. She will do her work well. 3. There is . . . milk in the cup. 4. There are . . . pencils in the pencil-box.

IX. Определите, какие местоимения (our, ours) следует употребить в данных предложениях:

1. These are . . . dictionaries. 2. These dictionaries are . . .

X. Определите, какое слово является синонимом к выделенному слову:

1. We **used** two types of thermometres in our work. (a) provided, b) applied). 2. The first sputnik was **created** in the Soviet Union, (a) invented, b) built).

Т2-2, I КУРС, 1-й СЕМЕСТР

I. Определите, в каком предложении глагол «to be» употреблен в качестве 1) смыслового глагола, 2) вспомогательного глагола:

1. This laboratory is equipped with up-to-date equipment. 2. The laboratory is our workplace.

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. In recent years great changes . . . in the life of our country.	1. took place
2. During the 19th century a number of discoveries in science and industry . . .	2. were made

III. Определите время и залог глагола-сказуемого в данных предложениях (1) Past Indefinite Active, 2) Past Indefinite Passive):

1. The Moscow University was named after M. V. Lomonosov. 2. Academician I. V. Kurchatov made a major discovery in nuclear physics.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. Many synthetic materials . . . in special laboratories. (a) tested, b) are tested). 2. Special instruments for measuring cosmic rays . . . in satellites. (a) installed, b) are installed). 3. The experiment made by our group must . . . in details.

(a) discussed, b) be discussed). 4. The exploration of cosmic space . . . by a number of important discoveries. (a) followed, b) was followed).

V. Определите, какое время выражает глагол-сказуемое придаточного предложения в русском языке (1) настоящее, 2) прошедшее, 3) будущее):

When they perform their experiments, they will be able to make a report on this problem.

VI. Определите, какая форма глагола является эквивалентом модального глагола «must»:

1. to have (to); 2. to be able (to); 3. to be allowed (to).

VII. Подберите соответствующую форму прилагательного:

1. Zink is . . . than other metals. (a) cheaper, b) cheapest). 2. Lead is one of the . . . metals, (a) heavier, b) heaviest). 3. Silver is one of the . . . conductors of electricity. (a) better, b) best).

VIII Определите, какие местоимения следует употребить в данных предложениях 1) much, 2) many, 3) little, 4) few:

1. They read . . . books. 2. We have . . . time. 3. She has . . . ink. 4. There are . . . new words in this text, the text is not difficult.

IX. Определите, какое местоимение (1) your, 2) yours) следует употребить в данных предложениях:

1. These are . . . books. 2. These books are . . .

X. Определите, какое слово является синонимом к выделенным словам:

1. Many **outstanding** scientists work at our institute. (a) heroic, b) well-known). 2. This method was successfully **used** in our work. (a) changed, b) utilized).

Т2-3, I КУРС, 1-й СЕМЕСТР

I. Определите, в каком предложении глагол «to be» употреблен в качестве 1) смыслового глагола, 2) вспомогательного глагола:

1. This work is based on the latest data obtained by scientists. 2. Universities are sources of scientific knowledge and culture.

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. Many new houses . . . in our town 1. built last year.

2. We . . . many new houses in our town last year. 2. were built

III. Определите время и залог глагола-сказуемого в данных предложениях (Past Indefinite Active, Past Indefinite Passive):

1. Great progress in the studies was made by the students of our group last term. 2. The students of our group made great progress in their studies last term.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. The students . . . with everything necessary for their research. (a) provided, b) are provided). 2. The new device . . . about. (a) spoke, (б) was much spoken). 3. His translation . . . by the teacher. (a) corrected, b) was corrected). 4. The study of kinematics . . . by the study of dynamics. (a) followed, b) is followed).

V. Определите, какое время выражает глагол-сказуемое придаточного предложения в русском языке (настоящее, прошедшее, будущее):

When the weather is fine, we shall go for a walk.

VI. Определите, какая из глагольных форм является эквивалентом модального глагола «must»:

1. to have (to); 2. to be able (to); 3. to be allowed to.

VII. Подберите соответствующую форму прилагательного:

1. This student is . . . of all in our group. (a) best, b) better). 2. Aluminium is . . . than lead. (a) lightest, b) lighter). 3. Lead is one of the . . . metals. (a) heavier, b) heaviest).

VIII. Определите, какие местоимения (much, many, little, few) следует употребить в данных предложениях:

1. They have . . . interesting books. 2. She has . . . friends. 3. There is . . . air in this small room. 4. Are there . . . people in the room?

IX. Определите, какие местоимения (their, theirs) следует употребить в данных предложениях:

1. These are . . . control works. 2. These control works are . . .

X. Определите, какое слово является синонимом к выделенным словам:

1. There are 17 **faculties** at our institute. (a) laboratories, b) departments). 2. All laboratories of our institute have **modern** equipment. (a) new, b) up-to-date).

Т2-4, I КУРС, 1-й СЕМЕСТР

I. Определите, в каком предложении глагол «to be» употреблен в качестве 1) смыслового глагола, 2) вспомогательного глагола:

1. The students are provided with all necessary conditions for study. 2. Moscow University is one of country's oldest educational establishments.

II. Определите, какой глагол следует употребить в данных предложениях:

1. New schools and institutes . . . in our city in the near future. 1. do
2. We . . . our practical work in laboratories and workshops. 2. will be opened

III. Определите время и залог глагола-сказуемого в данных предложениях (Past Indefinite Active, Past Indefinite Passive):

1. Last year many graduates of our institute were sent to work at the industrial enterprises. 2. Yesterday I sent a letter to my friend.

IV. Определите, какую глагольну форму следует употребить в данных предложениях:

1. Many interesting data . . . during our experiments. (a) received, b) were received). 2. These data . . . to. (a) referred, b) are often referred). 3. These substances . . . much at. (a) worked, b) were worked). 4. The readings of this device can . . . upon. (a) relied, b) be relied).

V. Определите, какое время выражает глагол-сказуемое придаточного предложения в русском языке (настоящее, прошедшее, будущее):

When (if) you go to the conference, you will hear many interesting reports.

VI. Определите, какая из глагольных форм является эквивалентом модального глагола «may»:

1. to be allowed (to); 2. to be able (to); 3. to have (to).

VII. Подберите соответствующую форму прилагательного:

1. The more experiments scientists perform, the . . . is their knowledge of the structure of matter. (a) greater, b) greatest). 2. From the . . . time people dreamed of air flights. (a) earlier, b) earliest). 3. Water is one of the . . . things in our life. (a) more common, b) most common).

VIII. Определите, какие местоимения (many, much, little, few) следует употребить в данных предложениях:

1. We have . . . different colour pencils. 2. There is . . . light in his room. 3. They had . . . fresh water. 4. I don't know . . . English words, that is why I have to use a dictionary.

IX. Определите, какие местоимения (my, mine) следует употребить в данных предложениях:

1. This is . . . pencil. 2. This pencil is . . .

X. Определите, какое слово является синонимом к выделенным словам:

1. This method of our work is **accurate**. (a) good, b) exact). 2. The institute has many laboratories and **classrooms**. (a) chambers, b) auditoriums).

Т1-1, I КУРС, 2-й СЕМЕСТР

I. Определите, в каком предложении глагол «to have» употреблен в качестве 1) смыслового глагола, 2) вспомогательного глагола:

1. Soviet scientists have made a great contribution to world science. 2. They have a lot of time to do this work. 3. A researcher has performed a lot of experiments.

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. Today we . . . a very interesting text.	1. was translated
2. A very interesting text . . . at the lesson yesterday.	2. have translated

III. Определите время и залог глагола-сказуемого в данных предложениях (Present Indefinite Active, Present Indefinite Passive):

1. Kiev is called the Mother of Russian cities. 2. We call Kiev the Mother of Russian cities.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. The work of these scientists . . . with the problem of utilization of solar energy. (1) was confronted, 2) confronted). 2. The procedure of the experiment . . . out. (1) will be worked, 2) worked). 3. The first sputniks . . . by a number of sputniks used for different purposes. (1) were followed, 2) followed). 4. The successes of cosmic researches. . . about in the world. (1) are much spoken, 2) spoke).

V. Определите время и залог глагола в данных предложениях:

1) Present Continuous Active, 2) Present Continuous Passive):

1. Cybernetics is being used in space research. 2. Electronics is becoming very important for space research.

VI. Подберите соответствующую форму глагола:

1. To-morrow Professor N. . . . us a lecture.	1. is delivered 2. delivered 3. will deliver
2. Automation . . . widely . . in all branches of industry.	1. is being used 2. has been used 3. was used

VII. Подберите в правой колонке английские эквиваленты следующих предложений:

1. Что вы делаете сейчас? Мы учимся.	1. What do you do? We study 2. What are you doing now? We are studying. 3. What have you done? We have studied.
2. Что вы делали, когда мы пришли?	1. What were you doing when we came? 2. What had you done by the time we came? 3. What will you be doing when we come?

VIII. Подберите соответствующую форму прилагательного:

An atom is . . . than a molecule.	1. small 2. smaller 3. smallest

IX. Какие слова в правой колонке являются антонимами по отношению к словам в левой колонке:

1. far	1. unknown
2. before	2. easy
3. difficult	3. after
4. known	4. near

Т1-2, I КУРС, 2-й СЕМЕСТР

I. Определите, в каком предложении употреблен глагол to have в качестве 1) смыслового глагола, 2) вспомогательного глагола, 3) модального глагола:

1. Lomonosov's dream of the development of Russian science has come true. 2. The Soviet Union has tremendous natural resources. 3. All the laboratory vessels have to be carefully washed.

II. Определите, какой глагол следует употребить в данных предложениях:

1. Since the Great October Socialist Revolution our institute . . . great progress.	1. took place
2. During the 19th century a great development of science and industry . . .	2. has made

III. Определите время и залог глагола-сказуемого в данных предложениях (Present Indefinite Active, Present Indefinite Passive):

1. All the historical life of the Ukraine is closely linked with Kiev. 2. Day by day the old city of Kiev grows more and more beautiful.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. The substances obtained . . . to a chemical change. (1) subjected, 2) were subjected). 2. Different new elements . . . artificially. (1) produced, 2) are produced). 3. This work . . . by many scientists everywhere in the world. (1) referred to, 2) is referred to). 4. Many other questions . . . to in some of his works. (1) were paid attention, 2) paid attention). 5. This metal . . . by the oxygen of the air. (1) is acted upon, 2) acted upon). 6. His early experiments . . . by a number of new important experiments. (1) were followed, 2) followed).

V. Определите время и залог глагола в данных предложениях (Present Continuous Active, Present Continuous Passive):

1. At present Soviet democracy is further being developed and socialist legality consolidated. 2. The operators are preparing programmes for automatic devices.

VI. Подберите соответствующую форму глагола:

1. The profession of an engineer . . . systematic training.	1. required 2. is required 3. requires
2. A party of students . . . on an expedition to the Antarctic next year.	1. will go 2. have gone 3. are gone

VII. Подберите в правой колонке английские эквиваленты следующих предложений:

1. Студенты нашей группы сейчас пишут контрольную работу по математике.	1. The students of our group will write a control paper in mathematics. 2. The students of our group are writing a control paper in mathematics. 3. The students of our group wrote a control paper in mathematics yesterday.
2. Что вы делаете в воскресенье?	1. What do you do on Sunday? 2. What were you doing on Sunday? 3. What will you do on Sunday?

VIII. Подберите соответствующую форму прилагательного:

1. A molecule is the . . . particle of a compound.	1. small 2. smallest 3. smaller

IX. Какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. at present	1. main
2. etc.	2. power plant
3. power station	3. and so on
4. chief	4. now

Т1-3, I КУРС, 2-й СЕМЕСТР

I. Определите, в каком предложении употребляется глагол в качестве 1) смыслового глагола, 2) вспомогательного глагола, 3) модального глагола:

1. Important changes have occurred in cultural, scientific and educational life of our country. 2. The students have

all the necessary conditions for creative work. 3. Everybody has to perfect his speciality.

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. Today a new satellite . . .	1. was launched
2. Yesterday a new satellite. . .	2. has been launched

III. Определите время и залог глагола-сказуемого в данных предложениях (Future Indefinite Active, Future Indefinite Passive):

1. A scientific conference will be held in our institute. 2. We shall hold a scientific conference in our institute.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. Many houses . . . in our city last year. (a) built, b) were built). 2. His translation . . . by the teacher. (a) corrected, b) was corrected). 3. Our laboratory . . . with new equipment. (a) will provide, b) will be provided). 4. The study of kinematics . . . by that of dynamics. (a) is followed, b) follows). 5. This method will . . . about. (a) be much spoken, b) speak). 6. Pavlov's works . . . (a) are referred to, b) refer).

V. Определите время и залог глагола в данных предложениях (Present Continuous Active, Present Continuous Passive):

1. Automation is being used in space research. 2. Electronics is becoming very important for engineers.

VI. Подберите соответствующую форму глагола:

1. Popov . . . the radio in 1895.	1. is invented 2. invented 3. invents
2. In summer the students . . . practical work at the instrument making plant.	1. will do 2. have been done 3. were being done

VII. Подберите в правой колонке английские эквиваленты следующих предложений:

1. Студенты будут готовиться к экзамену завтра весь день.	1. The students will prepare for their examination to-morrow. 2. The students will be preparing for their examination all day tomorrow. 3. The students prepare for their examination systematically.

2. Сейчас мы делаем перевод очень интересного текста.	1. Tomorrow we shall translate a very interesting text. 2. Now we are translating a very interesting text. 3. Yesterday we were translating a very interesting text.

VIII. Подберите соответствующую форму прилагательного:

The equipment of this laboratory is . . . than yours.	1. good 2. better 3. best

IX. Какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. to generate	1. many
2. for instance	2. to apply
3. to use	3. for example
4. a lot of	4. to produce

Т1-4, I КУРС, 2-й СЕМЕСТР

I. Определите, в каком предложении глагол «to have» употребляется в качестве 1) смыслового глагола, 2) вспомогательного глагола, 3) модального глагола:

1. Many new important industrial enterprises will have been built in Siberia by the end of the five-year period. 2. Our laboratory has modern equipment. 3. We have to control the work of these devices.

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. A new spaceship . . . this month.	1. was launched
2. Last year a spaceship . . .	2. has been launched

III. Определите время и залог глагола-сказуемого в данных предложениях (Past Indefinite Active, Past Indefinite Passive):

1. The monument to Lomonosov was erected as a mark of gratitude to the man, who gave Russia her first University. 2. Lomonosov showed keen interest in the development of university education.

IV. Определите, какую глагольную форму следует употребить в данных предложениях:

1. One of the basic laws of thermodynamics . . . in 1750—1751. (a) established, b) was established). 2. The conductor . . . by the magnetic field. (a) acted upon, b) is acted upon). 3. The rate of any reaction . . . by many factors. (a) influenced, b) is influenced). 4. At the last conference the new discoveries . . . much . . . (a) spoke about, b) were much spoken about). 5. They . . . new instructions. (a) sent, b) will be sent).

V. Определите время и залог глагола в данных предложениях (Present Continuous Active, Present Continuous Passive):

1. The decisions taken by the USSR Supreme Soviet are being introduced in our every-day life. 2. Science is playing an increasing role in developing productive forces.

VI. Подберите соответствующую форму глагола:

1. Our institute . . . well equipped workshops.	1. had 2. will have 3. has
2. Tomorrow he . . . a new apparatus.	1. will test 2. is tested 3. was tested

VII. Подберите в правой колонке английские эквиваленты следующих предложений:

1. Что вы вчера делали с 5 до 7 часов вечера?	1. What have you done? 2. What were you doing from 5 till 7 o'clock yesterday? 3. What are you doing?
2. Что вы будете делать завтра с утра до вечера?	1. What will you be doing tomorrow from morning till night? 2. What are you doing now? 3. What did you do yesterday?

VIII. Подберите соответствующую форму прилагательного:

The structure of matter is one of the . . . subjects.	1. interesting 2. most interesting 3. more interesting

IX. Какие слова в правой колонке являются антонимами по отношению к словам в левой колонке:

1. direct	1. discharge
2. inner	2. non-conductor
3. conductor	3. outer
4. charge	4. indirect

Т2-1, I КУРС, 2-й СЕМЕСТР

I. Определите, какой из данных вопросов относится к 1) подлежащему, 2) дополнению:

The automatic station performed a soft landing on the surface of the planet.

1. What performed a soft landing? 2. What did the automatic station perform?

II. Какой из данных вопросов относится к выделенным членам предложения:

These young engineers take part **in the construction of this power plant.**

1. Do these young engineers take part in the construction of this power plant? 2. Who takes part in the construction of this power plant? 3. What engineers take part in the construction of this power plant? 4. What did young engineers take part in?

III. Определите, в каком предложении глагол «to have» употребляют в качестве 1) смыслового глагола, 2) вспомогательного глагола, 3) модального глагола:

1. The studies of Venus's atmosphere have shown that it does not contain oxygen. 2. Cosmic flights show that man's abilities have no limit. 3. They have to inform us about the results of their work.

IV. Подберите в правой колонке обстоятельство, соответствующее по смыслу данному предложению:

Several weather satellites have been launched . . .	1. at present 2. last year 3. this year 4. by the end of the year.

V. Подберите русские эквиваленты глаголов-сказуемых придаточных предложений:

1. He said that his brother worked at a plant.	1. работал 2. работает
2. I shall have finished my work before the lesson begins.	1. начинается 2. начнется

VI. Определите, какую временную форму глагола следует употребить в данных предложениях:

1. The engineer asked what the weight of the body....	1. is 2. saw
2. The students said that they.... all the examinations.	1. passed 2. had passed
3. He said that he...his exams in June.	1. will take 2. would take

VII. Определите, какой вспомогательный глагол следует употребить в данном предложении:

1. When . . . our institute founded?	1. does 2. was 3. will

VIII. Замените инфинитив в скобках соответствующей временной формой глагола:

At the meeting the reporter pointed out that one more atomic power plant (to put) into operation.	1. will be put 2. had been put 3. has been put

IX. Определите, какое английское предложение соответствует русскому предложению:

Мы думали, что доклад будет интересным.

1. We thought that the report was interesting. 2. We thought that the report would be interesting. 3. We thought that the report had been interesting.

X. Определите, какие слова в правой колонке являются антонимами по отношению к словам в левой колонке:

1. small	1. remember
2. narrow	2. strong
3. new	3. old
4. weak	4. wide
5. forget	5. big

Т2-2, 1 КУРС, 2-й СЕМЕСТР

I. Определите, какой из данных вопросов относится к 1) подлежащему, 2) дополнению:

Automation provided the control of whole factories.

1. What provided the control of whole factories? 2. What did automation provide?

II. Какой из данных вопросов относится к выделенному члену предложения:

Union Republics have a large number of higher schools.

1. Have Union Republics a large number of higher schools? 2. Who has a large number of higher schools? 3. What republics have a large number of higher schools? 4. How many higher schools have Union Republics?

III. Определите, в каком предложении глагол «to have» употреблен в качестве 1) смыслового глагола, 2) вспомогательного глагола, 3) модального глагола:

1. Cybernetics has been of great help to the development of human knowledge in all spheres of science. 2. We have a lot of different methods for solving this problem. 3. We have to use a dictionary if the text is difficult.

IV. Подберите в правой колонке обстоятельство, соответствующее по смыслу данному предложению:

Automation is being widely used . . .	1. at present 2. last year 3. often 4. by the end of the year

V. Подберите русские эквиваленты глаголов-сказуемых придаточных предложений:

1. She said that she made a lot of experiments.	1. проводила 2. проводит
2. I shall have finished my work before my friend comes.	1. приходит 2. придет

VI. Определите, какую временную форму глагола следует употребить в данных предложениях:

1. He asked whether new thermonuclear reactions . . . be controlled.	1. can 2. could
2. They said that the problem . . . scientists.	1. interests 2. interested
3. He answered that the power station . . . into operation two years before.	1. was put 2. had been put

VII. Определите, какой вспомогательный глагол следует употребить в данном предложении:

What institute . . . you study at?	1. have 2. do 3. are

VIII. Замените инфинитив в скобках соответствующей временной формой глагола:

The newspapers wrote that our physicists (to make) a very important discovery.

1. make
2. had made
3. will make
4. are making

IX. Определите, какое английское предложение соответствует русскому предложению:

Ученый сказал, что он изучает важные вопросы, связанные с космическими полетами.

1. The scientist said that he would study the problems connected with space flights.
2. The scientist said that he studied the problems connected with space flights.
3. The scientist said that he had studied the problems connected with space flights.

X. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. similar	1. to predict
2. well-known	2. each
3. to invent	3. to discover
4. to foretell	4. famous
5. every	5. like

Т2-3, I КУРС, 2-й СЕМЕСТР

I. Определите, какой из данных вопросов относится к 1) подлежащему, 2) дополнению:

These plants get energy from sunlight.

1. What gets energy from sunlight? 2. What do plants get from sunlight?

II. Какой из данных вопросов относится к выделенному члену предложения:

There is a statue of M. Lomonosov **in front of Moscow University.**

1. Is there a statue of M. Lomonosov in front of Moscow University? 2. What is in front of Moscow University? 3. What statue is there in front of Moscow University? 4. In front of what University is there a statue of M. Lomonosov? 5. Where is there a statue of M. Lomonosov?

III. Определите, в каком предложении глагол «to have» употреблен в качестве 1) смыслового глагола, 2) вспомогательного глагола, 3) модального глагола:

1. The Soviet system of education has brought knowledge within the reach of all citizens. 2. Our institute has a sports stadium. 3. You have to change the position of the device, its measurements are incorrect.

IV. Подберите в правой колонке обстоятельство, соответствующее по смыслу данному предложению:

A new rocket will have been constructed . . .	1. at present 2. last year 3. next year 4. by the end of the year.

V. Подберите русские эквиваленты глаголов-сказуемых придаточных предложений:

1. We knew that they had performed many experiments.	1. проводят 2. провели
2. They said that all the experiments had already been performed last term.	1. будут проведены 2. были проведены

VI. Подберите из правой колонки глаголы в соответствующей форме и вставьте их в предложения вместо пропусков:

1. The foreign tourists asked when the monument to T. Shevchenko...	1. was erected 2. had been erected
2. They asked if we . . . them about our town.	1. can tell 2. could tell
3. They knew that the scientist . . . at this problem.	1. will work 2. would work

VII. Определите, какой вспомогательный глагол следует употребить в данном предложении:

What . . . the main task of Soviet higher technical schools?	1. do 2. is 3. will

VIII. Замените инфинитив в скобках соответствующей временной формой глагола:

The scientists said that this discovery (to have) a very great effect on the life of mankind in future.	1. have 2. would have 3. will have 4. had

IX. Определите, какое английское предложение соответствует данному русскому предложению:

Ученого спросили, работает ли он в области мирного использования атомной энергии.

1. The scientist was asked. «Do you work in the field of peaceful uses of atomic energy?»
2. The scientist was asked whether he worked in the field of peaceful uses of atomic energy.

X. Определите, какие слова в правой колонке являются антонимами по отношению к словам в левой колонке:

1. different	1. to increase
2. unknown	2. definite
3. independence	3. dependence
4. indefinite	4. known
5. to decrease	5. similar

Т1-1, II КУРС, 3-й СЕМЕСТР

I. Определите, какое слово является 1) подлежащим главного предложения, 2) подлежащим придаточного бессоюзного предложения:

1. A luminous body is seen because of the light it sends to the eye.	1. a luminous body 2. it
2. We may say force and motion always go together.	1. force and motion 2. we

II. Определите, какую форму глагола следует употребить в данном предложении:

If a spaceship . . . in contact with a meteor, It can be destroyed.	1. came 2. comes

III. Определите, в каком предложении инверсия 1) возможна, 2) невозможна:

1. If we had enough data, we should make an interesting report. 2. Unless the temperature rises, the reaction will not increase.

IV. Определите, в каком предложении слово «provided» является 1) глаголом, 2) союзом:

1. Provided we are given all the instruments, we shall be able to continue our investigations. 2. Cybernetic installations provided the launching of sputniks and rockets.

V. Определите, какой вопрос относится к 1) подлежащему, 2) дополнению:

The automatic station performed a soft landing on the surface of the planet.

1. What performed a soft landing? 2. What did the automatic station perform?

VI. Определите, в каком предложении выделенное слово является 1) существительным, 2) глаголом:

1. Many different nationalities **people** the Soviet Union. 2. The Soviet **people** take an active part in social life of the country. 3. **Radio** and electronics are very important in space research. 4. The instruments **radio** all the necessary information from our spaceships.

VII. Определите время и залог глагола-сказуемого в данных предложениях (Present Continuous Active, Present Continuous Passive):

1. The Academy of Sciences of the USSR became a centre which is uniting all of the country's research on fundamental sciences. 2. The energy of the Sun is being used for different purposes.

VIII. Определите, какие слова в правой колонке являются антонимами по отношению к словам в левой колонке:

1. direct	1. discharge
2. inner	2. non-conductor
3. conductor	3. outer
4. charge	4. indirect

Т1-2, II КУРС, 3-й СЕМЕСТР

I. Определите, какое слово является 1) подлежащим главного предложения, 2) подлежащим придаточного бессоюзного предложения:

1. The discovery of the radiation radioactive substances emit was of great importance.	1. the discovery 2. radioactive-substances
2. The property of a substance depends on the properties of the elements it consists of.	1. it 2. the property

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. If he . . . about our experiment before, he would have helped us.	1. knew 2. had known
2. If there . . . not enough oxygen in the air, it would be unsuitable for breathing.	1. is 2. were

III. Определите, в каком предложении инверсия 1) возможна 2) невозможна:

1. If he had all the necessary equipment, he would make his experiment in time. 2. If we compare the results of our experiment, we should get the necessary data.

IV. Определите, в каком предложении слово «provided» является 1) глаголом, 2) союзом:

1. We shall do our work in time provided we have all the necessary instruments. 2. The library provided all the students with necessary books.

V. Определите, какой вопрос относится к 1) подлежащему, 2) дополнению:

Plants get energy from sunlight.

1. What gets energy from sunlight? 2. What do plants get from sunlight?

VI. Определите, в каком предложении выделенное слово является 1) существительным, 2) глаголом:

1. V. I. Lenin always **thought** about the peoples' well-being. 2. It is a very interesting **thought**. 2. Our scientists did brilliant **work** in the field of physics. 4. These scientists **work** in the field of physics.

VII. Определите время и залог глагола-сказуемого в данных предложениях (Present Continuous Active, Present Continuous Passive):

1. Aluminium is being widely used in industry. 2. Human life is revolving around electricity and its many uses.

VIII. Определите, какие слова в правой колонке являются антонимами по отношению к словам в левой колонке.

1. direct	1. discharge
2. inner	2. non-conductor
3. conductor	3. outer
4. charge	4. indirect

Т1-3, II КУРС, 3-й СЕМЕСТР

I. Определите, какое слово является 1) подлежащим главного предложения, 2) подлежащим придаточного бессоюзного предложения:

1. The applications the radioactive isotopes are finding in medicine are of growing importance.	1. the application 2. the radioactive isotopes
2. Fuels are substances we burn to provide heat.	1. we 2. fuels

II. Определите, какую форму глагола следует употребить в данных предложениях:

1. If we . . . this material, we should have used it in our construction. 1. tested
2. If we . . . this material we should use it in our construction. 2. had tested

III. Определите, в каком предложении инверсия 1) возможна, 2) невозможна:

1. If I had enough data, I should make an interesting report.
2. If we solved this problem, we could build a new device.

IV. Определите, в каком предложении слово «provided» является 1) глаголом, 2) союзом:

1. Provided equal spaces are travelled by an object in equal intervals of time, the motion is uniform. 2. Lightning protection is provided by a special installation of lightning conductors.

V. Определите, какой вопрос относится к 1) подлежащему, 2) дополнению:

Automation provided the control of whole factories.

1. What provided the control of whole factories? 2. What did automation provide?

VI. Определите, в каком предложении выделенное слово является 1) существительным, 2) глаголом:

1. Heat **changes** the state of matter. 2. Materials are subjected to physical and chemical **changes**. 3. The **use** of this metal increases rapidly. 4. We widely **use** different metals in industry.

VII. Определите время и залог глагола-сказуемого в данных предложениях (Present Continuous Active, Present Continuous Passive):

1. In the Soviet Union great achievements are being made in the development of space research. 2. The scientists are preparing programmes for automatic devices.

VIII. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. at present	1. main
2. etc.	2. power plant
3. power station	3. and so on
4. chief	4. now

Т2-1, II КУРС, 3-й СЕМЕСТР

I. Определите, в каком предложении употреблен 1) независимый причастный оборот, 2) причастный оборот в функции определения, 3) причастный оборот в функции обстоятельства:

1. The satisfactory results having been obtained, scientists could finish their research. 2. Following the discoveries in the field of mechanics, we should mention some names of outstanding Russian scientists. 3. The method being used in our work helps us to solve a very difficult problem.

II. Определите, чем является ing-форма в данных предложениях (герундий, причастие):

1. Changing the volumeof a substance changes its density. 2. Performing this experiment we noticed that the substance changed its colour.

III. Определите, в какой функции (обстоятельство, определение) выступают Participle I и Participle II в данных предложениях:

1. Solving the problems connected with the investigation of space scientists help to develop the national economy. 2. Technical and scientific problems solved by Soviet scientists are of great importance for the development of world science and technology.

IV. Подберите соответствующую форму глагола:

1. The socialist society . . . schools and universities to the entire population.	1. has opened 2. had opened
2. During the 19th century a great development of science and industry . . . place.	1. took 2. has taken
3. The post-graduates . . . with everything necessary for their research work.	1. provided 2. are provided

V. Заполните пропуски соответствующими словами из правой колонки:

1. The . . . industry ensures increasing the living standards of the people. 2. The general trend of the . . . in modern science is the differentiation of science.	1. developed 2. development

VI. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. sufficient	1. to get
2. common	2. some
3. several	3. general
4. to receive	4. enough

Т2-2, II КУРС, 3-й СЕМЕСТР

I. Определите, в каком предложении употреблен 1) независимый причастный оборот, 2) причастный оборот в функции определения, 3) причастный оборот в функции обстоятельства:

1. Our laboratory having been built, we could continue our research work there. 2. Solving the problem connected with the investigation of space flights scientists obtain very valuable information about outer space. 3. Semiconductors being used in different branches of industry are of great importance in modern devices.

II. Определите, чем является ing-форма в данных предложениях (герундий, причастие):

1. Reading enriches our knowledge. 2. Being soluble in water this substance can be obtained by the evaporating of the water.

III. Определите, какую функцию (обстоятельство, определение) выполняют Participle I и Participle II в данных предложениях:

1. Studying the problem of electron atomic physicists solved many difficult problems. 2. The metals used in our work posses many important properties.

IV. Подберите соответствующую форму глагола:

1. Socialism . . . all possible conditions for the progress of science.	1. has created 2. was creating
2. The positive particle in the nucleus . . . the name of the «proton».	1. gave 2. was given

V. Заполните пропуски соответствующими словами из правой колонки:

1. . . . of automation and cybernetics to production inreases greatly the labour productivity.	1. applied
2. The method . . . gave good results.	2. application
3. It is necessary to . . . new devices in this experiment.	3. apply

VI. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. purpose	1. to supply
2. value	2. foundation
3. basis	3. aim
4. to provide	4. quality

I. Определите, в каком предложении употреблен 1) независимый причастный оборот, 2) причастный оборот в функции определения, 3) причастный оборот в функции обстоятельства:

1. Our laboratory having been supplied with different new instruments, the students could do their practical work there. 2. Having discussed chemical reactions we proceeded to the experiments. 3. The experiment being made at our laboratory showed the action of catalysts.

II. Определите, чем является ing-форма в данных предложениях (герундий, причастие):

1. Determining the volume of a gas at a definite temperature is rather easy. 2. Decreasing the temperature we slow down the reaction.

III. Определите, какую функцию (обстоятельство, определение) выполняют Participle I и Participle II в данных предложениях:

1. Studying the atomic weights of elements Mendeleyev found that they could be divided into nine groups. 2. The power stations being built in different parts of our country will supply energy to cities and villages.

IV. Подберите соответствующую форму глагола:

1. The Soviet people . . . great victories in the sphere of economic and cultural life since the Great October Socialist Revolution.	1. have achieved 2. achieved
2. On the 12th of April mankind . . . a new era — the era of mastering space.	1. entered 2. has entered
3. Heat . . . by the Sun to the Earth.	1. radiated 2. is radiated

V. Заполните пропуски соответствующими словами из правой колонки:

1. Automation not only makes labour . . . but radically changes its nature.	1. product
2. Cybernetics is a . . . of mathematics.	2. productivity
3. Automation and cybernetics greatly increase the labour . . .	3. productive

VI. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. fame	1. to obtain
2. to use	2. to apply
3. to continue	3. glory
4. to get	4. to go on

Т1-1, II КУРС, 4-й СЕМЕСТР

I. Определите, какую функцию выполняет герундий в данных предложениях:

1. Reading is of great help in study.	1. обстоятельство
2. I know of his coming here every day.	2. дополнение
3. By applying the new method the engineer achieved better results.	3. подлежащее

II. Определите, чем является ing-форма в данных предложениях:

1. Experimenting is closely connected with theory.	1. герундий
2. Experimenting with different substances the engineer discovered valuable properties of metals.	2. причастие

III. Определите, чем являются в предложении выделенные слова:

1. **Building** new plants is of great importance.	1. герундий
2. **Building** new plants we increase the economic might of our country.	2. причастие

IV. Определите, какой оборот образует ing-форма в данном предложении:

1. The atomic number and atomic weight being known, you can determine the number of protons, neutrons and electrons.	1. независимый причастный оборот 2. герундиальный оборот

V. Определите, какую роль выполняют выделенные слова:

1. It is the Soviet Union **that** first launched the man into outer space.	1. заменитель существительного
2. We know **that** all substances consist of very small particles — atoms.	2. союз
3. The physical structure of an element differs from **that** of a compound	3. часть усилительного оборота

VI. Определите, какое слово в правой колонке является синонимом к выделенному слову:

When man **wishes** to determine the composition of an ore, he gets a sample.	1. begins 2. wants

Т1-2, II КУРС, 4-й СЕМЕСТР

I. Определите, какую функцию выполняет герундий в данных предложениях:

1. Man's having penetrated into outer space is a logical step in world progress.	1. обстоятельство
2. Scientists work at the problem of penetrating into outer space.	2. определение
3. Upon being heated the molecules begin moving about very rapidly.	3. подлежащее

II. Определите, чем является ing-форма в данных предложениях:

1. Building hydroelectric stations is of great importance for the national economy.	1. герундий
2. Building houses we improve the living standard of people.	2. причастие

III. Подберите русские эквиваленты к выделенным словам:

1. **Studying** the properties of new elements is of great importance for science.	1. изучая
2. **Studying** the properties of electrons physicists constructed a very accurate device.	2. изучение

IV. Определите, какой оборот образует ing-форма в данных предложениях:

1. The scientists using new methods for study, the results of their work are very accurate.	1. независимый причастный оборот
2. The Soviet Union's launching the first artificial satellite aroused wide interest.	2. герундиальный оборот

V. Определите, какую роль выполняют выделенные слова:

1. It was in the Soviet Union **that** the 22nd Olympic Games had taken place.	1. указательное местоимение
2. We know **that** the Soviet Union is the lagest country in the world.	2. союз
3. **That** substance would combine with oxygen under certain conditions.	3. составная часть усилительного оборота

VI. Определите, какое слово в правой колонке является синонимом к выделенному слову:

This substance is made up of a large number of simpler ones.	1. is done 2. consists of

Т1-3, II КУРС, 4-й СЕМЕСТР

I. Определите, какую функцию выполняет герундий в данных предложениях:

1. Man's having walked out into space was another landmark in space exploration.	1. обстоятельство
2. Automatic devices can accomplish and are accomplishing tasks of providing man with very important data.	2. определение
3. By using new materials builders produced a new type of construction.	3. подлежащее

II. Определите, чем является ing-форма в данных предложениях:

1. Reading is a great help in studying English.	1. герундий
2. Reading he made notes.	2. причастие

III. Подберите русские эквиваленты к выделенным словам:

1. **Constructing** a new type of device became possible after numerous experiments.	1. конструирование
2. **Constructing** a new device the engineer used various materials.	2. конструируя

IV. Определите, какой оборот образует ing-форма в данных предложениях:

1. Our laboratory being supplied with different new instruments, the students can do their practical work there.	1. независимый причастный оборот
2. New types of devices being invented are of great importance for research work.	2. герундиальный оборот

V. Определите, какую роль выполняют выделенные слова:

1. He has **one** English book and two French books.	1. заменитель существительного
2. **One** must know how to switch on a TV set.	2. неопределенное местоимение
3. The motion of the wind is always from a place of high to **one** of low pressure.	3. числительное

VI. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. discovery	1. to be indebted to
2. significant	2. to happen
3. to occur	3. important
4. to be due to	5. invention

Т2-1, II КУРС, 4-й СЕМЕСТР

I. Определите, какую функцию выполняет инфинитив в данных предложениях:

1. To master a foreign language is necessary for every student.	1. обстоятельство
2. He was the first to introduce this method.	2. определение
3. To master a foreign language it is necessary to work hard.	3. подлежащее

II. Определите форму инфинитива в данных предложениях:

1. To solve this problem means to study the properties of this material.
2. The problem to be solved is of great importance.
3. You ought to have prepared all the necessary materials for this work in time.
4. The device must have been tested under different temperature conditions.

1. Perfect Active
2. Perfect Passive
3. Indefinite Active
4. Indefinite Passive

III. Определите инфинитивные обороты в данных предложениях:

1. All progressive mankind wants atomic energy to be used for peaceful purposes.
2. We know industrial electronics equipment to play a very significant role in the modern world.
3. Atomic energy is likely to become the main source of power-supply in the years to come.
4. The force of gravity is known to play an important part in many common phenomena of mechanics as well as in every-day life.

1. субъектный инфинитивный оборот
2. объектный инфинитивный оборот

IV. Определите, в каком предложении употреблен эмфатический оборот:

1. It was D. Mendeleyev, a famous Russian chemist, who was the first to discover the law of dependence of the properties of elements upon their atomic weights.
2. D. Mendeleyev was an outstanding Russian scientist who gave the world his periodic table of elements.

1. обычное предложение
2. предложение с эмфатическим оборотом

V. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. foundation	1. to receive
2. quantity	2. general
3. purpose	3. aim
4. common	4. number
5. to obtain	5. basis

Т2-2, II КУРС, 4-й СЕМЕСТР

I. Определите, какую функцию выполняет инфинитив в данных предложениях:

1. To solve this problem means to study the properties of this material.	1. обстоятельство
2. The problem to be solved was discussed at the meeting.	2. определение
3. To understand the importance of this invention you should know thermodynamics.	3. подлежащее

II. Определите функцию инфинитива в данных предложениях:

1. A barometer is an instrument to show air pressure.	1. обстоятельство
2. The pieces of metal to be joint were white hot heated.	2. определение
3. To irrigate deserts we build canals.	3. подлежащее

III. Определите форму инфинитива в данных предложениях:

1. To master a foreign language, it is necessary to work hard.	1. Perfect Active
2. The substance to be tested is in the laboratory.	2. Perfect Passive
3. We are glad to have listened to the professor's lecture.	3. Indefinite Active
4. The device must have been tested under different temperature conditions.	4. Indefinite Passive

IV. Определите инфинитивные обороты в данных предложениях:

1. The members of this scientific group want the new device to be tested immediately.	1. субъектный инфинитивный оборот
2. Faraday expected electrochemistry to be widely used in industry.	2. объектный инфинитивный оборот
3. Newton is known to be extremely sensitive to criticism.	
4. He seemed to be rather slow in his studies in his teens.	

V. Определите, в каком предложении употреблен эмфатический оборот:

1. It was Popov who invented radio in 1895.	1. обычное предложение
2. Popov is an outstanding Russian scientist who gave the world radio.	2. предложение с эмфатическим оборотом

VI. Определите, какие слова в правой колонке являются антонимами по отношению к словам в левой колонке:

1. linear	1. natural
2. complex	2. indirect
3. expensive	3. cheap
4. direct	4. simple
5. artificial	5. nonlinear

Т2-3, II КУРС, 4-й СЕМЕСТР

I. Определите, какую функцию выполняет инфинитив в данных предложениях:

1. To test this machine is rather difficult.	1. обстоятельство
2. The discovery of the vacuum device was prepared by Lodygin's invention of the incandescent lamp tube widely to be used in industry.	2. определение
3. To solve this problem it is necessary to know the principles of modern electronics.	3. подлежащее

II. Определите форму инфинитива в данных предложениях:

1. The piece of metal to be tested is in the laboratory.	1. Perfect Active
2. The students must have studied the conditions of chemical changes of these substances before starting their practical work.	2. Perfect Passive
3. The control work ought to have been done by our group well.	3. Indefinite Active
	4. Indefinite Passive

III. Определите инфинитивные обороты в данных предложениях:

1. Soviet scientists consider the Far East to be one of the main sources of energy and mineral resources.	1. субъектный инфинитивный оборот
2. The scientists wanted this apparatus to be adjusted carefully by the operator.	2. объектный инфинитивный оборот
3. Electrons are thought to lie in different groups about the nucleus.	
4. The rays from uranium compounds were found to differ from X-rays.	

IV. Определите, в каком предложении употреблен эмфатический оборот:

1. It was M. Lomonosov who first stated that heat phenomena are connected with the motion of molecules.	1. обычное предложение
2. M. Lomonosov was an outstanding Russian scientist who worked in different fields of science.	2. предложение с эмфатическим оборотом

V. Определите, какие слова в правой колонке являются синонимами по отношению к словам в левой колонке:

1. value	1. to apply
2. apparatus	2. to allow
3. precise	3. exact
4. to permit	4. instrument
5. to use	5. quantity

Раздел IV

КРАТКИЙ ГРАММАТИЧЕСКИЙ СПРАВОЧНИК

§ 1. СЛОВООБРАЗОВАНИЕ (WORDBUILDING)

Основными способами словообразования в английском языке являются:

1) аффиксация;
2) конверсия;
3) словосложение.

1. АФФИКСАЦИЯ

Аффиксация — образование новой (производной) основы из уже существующей путем присоединения к ней аффикса. В состав аффиксов входят суффиксы и префиксы.

1. Суффиксы

Самыми распространенными суффиксами существительных являются суффиксы **-er, -or,** которые присоединяются к основе глагола:

to teach + -er = teach**er** учить, учитель
to work + -er = work**er** работать, рабочий
to construct + -or = construct**or** конструировать, конструктор
to invent + -or = invent**or** изобретать, изобретатель

Некоторые существительные, обозначающие специальность, образуются с помощью суффикса **-ist,** который присоединяется к основе существительного или прилагательного:

science	наука	scient**ist**	ученый
art	искусство	art**ist**	художник
special	специальный	special**ist**	специалист
chemistry	химия	chem**ist**	химик

Некоторые существительные образуются с помощью суффикса **-tion,** который присоединяется к основе глагола:

to act	действовать	act**ion**	действие
to produce	производить	produc**tion**	продукция

Существительные, обозначающие действие или состояние, образуются с помощью суффиксов **-ance, -ence**, которые присоединяются к основе глагола:

to differ	отличаться	difference	разница
to resist	сопротивляться	resistance	сопротивление

Абстрактные существительные, обозначающие качество или свойство, образуются с помощью суффикса **-ness**, который присоединяется к основе прилагательного:

white	белый	whiteness	белизна
near	близкий	nearness	близость
hard	твердый	hardness	твердость
dark	темный	darkness	темнота

Абстрактные существительные также образуются с помощью суффикса **-th**, который присоединяется к основе прилагательного или глагола:

strong	сильный	strength	сила
long	длинный	length	длина
to die	умирать	death	смерть

Наиболее распространенные суффиксы прилагательных: **-ful, -less.**

Суффикс **-ful** обозначает наличие качества:

use	польза	useful	полезный
skill	умение	skilful	умелый
power	сила	powerful	сильный

Суффикс **-less** обозначает отсутствие качества:

use	польза	useless	бесполезный
power	сила	powerless	бессильный
help	помощь	helpless	беспомощный

Существуют еще и такие суффиксы прилагательных, как **-ish, -y, -ible, -able, -al, -ical:**

reddish — красноватый, greenish, — зеленоватый, dirty — грязный, windy — ветреный, sleepy — сонный, possible — возможный, comfortable — удобный, political — политический, social — общественный.

Наречия образуются от прилагательных с помощью суффикса **-ly:**

wide	широкий	widely	широко
regular	регулярный	regularly	регулярно

2. Префиксы

Наиболее распространенными префиксами являются **un-, im-, ir-, il-:**

natural — **un**natural естественный — **не**естественный
known — **un**known известный — **не**известный
definite — **in**definite определенный — **не**определенный
possible — **im**possible возможный — **не**возможный
regular — **ir**regular регулярный — **не**регулярный
literate — **il**literate грамотный — **не**грамотный

Префикс re- в сочетании с глаголом указывает на повторяемость действия:

build	строить	**re**build	перестроить
make	делать	**re**make	переделать
write	писать	**re**write	переписать

II. КОНВЕРСИЯ

Конверсия — образование слова путем перехода основы слова из одной части речи в другую.

Образование существительных от глаголов путем конверсии:

to look	смотреть	look	взгляд
to cut	резать	cut	порез
to hand	вручать	hand	рука
to laugh	смеяться	laugh	смех

В некоторых случаях изменение ударения обозначает переход слова в другую часть речи:

to progréss (v)	развиваться	prógress (n)	развитие
to expórt (v)	вывозить	éxport (n)	вывоз
to presént (v)	дарить	présent (n)	подарок

III. СЛОВОСЛОЖЕНИЕ

Многие слова в английском языке являются сложными, т. е. образуются путем соединения двух слов в одно слово. В сложных существительных ударение обычно падает на первое слово: bláckboard, bédroom, schóolboy, néwspaper, réading-room, ice-box.

§ 2. АРТИКЛЬ (THE ARTICLE)

Артикль является определителем имен существительных. В английском языке существует неопределенный артикль «a», «an» и определенный — «the». Неопределенный артикль

происходит от числительного one — *один*, следовательно, он употребляется только с исчисляемыми существительными в единственном числе. Неопределенный артикль «a» употребляется перед существительными, начинающимися с согласной буквы, а «an» — перед существительными, которые начинаются с гласной буквы: a book, an apple.

Неопределенный артикль употребляется перед существительными:

1) когда необходимо выделить лицо или предмет из класса подобных предметов:

He reads **a** book.	Он читает книгу (а не журнал).
He reads books.	Он читает книги (во множественном числе неопределенный артикль не употребляется).

2) когда существительное указывает, кем или чем является лицо или предмет, или когда существительное имеет определение описательного характера:

He is **a** student.	Он студент.
He has become **a** teacher of English.	Он стал преподавателем английского языка (как категория преподавателей).

3) когда имеется в виду какой-нибудь представитель данного класса:

A square has four equal sides.	Квадрат (любой) имеет четыре равные стороны.

Определенный артикль происходит от указательного местоимения «that» *тот*. Он употребляется перед исчисляемыми существительными как в единственном, так и во множественном числе.

Определенный артикль употребляется:

1) когда существительное имеет определение, которое выделяет его из класса подобных предметов:

The device constructed by the students of our group is of great importance.	Прибор, сконструированный студентами нашей группы, очень важен.

2) если из ситуации или контекста ясно, о каком лице или предмете идет речь:

Open **the** window	Откройте окно (именно то, которое сейчас закрыто).

3) если речь идет о лице или предмете, о котором уже упоминали:

I see a boy. The boy is reading a book.

4) если существительное обозначает единственный в своем роде, классе или ситуации предмет:

The Sun is a star. Солнце — звезда.

5) перед названиями рек, горных хребтов, морей, английских и американских газет и журналов и т. д.

the Volga, the Urals, the Baltic Sea, «The Morning Star», «The Times», the Soviet Union, the United States.

Артикли не употребляются:

1) если перед существительным стоит местоимение: my book, some books;

2) если перед существительным имеется количественное числительное: two books, five lessons;

3) перед собственными именами: Moscow, Petrov.

Если мы имеем в виду всех членов семьи, то определенный артикль ставят перед фамилией во множественном числе:

the Petrovs Петровы (семья Петровых);

4) перед неисчисляемыми существительными: iron, gold, glass.

§ 3. МНОЖЕСТВЕННОЕ ЧИСЛО СУЩЕСТВИТЕЛЬНЫХ (PLURAL OF NOUNS)

Имена существительные образуют множественное число путем прибавления к форме единственного числа окончания **-(e)s**: book — books, box — boxes.

Окончание **-(e)s** произносится следующим образом:

[s] — после глухих согласных: students, parts;

[z] — после звонких согласных и гласных: machines, cars, boys;

[ɪz] — после шипящих и свистящих: classes, inches.

Запомните:

1. Существительные, оканчивающиеся на согласную + «y», образуют множественное число с помощью **-es**, причем «y» переходит в «i»: army — armies; factory — factories.

2. Существительные, оканчивающиеся на «o», образуют множественное число с помощью **-es**: hero — heroes, potato—potatoes.

3. У существительных, оканчивающихся на «f» или «fe», при образовании множественного числа «f» переходит в «v» и прибавляется окончание **-es**: life — lives, leaf — leaves.

Но: chief — chiefs, safe — safes.

ОСОБЫЕ СЛУЧАИ ОБРАЗОВАНИЯ МНОЖЕСТВЕННОГО ЧИСЛА

Некоторые существительные образуют множественное число путем изменения корневых гласных: man [æ] — men [e], woman ['wumən], women ['wimin].

Некоторые существительные сохранили древнюю форму окончания множественного числа: ox — oxen, child — children.

Некоторые существительные, заимствованные из греческого и латинского языков, сохранили форму множественного числа этих языков:

nucleus ['nju:kliəs] — nuclei ['nju:kliai] ядро — ядра
radius ['reidiəs] — radii ['reidiai] радиус — радиусы
basis ['beisis] — bases ['beisi:z] базис — базисы
datum ['deitəm] — data ['deitə] данные
stadium ['stædiəm] — stadia ['stædiə] стадион — стадионы
phenomenon [fə'nɔmənən] — phenomena [fə'nɔmənə] явление

Однако все чаще встречаются такие формы множественного числа, как sanatoriums, formulas, stadiums.

В именах существительных, состоящих из двух слов, которые пишутся слитно, форму множественного числа принимает второе слово: schoolgirl — schoolgirls, workman — workmen, housewife — housewives.

В существительных, состоящих из нескольких слов, которые пишутся раздельно или через дефис, форму множественного числа обычно принимает основное по смыслу слово: editor-in-chief editors-in-chief.

Если первым словом составного существительного является слово man или woman, то оба слова принимают форму множественного числа:

woman-pilot	women-pilots
man-servant	men-servants

Есть существительные, которые имеют только форму единственного числа: iron (железо), gold (золото), friendship (дружба), advice (совет), knowledge (знание), progress (прогресс) и др.

Существительные, обозначающие названия наук, оканчивающиеся на -ics, например: mathematics, physics, phonetics и существительное news (новость) выражают единственное число, хотя имеют форму множественного числа:

Mathematics is my favourite subject.

Математика — мой любимый предмет.

Некоторые существительные имеют только форму множественного числа: spectacles (очки), scissors (ножницы), goods (товары), wages (заработная плата) и др.

§ 4. МЕСТОИМЕНИЕ (THE PRONOUN)

Личные местоимения Personal Pronouns имеют два падежа: именительный и объектный.

ЛИЧНЫЕ МЕСТОИМЕНИЯ

Именительный падеж		Объектный падеж	
I	я	me	меня, мне
you	ты	you	тебя, тебе
he	он	him	его, ему
she	она	her	ее, ей
it	он, она, оно	it	его, ее, ему, ей
we	мы	us	нас, нам
you	вы	you	вас, вам
they	они	them	их, им

Личные местоимения в именительном падеже в основном выполняют в предложении функции подлежащего и именной части составного сказуемого:

He is a student. It is **he**.

Личные местоимения в объектном падеже выполняют в предложении функции дополнения, обстоятельства и именной части составного сказуемого:

Excuse **me**, who gave **her** that idea?	Извините, кто предложил ей эту идею (мысль)?
Who is that? It's **me**.	Кто это? Это я.
The ball fell behind **him**.	Мяч упал позади него.

Притяжательные местоимения имеют две формы: зависимую и независимую, которые отличаются одна от другой своими синтаксическими функциями.

ПРИТЯЖАТЕЛЬНЫЕ МЕСТОИМЕНИЯ

Зависимая форма	Независимая форма
my	mine
your	yours
his	his
her	hers
its	its
our	ours
your	yours
their	theirs

Зависимые притяжательные местоимения являются местоимениями-прилагательными. Они употребляются только в функции определения:

Everything is good in **its** season.

Are you coming **my** way?

Притяжательные местоимения в независимой форме являются местоимениями-существительными. Они выполняют в предложении такие функции:

1) подлежащего:

We have got a TV set too. But **yours** is much better.

Where are all your books? **Mine** are here.

2) дополнения:

Oh, you have broken your pencil. Take **mine**.

3) именной части составного сказуемого:

This pencil is **mine**.

4) определения:

Kate is an old friend of **mine**.

МЕСТОИМЕНИЕ „it"

Местоимение **it** может заменять упомянутое раньше существительное. В этом случае **it** имеет значение *он, она, оно*:

He saw a book.	Он увидел книгу.
It was open.	*Она* была открыта.
The window **(it)** was open.	Окно (*оно*) было открыто.
The table **(it)** is square.	Стол (*он*) квадратный.

Если местоимение **it** в функции подлежащего не заменяет ранее упомянутое существительное, то оно является формальным подлежащим безличного предложения и на русский язык не переводится:

It is cold.	Холодно.
It is impossible to open windows.	Невозможно открыть окна.

It может выступать в роли указательного местоимения:

What is it? Что это?
It is a diode. *Это* диод.

§ 5. НЕОПРЕДЕЛЕННЫЕ МЕСТОИМЕНИЯ И ИХ ПРОИЗВОДНЫЕ

МЕСТОИМЕНИЯ

Местоимение **some** употребляется главным образом в утвердительных предложениях в значении *несколько, немного, некоторое количество, какие-то.*

Give me **some** water, please.

Some people like summer and some don't.

Местоимение **any** употребляется главным образом в вопросительных предложениях в значении *какой-нибудь, сколько-нибудь* или просто усиливает вопрос.

Have you got **any** new books?

Неопределенные местоимения **some, any** с отрицательным местоимением **no** образуют производные местоимения и наречия, которые употребляются в утвердительной, вопросительной и отрицательной форме, подобно местоимениям, от которых они образованы:

Утвердительное предложение		Вопросительное предложение		Отрицательное предложение	
somebody someone	*кто-то*	anybody anyone	*кто-нибудь*	nobody no one	*никто*
something	*что-то*	anything	*что-нибудь*	nothing	*ничего*
somewhere	*где-то, куда-то*	anywhere	*куда-нибудь, где-нибудь*	nowhere	*нигде, никуда*

Somebody told me about this new experiment.
Кто-то говорил мне об этом новом опыте.

Did you tell **anybody** about this experiment?
Вы говорили *кому-нибудь* об этом опыте?

Tell **nobody** about this experiment.
Никому не рассказывайте об этом опыте.

МЕСТОИМЕНИЯ many, much, little, a little, few, a few

Местоимения **much** *много,* **little** *мало* и **a little** *немного* употребляются с неисчисляемыми существительными, а местоимения **many** *много,* **few** *мало,* **a few** *несколь-*

ко — с и с ч и с л я е м ы м и существительными во множественном числе.

С р а в н и т е: much work — many days

little ink — few books
a little water — a few chairs

We haven't **much** snow this winter. В этом году было *немного* снега. I have **little** time for skating today. У меня сегодня *мало* времени для катанья на коньках. The teacher of physics told us **many** interesting things about electricity. Преподаватель физики рассказал нам *много* интересного об электричестве.

Местоимения **much, many, little, few** изменяются по степеням сравнения:

Положительная степень	Сравнительная степень	Превосходная степень
much, many	more	(the) most
little	less	(the) least
few	fewer	(the) fewest

Jane has **more** English books than I have. У Джейн *больше* английских книг, чем у меня. Your homework is **better** now. Ваше домашнее задание сейчас выполнено *лучше*. You have made **fewer** mistakes than usually. Вы сделали *меньше* ошибок, чем обычно. We had very **little** sunshine this week. На этой неделе было *мало* солнца. You haven't **the least** chance of success if you don't work hard. У вас нет ни малейшей надежды на успех, если вы не будете упорно работать.

§ 6. ОБОРОТ THERE IS, THERE ARE

Сравните два предложения:

Микроскоп на столе.

На столе микроскоп.

В первом предложении сообщается, где находится микроскоп, о котором уже шла речь. Во втором предложении сообщается, что на определенном столе есть микроскоп. Предложения строятся по-разному в зависимости от того, что находится в центре внимания говорящего: если подлежащее (микроскоп), то в предложении будет прямой поря-

док слов: The microscope is on the table, а если обстоятельство места (на столе),— то употребляется оборот **there** + + глагол **to be** в личной форме:

Present Indefinite:	There is a microscope on the table.
Past Indefinite:	There was a microscope on the table.
Future Indefinite:	There will be a microscope on the table.

Перевод предложений с оборотом **there is** нужно начинать с обстоятельства места: на столе микроскоп. Слово **there** в этом предложении теряет свое лексическое значение и на русский язык не переводится.

В тех случаях, где слово **there** необходимо по смыслу, оно ставится в конце предложения, на место обстоятельства:

Our library is very good. У нас очень хорошая библиотека.

There are many English books **there**. Там много английских книг.

В вопросительной форме глагол **to be** ставится перед словом **there:**

Is there a new library in our city?

Yes, there is.
No, there is not.

Are there many English books in the library?

Yes, there are.
No, there are not.

В отрицательной форме после оборота **there** + **to be** употребляется местоимение **no**, т. е. отрицание относится к существительному и исключает употребление артикля:

There is **no** book on the table. На столе нет книги.

Перед местоимениями **many, any** употребляется отрицательная частица **not:**

There are **not** many English books in the library.

В обороте **there** + **to be** вместо глагола **to be** могут употребляться и другие слова, которые по своему содержанию связаны с появлением, пребыванием или существованием:

There **stands** a chair at the table. У стола стоит стул.

Если в предложении с оборотом **there** + **to be** есть несколько подлежащих, то глагол **to be** всегда согласуется с подлежащим, которое стоит за ним:

There is a table and two chairs in the room.	В комнате есть стол и два стула.
There are two chairs and a table in the room.	В комнате два стула и стол.

§ 7. СЛОВА-ЗАМЕНИТЕЛИ

К словам-заменителям относятся местоимения **one** (во множ. числе **ones**) и **that** (во множ. числе **those**).

One (ones) заменяет уже упомянутое исчисляемое существительное, перед которым стоит определение. При переводе на русский язык **one** может опускаться или переводиться существительным, которое оно заменяет.

This receiver is more powerful than that **one**.	Этот приемник более мощный, чем тот.
These receivers are more powerful than those **ones**.	Эти приемники более мощные, чем те (приемники).
Some properties of air are similar to **those** of water	Некоторые свойства воздуха похожи на свойства воды.

§ 8. БЕЗЛИЧНЫЕ ПРЕДЛОЖЕНИЯ

В русском языке безличные предложения не имеют подлежащего. Предложения типа *Холодно. Темно. Тяжело.* в настоящем времени не имеют также личной формы глагола.

В английском языке каждое предложение имеет подлежащее и сказуемое. Предложения такого типа строятся так:

It is dark (was dark, will be dark).
It is hot (was hot, will be hot).
It is difficult (was difficult, will be difficult).

Местоимение **it** не имеет в этих предложениях самостоятельного значения и не переводится на русский язык. Оно является служебно-грамматическим словом, занимает место подлежащего и сохраняет таким образом прямой порядок слов утвердительного предложения.

§ 9. ПРЕДЛОГИ (THE PREPOSITIONS)

Предлоги в английском языке играют очень важную роль, поскольку они часто являются единственным средством выражения грамматических отношений между словами в предложении.

Предлоги **of, by, with, to, for** выражают отношения, которые в русском языке соответствуют падежным окончаниям. В этом случае они не переводятся на русский язык.

Предлог **of** выражает отношения, которые соответствуют родительному падежу в русском языке:

All the students **of** our group know English well.	Все студенты нашей группы хорошо знают английский язык.

Отношения творительного падежа передаются:

1) существительным с предлогом **by** для обозначения действующего лица или предмета:

The device has been constructed **by** our students.	Этот прибор сконструирован нашими студентами.

2) существительным с предлогом **with** — для обозначения орудия действия:

He is writing **with** a fountain-pen.	Он пишет авторучкой.

Предлоги **to, for** в некоторых случаях выражают отношения, которые соответствуют дательному падежу в русском языке:

The teacher explained a new rule **to** students.	Преподаватель объяснил новое правило студентам.
They prepared a new present **for** him.	Они приготовили ему новый подарок.

Некоторые предлоги используются не только для выражения грамматических отношений между словами, но имеют также и самостоятельное значение. Многие предлоги имеют не одно, а несколько значений.

Наиболее распространенные предлоги:

1) предлоги места: in, on, at, under, in front of, near, across, between, among.

The book is **on** the table.	Книга *на* столе.
We sit (are sitting) **at** the table.	Мы сидим *за* столом.

2) предлоги времени: in, on, at, before, after, till, until, during, between:

He was born **in** May 1950.	Он родился *в* мае 1950 г.
но **on** the 9th of May	Наши лекции начинаются в 9 ч. утра.
Our lessons begin **at** 9 a. m.	

3) предлоги направления: to, into, towards, from, out of:

He goes to the institute every morning.	Он ходит *в* институт каждое утро.

ОСНОВНЫЕ ЗНАЧЕНИЯ НЕКОТОРЫХ ПРЕДЛОГОВ

about	о, около, вокруг	besides	кроме
above	над, выше	between	между (двумя)
after	после, за	by	к, у, при, посредством (соответствует русскому творительному падежу)
against	против		
among	среди		
at	в, на, у, при		
before	перед, перед тем как, до	down	вниз
behind	за, позади	for	в течение, для, за
below	ниже,	from	от, из
beside	рядом с, около, близ	in	в, на, через
		into	в, на
of	з, из, от (указывает на принадлежность; соответствует русскому родительному падежу)		
on	на, у, в, по		
to	в, к, на, для (соответствует русскому дательному падежу)		
under	под		
up	вверх		
with	с (соответствует русскому творительному падежу)		
without	без		

§ 10. ЧИСЛИТЕЛЬНЫЕ (NUMERALS)

Числительные делятся на количественные (cardinal) порядковые (ordinal) и дробные (fráctional). В предложении числительные могут выполнять функции:

1) подлежащего:

Ten were present at the lecture.

2) именной части составного сказуемого:

Two times two is **four**.

3) дополнения:

How many English books did you read last term? I read five.

4) определения:

The **second** student read without mistakes.

Количественные числительные

1 one	11 eleven	21 twenty-one
2 two	12 twelve	30 thirty
3 three	13 thirteen	40 forty
4 four	14 fourteen	50 fifty
5 five	15 fifteen	60 sixty
6 six	16 sixteen	70 seventy
7 seven	17 seventeen	80 eighty
8 eight	18 eighteen	90 ninety
9 nine	19 nineteen	100 a (one) hundred
10 ten	20 twenty	200 two hundred
		273 two hundred and seventy three

1,000 a (one) thousand
2,000 two thousand
1,000,000 a (one) million
2,000,000 two million
2,372,536 two million three hundred and seventy-two thousand five hundred and thirty-six

Числительные от 13 до 19 образуются с помощью суффикса **-teen**: 13 — thirteen, 17 — seventeen, 19 — nineteen.

Числительные от 20 до 90 образуются с помощью суффикса **-ty**: 20 — twenty, 50 — fifty, 90 — ninety.

Числительные hundred, thousand, million могут иметь окончание **-s** лишь в том случае, если они употребляются в качестве существительных:

hundreds of books сотни книг

Порядковые числительные

1-й	first	11-й	eleventh
2-й	second	12-й	twelfth
3-й	third	13-й	thirteenth
4-й	fourth	14-й	fourteenth
5-й	fifth	15-й	fifteenth
6-й	sixth	20-й	twentieth
7-й	seventh	21-й	twenty-first
8-й	eighth	30-й	thirtieth
9-й	ninth	100-й	one hundredth
10-й	tenth	1,000-й	one thousandth
		1,000,000-й	one millionth

Простые дроби		Десятичные дроби	
1/2	a half	0,2—0.2	1) o [ou] point two
1/3	one third		2) nought point two
1/4	one fourth, a quarter		3) zero point two
1/25	one twenty-fifth		4) point two
1/1000	a (one) thousandth	12,305—12.305	twelve point three o five
2/3	two thirds		
25/38	twenty-five thirty-eighth		

Даты обычно читаются так:

в 1900 году in nineteen hundred
в 1905 году in nineteen five (in nineteen o [ou] five)
в 1970 году in nineteen seventy

Слово year (*год*) ставится перед числительным:
in the year nineteen seventy.

ОСОБЕННОСТИ ПРАВОПИСАНИЯ

three — thirteen — thirty (три — тринадцать — тридцать)
four — fourteen — forty (четыре — четырнадцать — сорок)
five — fifteen — fifty-fifth (пять — пятнадцать — пятьдесят пятый)
eight — eighth (восемь — восьмой)
nine — ninth (девять — девятый)
twelve — twelfth (двенадцать — двенадцатый)
twenty — twentieth (двадцать — двадцатый)

§ 11. ИМЯ ПРИЛАГАТЕЛЬНОЕ (THE ADJECTIVE)

СТЕПЕНИ СРАВНЕНИЯ ПРИЛАГАТЕЛЬНЫХ

В английском языке, в отличие от русского языка, прилагательное не согласуется с существительным ни по родам, ни по числам, ни по падежам.

an interesting article интересная статья
interesting articles интересные статьи

В английском языке прилагательные изменяются только по степеням сравнения. Степени сравнения о д н о с л о ж н ы х и некоторых д в у с л о ж н ы х прилагательных образуются путем прибавления суффиксов. Сравнительная

степень образуется путем прибавления суффикса **-er**, а превосходная — путем прибавления суффикса **-est.**

large — larger — (the) largest
hard — harder — (the) hardest
brave — braver — (the) bravest

Если прилагательное оканчивается на с о г л а с н у ю, перед которой стоит краткая гласная, то в сравнительной и превосходной степени конечная согласная буква удваивается:

hot — hotter (the) hott- big — bigger (the) biggest est

Если прилагательное оканчивается на «у» с предшествующей с о г л а с н о й, то в сравнительной и превосходной степени «у» переходит в «i»:

easy — easier — (the) easiest
busy — busier — (the) busiest

Если перед «у» стоит г л а с н а я, то «у» остается без изменений:

gay — gayer — (the) gayest

Большинство прилагательных д в у с л о ж н ы х, а также прилагательных, состоящих из трех слогов и более, образуют сравнительную степень при помощи слова **more**, а превосходную — при помощи слова **most**:

active — **more** active — (the) **most** active
comfortable — **more** comfortable — (the) **most** comfortable
beautiful — **more** beautiful — (the) **most** beautiful.

Существительные, перед которыми стоит прилагательное в превосходной степени, употребляются с определенным артиклем:

His device is **the** most accurate one of all.

Некоторые прилагательные образуют сравнительную и превосходную степени сравнения от других корней, подобно соответствующим прилагательным в русском языке:

good — better — the best
bad — worse — the worst
little — less — the least
much, many — more — the most

После прилагательного в сравнительной степени употребляется союз **than**, соответствующий русскому союзу чем:

The sun is much hotter **than** other stars.

Сравнение предметов о д и н а к о в о г о качества может быть выражено при помощи союзов **as** . . . **as** *такой же ..., как* и **not so... as** *не такой ..., как*:

His articles are as interesting as yours.	Его статьи *такие же* интересные, *как* и ваши.
This book is not so interesting as that one.	Эта книга *не такая* интересная, *как* та.

§ 12. ТИПЫ ВОПРОСИТЕЛЬНЫХ ПРЕДЛОЖЕНИЙ

Вопросительные предложения бывают разными в зависимости от типа вопроса.

Есть вопросы общие и специальные. Общие вопросы ставят ко всему предложению, и они требуют ответа «да» или «нет»:

This machine operates well.

Does this machine operate well?

Yes, it does. No, it does not.

Специальные вопросы ставят к отдельным членам предложения. Они начинаются с вопросительного слова и требуют полного ответа:

The electronic tube is used in this device.

What tube is used in this device?

Where is the electronic tube used?

What is used in this device?

В общих вопросах порядок слов обратный, т. е. перед подлежащим стоит вспомогательный или смысловой глагол.

В специальных вопросах порядок слов может быть как прямой, так и обратный.

Сравните:

He will make physical experiments at the laboratory.

Общий вопрос:

Will he make physical experiments at the laboratory?

Специальный вопрос:

Who will make physical experiments at the laboratory?

Where will he make physical experiments?

Если вопросительное слово является подлежащим или входит в группу подлежащего, то вопрос будет иметь форму утвердительного предложения:

Who lives here?

What students worked in the shop?

How many people will be present at the meeting?

Если вопросительное слово не является подлежащим и не входит в группу подлежащего, то порядок будет следующим: 1) вопросительное слово; 2) вспомогательный глагол; 3) подлежащее; 4) смысловой глагол; 5) другие члены предложения:

Where do you study?
What do they study at the institute?

К вопросительным словам относятся: who, whom, whose, what, where, when, why, how, which, how many, how much.

Вопросительное слово или группа слов	Вспомогательный глагол	Подлежащее	Смысловой глагол	Другие члены предложения
What	do	you	say?	
When	does	the academic year	begin?	
Where	did	you	spend	your holiday?
Why	does	he	smoke	here?
Which books	do	you	want	to read?
How many hours	will	he	work?	
Whom	did	they	meet	here?

§ 13. МОДАЛЬНЫЕ ГЛАГОЛЫ (MODAL VERBS)

Модальные глаголы употребляются только в сочетании с инфинитивом смыслового глагола и выражают возможность, способность, вероятность, необходимость совершения действия. Модальные глаголы в сочетании с инфинитивом смыслового глагола выполняют в предложении роль составного глагольного сказуемого.

Основные модальные глаголы: **can, may, must.**

Глагол **can** в сочетании с инфинитивом смыслового глагола употребляется для выражения возможности или способности совершить действие и переводится на русский язык словами *могу, умею.*

I **can answer** your questions.

He **can lift** this heavy box.

Глагол **may** в сочетании с инфинитивом смыслового глагола употребляется для выражения разрешения совершить действие и переводится на русский язык словом *могу*. **May** также употребляется для выражения вероятности действия, в осуществлении которого говорящий не уверен:

You **may use** these instruments for your work.
He **may come** to Moscow in the summer.
Он *может быть приедет* в Москву летом (вероятность действия).

Глагол **must** в сочетании с инфинитивом смыслового глагола употребляется для выражения необходимости совершения действия в силу определенных обстоятельств, а также для выражения приказания или совета. На русский язык переводится словами *должен, нужно, надо:*

Every one **must work** well. (*должен*)
You **must do** this work immediately. (*необходимость*)

Особенности модальных глаголов следующие:

1) модальные глаголы не имеют неличных форм (инфинитива, герундия, причастия), не имеют формы повелительного наклонения;

2) они не изменяются ни по лицам, ни по числам (в 3-м лице единственного числа не имеют окончания -s):

He **can**, she **may**, you **must**.
He **can speak** English.
She **may take** this book.
You **must help** her sister.

3) инфинитив, который следует за модальным глаголом, употребляется без частицы **to**.

4) в вопросительной форме (так же, как и с глаголами **to be** и **to have**) модальный глагол находится перед подлежащим. В отрицательной форме отрицание **not** стоит после модального глагола:

Must you go to the institute every day?
Yes, we must. No, we **must not**.
Can you speak English? Yes, I can. No, I **cannot (can't)**.
May I come in? Yes, you may. No, you **must not**.
He **cannot speak** French.

Модальные глаголы **can, may,** имеют формы настоящего и прошедшего времени: **can — could, may — might,** а глагол **must** имеет только форму настоящего времени.

Модальные глаголы не имеют формы будущего времени. Эти формы модальных глаголов заменяются эквивалентными выражениями, которые имеют модальное значение, но в отличие от модальных глаголов имеют все глагольные формы, т. е. форму лица, числа и времени:

can — to be able (to)	*мочь, быть в состоянии*
may — to be allowed (to)	*иметь разрешение*
must — to have (to)	*быть обязанным*

Present Indefinite	Past Indefinite	Future Indefinite
can	could	shall / will be able to
may	might	shall / will be allowed to
must	had to	shall / will have to

He **could translate** technical texts quite well.
Он достаточно хорошо *умел переводить* технические тексты.

They **had to work** much on their report.
Им *пришлось* много *поработать* над своим докладом.

They **will have to work** much at their diploma designs.
Им *нужно будет* много *поработать* над дипломными проектами.

You **will be allowed to take** books and magazines from the library.
Вы *сможете взять* книги и журналы из библиотеки.

Вопросительная и отрицательная форма с глаголом **to have** в модальном значении образуется при помощи глагола **do**:

Did you **have to return** the magazine yesterday? — Yes, I did.

Должны ли вы *были вернуть* вчера журнал? — Да.

She **did not have to go** there.

Ей *не нужно было* туда *идти*.

Модальный глагол **should** *должен, надо* имеет только одну временную форму.

Утвердительная форма: **I should go.**

Вопросительная форма: **Should I go?**

Отрицательная форма: **I should not (shouldn't) go.**

Should употребляется:

а) для выражения морального долга, совета:

You **should be** more **careful.**
Вам *следует быть* более *внимательным*.

б) в сочетании с перфектным инфинитивом модальный глагол **should** выражает упрек, осуждение

по поводу невыполнения какого-то действия или обязательства в прошлом:

You **should have helped** your friend (but you didn't).	Вам *следовало бы помочь* вашему другу.

Модальный глагол **ought** — *должен, следовало* имеет только одну временную форму.

Утвердительная форма:

You **ought to go** there. Вам *следовало пойти* туда.

Вопросительная форма:

Ought I **to go** there?

Отрицательная форма:

I **ought not to go** there.

Модальный глагол **need** имеет только форму настоящего времени.

Вопросительная форма:

Need I?

Отрицательная форма:

Need not (needn't).

Модальный глагол **need** употребляется только в вопросительных и отрицательных предложениях со значением необходимости совершения действия или отсутствием таковой:

Need you **go** so soon?

You **needn't do** the whole exercise again.

§ 14. НЕОПРЕДЕЛЕННЫЕ ВРЕМЕНА (INDEFINITE TENSES)

Группа времен Indefinite включает Present, Past и Future Indefinite. Времена этой группы выражают обычное, постоянно повторяющееся действие в настоящем, прошедшем и будущем времени. Форма **Present Indefinite** совпадает с формой инфинитива (без частицы to) во всех лицах, кроме 3-го лица единственного числа, где глагол получает окончание **-s:**

I **know** several foreign languages.

He **knows** about the latest achievements of scientists in this branch of industry.

We **know** how this machine works.

Глаголы, которые оканчиваются на **-ss, -ch, -sh, -x,** а также **-o,** принимают окончание **-es** в 3-м лице единственного числа:

She **teaches** mathematics at this Institute.

He **wishes** to do his practical work at our laboratory.

She **goes** to the library in the evening.

Глаголы, которые оканчиваются на «y» с предшествующей согласной, в 3-м лице единственного числа меняют «y» на «i» и принимают окончание **-es.**

I stud*y* new methods of work.

He stud*ies* chemistry.

Если глагол оканчивается на «y», перед которой стоит гласная, то форма 3-го лица единственного числа образуется по общему правилу:

I pla*y* tennis and he pla*y*s football.

Вопросительная форма образуется при помощи вспомогательного глагола **to do** в настоящем времени, который в 3-м лице единственного числа имеет форму **does**, и инфинитива смыслового глагола (без **to**). Вспомогательный глагол **to do** стоит перед подлежащим:

He **attends** lectures and seminars every day.

Does he **attend** lectures and seminars every day?

They **take** English lessons.

Do they **take** English lessons?

Отрицательная форма образуется также при помощи вспомогательного глагола **to do**, отрицания **not** и инфинитива смыслового глагола (без частицы **to**). Порядок слов в предложении прямой:

I **do not take** a tram when I go to my work.

She **does not work** at this problem.

You **do not discuss** the plan of our work.

Past Indefinite правильных глаголов образуется путем прибавления во всех лицах окончания **-ed** к форме инфинитива:

to help — helped	to want — wanted
to live — lived	to play — played

Past Indefinite неправильных глаголов образуется разными способами (см. таблицу неправильных глаголов):

to come — came	to build — built
to give — gave	to go — went
	to cut — cut

Глагол в Past Indefinite не имеет личных окончаний.

We **tested** a new device last week.

He **carried out** a very interesting experiment.

Вопросительная форма как правильных, так и неправильных глаголов образуется при помощи

глагола **to do** (в прошедшем времени **did**) и формы инфинитива смыслового глагола (без частицы **to**):

We **took part** in this conference.

Did we **take part** in this conference?

They **worked out** a new plan of work.

Did they **work out** a new plan of work?

Отрицательная форма как правильных, так и неправильных глаголов образуется при помощи глагола **to do** (**did** в прошедшем времени) и частицы **not**, которая стоит после вспомогательного глагола **did**, и формы инфинитива смыслового глагола (без частицы **to**):

We **did not (didn't) take part** in this conference.

They **did not work out** a new plan of work.

Future Indefinite образуется при помощи вспомогательных глаголов **shall** и **will** и инфинитива смыслового глагола (без частицы **to**). **Shall** употребляется в 1-м лице единственного и множественного числа, а **will** — во всех остальных лицах.

I **shall explain** these rules to you.

We **shall visit** different plants during our practice.

They **will work** with their professor at the laboratory.

В вопросительной форме вспомогательные глаголы **shall** и **will** стоят перед подлежащим:

Shall we **take part** in this work?

Will you **make** your report at the meeting?

В отрицательной форме частица **not** ставится после вспомогательных глаголов **shall** и **will**:

I (we) **shall not continue** this work.

You (they) **will not finish** these experiments today.

§ 15. СТРАДАТЕЛЬНЫЙ ЗАЛОГ (PASSIVE VOICE)

Глагол в действительном залоге выражает действие, которое выполняет лицо или предмет, выступающее в предложении в роли подлежащего:

The workers **develop** the new methods of work at this factory.

Глагол в страдательном залоге выражает действие, которое направлено на лицо или предмет в роли подлежащего:

New methods of work **are developed** at this factory.

Времена страдательного залога образуются при помощи вспомогательного глагола **to be** в соответствующем времени

и формы причастия прошедшего времени (Participle II) смыслового глагола:

to be + Participle II

При спряжении глагола в страдательном залоге изменяется только глагол **to be**, смысловой же глагол имеет во всех временах одну и ту же форму Participle II. Следовательно, время глагола в страдательном залоге определяется формой вспомогательного глагола **to be**.

	Indefinite	Continuous	Perfect
Present	I am informed He is informed We are informed	I am being informed He is being informed We are being informed	I have been informed He has been informed We have been informed
Past	I was informed He was informed We were informed	I was being informed He was being informed We were being informed	I had been informed He had been informed We had been informed
Future	I shall be informed He will be informed We shall be informed	—	I shall have been informed He will have been informed We shall have been informed

Вопросительные предложения с глаголом в страдательном залоге образуются следующим образом:

Is he **invited** to visit this institute?
Are these laboratories **supplied** with the new equipment?
Were the students **sent** to work to the collective farm?
Shall we **be sent** for practice to this plant?

Отрицательная форма образуется при помощи частицы **not**, которая ставится после глагола **to be**:

These shops **are not reconstructed**.

We **shall not be informed** about the results of the experiment.

The work **is not done** in time.

Есть несколько способов перевода предложений с глаголом в страдательном залоге на русский язык:

1) при помощи глагола «*быть*» в прошедшем или будущем времени в сочетании с причастием прошедшего времени:

The plan **was fulfilled** in time.	План *был выполнен* вовремя.
The research work **will be carried out** under the direction of professor N.	Научно-исследовательская работа *будет выполнена* под руководством профессора Н.

2) глаголом в 3-м лице единственного или множественного числа с окончанием *-ся* или *-ться*:

The exploration of cosmic space **is done** by means of sputniks and spaceships.	Исследования космоса *проводят (проводятся)* с помощью спутников и космических кораблей.

3) безличным предложением:

The plan of work **was discussed** at the meeting.	На заседании *обсудили* план работы.

4) предложениями с глаголом в действительном залоге:

The article **was read** by the students yesterday.	Студенты *прочитали* вчера статью.

§ 16. ОСОБЕННОСТИ СТРАДАТЕЛЬНЫХ ОБОРОТОВ

В страдательном залоге действие направлено на субъект, но сам субъект не выполняет действие. Особенность английских страдательных оборотов заключается в том, что субъект может быть как прямым, так и косвенным объектом действия. Сравните такие предложения:

Students **are sent** to do practical work.	Студентов *посылают* на практику.
Students **are sent** control works.	Студентам *посылают* контрольные работы.

В первом случае подлежащее **students** является прямым объектом действия. Подлежащее переводится на русский язык существительным в именительном или винительном падеже.

Во втором случае подлежащее **students** является косвенным объектом действия, а прямым объектом будет словосочетание **control works**. Следовательно, слово **students** переводится существительным в дательном падеже.

Если в английском предложении с глаголом в действительном залоге предлог стоит между глаголом и существительным (или местоимением), то с глаголом в страдательном залоге предлог будет стоять после глагола.

Сравните:

We speak about his discovery.	Мы говорим о его открытии.
His discovery is spoken about.	О его открытии говорят.

Если в страдательном залоге употребляются глаголы с предлогами, то при переводе на русский язык предлог ставят перед тем словом, которое в английском предложении является подлежащим:

These data are often **referred to.**	*На* эти данные часто ссылаются.
The readings of this device **can be relied upon.**	*На* показания этого счетчика можно положиться.

§ 17. ДЛИТЕЛЬНЫЕ ВРЕМЕНА (CONTINUOUS TENSES)

Времена группы Continuous выражают действие, которое происходит в момент разговора или в определенный период настоящего (Present Continuous), прошедшего (Past Continuous) или будущего (Future Continuous) времени.

Времена группы Continuous (Present, Past и Future) образуются при помощи вспомогательного глагола **to be** в соответствующем времени и Participle I (причастия настоящего времени):

to be + Participle I

Глагол **to be** изменяется по временам, лицам и числам, а смысловой глагол в форме Participle I не изменяется:

He **is delivering** a lecture now.	Он сейчас *читает* лекцию.
The students **were working** in the shop when we came.	Студенты *работали* в мастерской, когда мы пришли.
We **shall be working** at the results of our research from 3 till 6 o'clock in the evening.	Мы *будем работать* над результатами наших научных исследований с 3 до 6 часов вечера.

Вопросительная и отрицательная формы времен Continuous образуются согласно общему правилу сложных глагольных форм.

Времена группы Continuous

Present Continuous	Past Continuous	Future Continuous
Утвердительная форма		
I am studying He, She, It } is studying We, You, They } are studying	I, He, She, It } was studying We, You, They } were studying	I shall be studying He, She, It } will be studying We shall be studying You, They } will be studying
Вопросительная форма		
Am I studying? Is he studying? Are { we, you, they } studying?	Was I studying? Was he studying? Were { we, you, they } studying?	Shall I be studying? Will he be studying? Shall we be studying? Will { you, they } be studying?
Отрицательная форма		
I am not studying He is not studying We, You, They } are not studying	I was not studying He was not studying We, You, They } were not studying	I shall not be studying He will not be studying We shall not be studying You, They } will not be studying

§ 18. ПЕРФЕКТНЫЕ ВРЕМЕНА (PERFECT TENSES)

Времена группы Perfect выражают законченное, завершенное действие. Слово Perfect в переводе означает «завершенный, законченный». К этой группе принадлежат Present Perfect, Past Perfect и Future Perfect.

Present Perfect выражает действие, которое совершилось к определенному моменту в настоящем времени, **Past Perfect** выражает действие, которое закончилось к определенному моменту в прошлом, а Future Perfect выражает действие, которое завершится к определенному моменту в будущем.

Времена группы Perfect образуются при помощи вспомогательного глагола **to have** и Participle II (причастие прошедшего времени) смыслового глагола:

to have + Participle II

Глагол **to have** изменяется по временам, лицам и числам; а смысловой глагол в форме Participle II остается неизменным:

We **have** already **passed** all the examinations.	Мы уже сдали все экзамены.
He **had finished** the test by 5 o'clock.	Он закончил эксперимент к 5 часам.
They **will have designed** the device by the end of the week.	Они сконструируют прибор к концу недели.

Времена группы Perfect

Present Perfect	Past Perfect	Future Perfect
Утвердительная форма		
I have written He, She, It — has written We, You, They — have written	I, He, She, It, We, You, They — had written	I shall have written He, She, It — will have written We shall have written You, They — will have written

Вопросительная форма		
Have I written? Has he / she / it written? Have we / you / they written?	Had I / he / she / it / we / you / they written?	Shall I have written? Will he / she / it have written? Shall we have written? Will you / they have written?
Отрицательная форма		
I have not written? He / She / It has not written We / You / They have not written	I / He / She / It / We / You / They had not written	I shall not have written He / She / It will not have written We shall not have written You / They will not have written

Present Perfect часто употребляется без указания времени совершения действия, поскольку внимание говорящего обращено не на время совершения действия, а на его результат в настоящем:

She **has finished** her work. He **has left** Moscow.

Present Perfect употребляется с обстоятельствами, обозначающими еще не истекший период времени,— **today** *сегодня*, **this week** *на этой неделе*, **this month** *в этом месяце*, **this year** *в этом году*.

Present Perfect не употребляется с обстоятельствами, обозначающими истекший период времени,— **yesterday** *вчера*, **last week** *на прошлой неделе*, **last year** *в прошлом году*. С этими выражениями употребляется Past Indefinite.

Сравните:

The plant **has overfulfilled** its plan.	Завод *перевыполнил* план.
This month the plant **has overfulfilled** its plan.	Завод *перевыполнил* план *в этом месяце.*
Last month the plant **overfulfilled** its plan.	Завод *перевыполнил* план *в прошлом месяце.*

Все три предложения переводятся на русский язык одинаково, так как указывают на завершенность действия, независимо от времени его выполнения.

Present Perfect часто употребляется с наречиями неопределенного времени **already** *уже*, **never** *никогда*, **ever** *когда-нибудь*, **seldom** *редко*, **often** *часто*, **sometimes** иногда, которые указывают на повторяемость действия и на его связь с настоящим временем. В таких случаях Present Perfect переводится только глаголами несовершенного вида:

I **have** *often* made reports at the lectures.	Я *часто делал* доклады на лекциях.

В некоторых случаях глаголы в Present Perfect выражают действие или состояние, которое началось в прошлом и продолжается в настоящем времени. В таких случаях глаголы в Present Perfect переводятся глаголами в настоящем времени и глаголами несовершенного вида в прошедшем:

He **has lived** here for many years.	Он *живет* здесь много лет.
I have not seen her since childhood.	Я *не видел* ее с детства.

Момент завершения действия в Past Perfect можно выразить 1) точным временем, к моменту которого завершилось действие:

We **had built** a new power plant by the end of the year.	Мы *построили* новую электростанцию к концу года.

2) другим действием в прошлом:

They **had finished** their experiments before they received your instructions.	Они *закончили* свои опыты до того, как получили ваши указания.

Так же выражается момент завершения действия и в Future Perfect:

The plant **will have fulfilled** the plan by the end of the year.	Завод *выполнит* план к концу года.
You **will have received** our telegram before we arrive.	Вы *получите* нашу телеграмму до нашего приезда (до того, как мы приедем).

§ 19. СОГЛАСОВАНИЕ ВРЕМЕН (SEQUENCE OF TENSES)

В английском языке время глагола в придаточном предложении зависит от времени, в котором употреблен глагол главного предложения. Употребление времен в придаточных предложениях, главным образом дополнительных, осуществляется согласно следующим правилам, называемым правилами согласования или последовательности времен:

1. Если сказуемое главного предложения выражено глаголом в одной из форм настоящего времени (обычно Present Indefinite или Present Perfect) или будущего времени (обычно Future Indefinite), то глагол в придаточном предложении употребляется в любом времени, которое требуется по смыслу:

I **think** you **are right**.	Я *думаю*, вы *правы*.
Do you **know** why he **was absent** yesterday?	*Знаете* ли вы, почему его *не было* вчера?
I'**ll tell** you what you **will have to do**.	Я *скажу* вам, что вам *нужно будет сделать*.

2. Если сказуемое главного предложения выражено глаголом в одной из форм прошедшего времени (обычно Past Indefinite), то глагол придаточного предложения употребляется в одной из форм прошедшего времени или будущего в прошедшем (Future-in-the-Past).

Такой зависимости в русском языке нет.

I **did not know** he **could speak** English.	Я *не знал*, что он *говорит* на английском языке.
He **told** me that you **were writing** your composition.	Он *сказал* мне, что ты *пишешь* сочинение.
I **hoped** you **would come**.	Я *надеялся*, что *вы придете*.

Для выражения действия, одновременного с действием главного предложения, глагол придаточного предложения употребляется в Past Indefinite или Past Continuous:

I **thought** you **were ready**.	Я думал, что ты готов.
He **told** me that he **was preparing** for his exams.	Он сказал мне, что готовится к экзаменам.

Для выражения действия, предшествующего действию главного предложения, глагол придаточного предложения употребляется в Past Perfect:

I **did not know** that she **had gone** away.	Я не знал, что она ушла.

С обстоятельствами времени (in 1968, yesterday), предшествующее действие выражают глаголом в Past Indefinite:

I **thought** you **were born** in 1968.
I **thought** you **came back** from your trip yesterday.

Для выражения будущего действия с точки зрения прошедшего времени глагол употребляют в форме Future-in-the-Past:

I **did not expect** you **would be late.**	Я не ожидал, что ты опоздаешь.
He **told** me that he **would meet** us at the stadium.	Он сказал, что встретит нас на стадионе.

§ 20. ПРЯМАЯ И КОСВЕННАЯ РЕЧЬ (DIRECT AND INDIRECT SPEECH)

При преобразовании прямой речи в косвенную в английском языке следует соблюдать определенные правила.

Прямая речь принимает форму дополнительного придаточного предложения, которое вводится союзом **that**. Союз **that** иногда опускается.

Глагол **to tell** всегда употребляется с косвенным дополнением, а глагол **to say** употребляется или с предложным дополнением (предлог **to**), или без него:

Tom says he is going to study French.	Том говорит, что он собирается изучать французский язык.
Jack told me that his hobby was collecting postage stamps.	Джек сказал мне, что он увлекается собиранием почтовых марок.
She answered that she knew nothing about it.	Она ответила, что ничего об этом не знает.

При преобразовании прямой речи в косвенную следует соблюдать правила согласования времен. При этом некоторые местоимения и наречия времени и места изменяются по такой схеме:

Прямая речь	Косвенная речь
this	that
these	those
here	there
now	then
today	on that day
this week (year, etc.)	that week (year, etc.)
yesterday	the day before
last week	the week before
two days ago	two days before
tomorrow	the next day, the following day
next week	the next week

При преобразовании вопросов из прямой речи в косвенную изменяется порядок слов: косвенные вопросы в отличие от прямых характеризуются прямым порядком слов. В главном предложении обычно используется глагол **to ask**. Общие вопросы вводятся в косвенной речи союзами **if** или **whether**:

«Are you free tomorrow?» — I asked her **if** she was free the next day.

«Do you speak English?» — She asked me **whether** I spoke English.

Специальные вопросы вводятся в косвенной речи соответствующими вопросительными словами, которые выполняют в предложении функцию союзов:

«Where are you going?» — He asked me **where** I was going.

«What do you think about it» — I asked Mary **what** she thought about it.

§ 21. СЛОЖНОПОДЧИНЕННЫЕ ПРЕДЛОЖЕНИЯ

Сложноподчиненное предложение состоит из главного предложения (Principal Clause) и одного или нескольких придаточных предложений, которые раскрывают содержание главного предложения. Типы придаточных предложений в английском языке такие же, как и в русском, а именно: придаточное предложение подлежащее, сказуемое, дополнительное, определительное, придаточные обстоятельственные предложения. Придаточные обстоятельственные предложения подразделяются на обстоятельственные предложения времени, места, условия, причины, способа дей-

ствия, цели и т. д. В английском языке придаточные предложения могут стоять перед главным предложением или после него. В отличие от русского языка в английском языке придаточные предложения часто не отделяются от главного предложения запятой и всегда имеют подлежащее.

ТИПЫ ПРИДАТОЧНЫХ ПРЕДЛОЖЕНИЙ

1. **Придаточные предложения-подлежащие (Subject Clauses)** выполняют в сложном предложении функцию подлежащего и отвечают на вопросы **who?** *кто?* **what?** *что?* Они присоединяются к главному предложению союзами **that, whether, if** и союзными словами **who (whom), what, which, when, where, how, why:**

That he is a talented scientist is known to everybody.	То, что он талантливый ученый, известно каждому.
Whether she comes or not is unknown.	Придет она или нет — неизвестно.
When we shall begin this experiment is uncertain.	Неизвестно, когда мы начнем этот эксперимент.

2. **Придаточные предложения-сказуемые (Predicative Clauses)** выполняют в сложном предложении функцию именной части составного сказуемого; они вводятся такими же союзами и союзными словами, как и придаточные предложения-подлежащие:

The problem is **when** we can do it.	Дело в том, когда мы начнем это делать.

3. **Дополнительные придаточные предложения (Object Clauses)** выполняют в сложных предложениях функцию дополнения — прямого или предложного; они вводятся теми же союзами и союзными словами, что и придаточные предложения подлежащие и сказуемые:

We know **that** they will be able to test this device in time.	Мы знаем, что они смогут своевременно испытать этот прибор.
He asked me **if** I knew this student.	Он спросил меня, знаю ли я этого студента.

Часто дополнительное придаточное предложение, которое вводится союзом **that**, может присоединяться к главному

бессоюзным способом. В этом случае подлежащее дополнительного придаточного предложения стоит сразу же после переходного глагола, который является сказуемым главного предложения:

We know they will be able to test this device in time.

Переводится такое бессоюзное придаточное предложение так же, как и дополнительное придаточное предложение с союзом **that**.

4. **Определительные придаточные предложения (Attributive Clauses)** выполняют в сложном предложении функцию определения. Они присоединяются к главному предложению союзами, союзными словами, относительными местоимениями **who, which, that** и наречиями **when, where, how, why.**

Определительное придаточное предложение непосредственно следует за тем словом в главном предложении, которое оно определяет:

Alexei Leonov was the first man **who** stepped into space.	Алексей Леонов был первым человеком, который вышел в открытый космос.

Относительное местоимение **who** употребляется для лиц, **which** — для предметов, **that** может употребляться и для лиц, и для предметов.

Определительное придаточное предложение может быть бессоюзным:

This is the device (which) we tested last week.	Это прибор, который мы испытывали на прошлой неделе.

Местоимения **which** и **whom** могут употребляться с предлогами **to whom, for whom, about whom** и т. д. Место предлога — или перед местоимением, или после глагола:

The man **to whom** you were speaking is our professor.

The man you were speaking **to** is our professor.

Человек, с которым вы разговаривали, наш профессор.

Второй вариант более распространенный.

5. Обстоятельственные придаточные предложения (рассмотрим только некоторые из них) подразделяются на:

а) обстоятельственные придаточные предложения времени отвечают на вопросы **when? since when? how long?** Они присоединяются к главному предложению союзами **when, whenever, while, as, after, before, till, until, since, as long as:**

Read this book **when** you are free.	Прочтите эту книгу, когда будете свободны.
You cannot carry on experiments **until** you have all the necessary equipment.	Вы не сможете проводить опыт, пока у вас не будет необходимого оборудования.

Обратите внимание, в придаточных предложениях времени (и условия) глагол употребляется не в будущем времени, а в настоящем (when you are free; until you have all the necessary equipment)

б) Обстоятельственные придаточные предложения места отвечают на вопрос **where**. Они присоединяются к главному предложению союзами **where, wherever:**

They use this device **where** high efficiency is required.	Они пользуются этим прибором там, где необходим высокий коэффициент полезного действия.

в) Условные придаточные предложения отвечают на вопросы **in what case?** (*в каком случае?*), **on what condition?** (*при каком условии?*). Они присоединяются к главному предложению союзами **if, unless, provided, in case:**

He will translate the text **unless** he is busy.	Он переведет текст, если не будет занят.

Условные придаточные предложения подразделяются на две группы: 1) предложения реального условия 2) предложения нереального условия.

Предложения реального условия выражают условие как действительный факт и относятся к настоящему, прошедшему и будущему времени:

If he **has** time he **plays** chess.	Если у него есть время, он играет в шахматы.
If he **had** time (yesterday), he **played** chess.	Если у него было время (вчера), он играл в шахматы.
If he **has** time (tomorrow), he **will play** chess.	Если у него будет время (завтра), он будет играть в шахматы.

Предложения нереального условия выражают условие не как реальный факт, а как предположение. Они делятся на предложения, действие которых происходит

а) в настоящем и будущем времени и б) в прошедшем времени. Переводятся они на русский язык одинаково— глаголом в условном наклонении, т. е. с частицей *бы*.

If he **had** time (today, tomorrow), he **would play** chess.	Если *бы* у него было время (сегодня, завтра), он *бы* играл в шахматы.
If he **had had** time (yesterday) he **would have played** chess.	Если *бы* у него было время (вчера), он *бы* играл в шахматы.

Условные придаточные предложения, в состав сказуемого которых входят глаголы **were, had, could,** могут присоединяться к главному предложению бессоюзным способом. В таких предложениях эти глаголы находятся перед подлежащим:

Had he time he would play chess.

Перевод такой же, как и в предложениях с союзами: Если бы у него было время...

а) придаточные предложения п р и ч и н ы отвечают на вопрос **why?** *(почему?)*. Они присоединяются к главному предложению союзами **as, since, for, because:**

He speaks English well **because** he studies much.	Он хорошо говорит на английском языке, потому что много работает.

§ 22. НЕЛИЧНЫЕ ФОРМЫ ГЛАГОЛА (VERBALS)

В английском языке (как и в русском) наряду с личными имеются и неличные формы глагола. Это инфинитив (the Infinitive), причастие (the Participle) и герундий (the Gerund).

Английский инфинитив соответствует русской неопределенной форме глагола, а причастие — русскому причастию и деепричастию. Формы, соответствующей английскому герундию, в русском языке нет. Значение герундия на русский язык можно передать отглагольным существительным, неопределенной формой глагола и другими формами.

Неличные формы глагола не имеют форм лица и числа, и поэтому они не могут самостоятельно выступать в функции сказуемого.

Отличительной чертой английских неличных форм является их особенность образовывать так называемые

синтаксические конструкции. Эти конструкции эквивалентны по функции в предложении придаточным предложениям.

§ 23. ПРИЧАСТИЕ (THE PARTICIPLE)

Participle обладает свойствами прилагательного и глагола и может выполнять в предложении функцию определения и обстоятельства. Participle не изменяется ни по лицам, ни по числам, но имеет форму времени и залога.

Категория времени неличных форм глагола имеет относительный характер, т. е. не выражает время действия (настоящее, прошедшее, будущее), а указывает на одновременность или предшествование действия, выраженного неличными формами глагола, по отношению к действию, выраженному сказуемым.

Present Participle употребляется для выражения действия, происходящего одновременно с действием сказуемого:

Studying we improve our knowledge.	Учась, мы углубляем свои знания.

Для выражения действия, происшедшего ранее действия сказуемого, употребляется Perfect Participle.

Having studied the theory they applied it in their work.	Изучив теорию, они применили ее в своей работе.

Пассивная форма неличных форм глагола образуется при помощи вспомогательного глагола **to be** и Participle II.

Формы Participle

Participle	Active	Passive
Present	writing	being written
Perfect	having written	having been written
Past	—	written

Причастие настоящего времени — Participle I — выполняет в предложении следующие функции:

1) определения и определительного причастного оборота:

The **moving** parts of the machine were carefully cleaned.	*Движущиеся* части машин были тщательно вычищены.
The power stations **being built in different parts of our country** will supply energy to cities and villages.	Электростанции, *строящиеся в разных уголках нашей страны*, будут снабжать энергией города и села.

2) обстоятельства:

Making a number of experiments the scientist used different substances.	*Проводя опыты*, ученый использовал различные вещества.
Working with this new device the inventor will arrive at new valuable conclusions.	*Работая с новым прибором*, изобретатель сделает новые ценные выводы.
Having predicted the properties of some elements Mendeleev left several blanks in his table.	*Предсказав свойства некоторых элементов*, Менделеев оставил для них несколько свободных мест в своей таблице.

1. НЕЗАВИСИМЫЙ ПРИЧАСТНЫЙ ОБОРОТ (THE ABSOLUTE PARTICIPLE CONSTRUCTION)

Независимый причастный оборот имеет собственное подлежащее, которое не зависит от подлежащего предложения. Например:

Copper being a good conductor of electricity, it is widely used in electrical engineering.	*Так как медь хороший проводник электричества*, она очень широко применяется в электротехнике.
Our laboratory being supplied with different new instruments, the students can do their practical work there.	*Так как наша лаборатория оснащена различными приборами*, студенты могут выполнять там свои практические работы.

В первом примере независимый причастный оборот — copper being a good conductor of electricity. Подлежащим этого оборота является copper, а причастие being выступает в роли сказуемого. Этот оборот всегда отделяется запятой.

Независимый причастный оборот может стоять как в начале, так и в конце предложения. Если независимый при-

частный оборот находится в начале, предложения, то связь с предложением будет подчинительной, и оборот переводится придаточным обстоятельственным предложением времени, условия, причины, вводимом союзами *«поскольку»*, *«когда»*, *«после того как»* и др.

Если независимый причастный оборот стоит в конце предложения, то связь с предложением будет сочинительной, и независимый причастный оборот переводится самостоятельным предложением с союзами *«а»*, *«при этом»*, *«и»* или совсем без союза:

A magnet being broken into two, two complete magnets result, **two new poles appearing at the fracture.**	Если магнит разделить на две части, получим два новых магнита, *при этом на месте разрыва появятся два новых полюса.*

II. ПРИЧАСТИЕ ПРОШЕДШЕГО ВРЕМЕНИ (PARTICIPLE II)

Participle II выполняет в предложении функции составной части сказуемого, определения и обстоятельства:

They have **taken** part in this practical work.	Они приняли участие в этой работе.
Cosmic explorations **made** by our scientists are of great importance for world science.	Космические исследования, *проведенные* нашими учеными, имеют большое значение для мировой науки.
This metal when **examined** showed valuable properties.	Этот металл при исследовании проявил ценные свойства.

§ 24. ГЕРУНДИЙ (THE GERUND)

Герундий — неличная форма глагола, оканчивающаяся на **-ing**. Герундий сочетает в себе признаки существительного и глагола.

Формы герундия

Gerund	Active Voice	Passive Voice
Indefinite	asking	being asked
Perfect	having asked	having been asked

I. СВОЙСТВА ГЕРУНДИЯ

К г л а г о л ь н ы м свойствам герундия относятся:

1) свойство выражать соответствующее время, т. е. передавать действие, происходящее о д н о в р е м е н н о с действием, выраженным сказуемым, или п р е д ш е с т в у ю щ е е ему:

Indefinite Gerund передает действие

а) о д н о в р е м е н н о е с действием, выраженным сказуемым:

I **know** of his **coming** here every day.	Я *знаю*, что он *приходит* сюда каждый день.

б) относящееся к б у д у щ е м у:

I **know** of his **coming** here tomorrow.	Я *знаю*, что он *придет* сюда завтра.

в) безотносительно ко времени его совершения:

Reading books is useful.	*Чтение* книг полезно. *Читать* книги полезно.

Perfect Gerund передает действие, которое закончилось р а н ь ш е действия, выраженного сказуемым. Переводится на русский язык придаточным предложением со сказуемым, выраженным глаголом в прошедшем времени:

I **know** of his **having invented** this device.	Я *знаю* что он *изобрел* этот прибор.

2) наличие категории залога:

I don't like **asking** questions.	Я не люблю задавать вопросы
I don't like **being asked** questions.	Я не люблю, когда мне задают вопросы.

3) герундий может иметь прямое дополнение:

Reading *books* is useful.	**Читать** *книги* полезно.

4) после герундия может стоять определение, выраженное наречием:

He likes **walking** *slowly*.	Он любит **ходить** *медленно*.

Обладая свойствами существительного, герундий может иметь

1) определение, выраженное притяжательным местоимением или существительным в притяжательном или общем

падеже. В сочетании с герундием эти определения выражают не принадлежность, а лицо, к которому относится действие, выраженное герундием:

We know of *Popov's* **being** the inventor of the radio.	Мы знаем, что Попов — изобретатель радио.

2) перед собой предлог:

We shall discuss it *after* **reading.**	Мы обсудим это после чтения

II. ФУНКЦИИ ГЕРУНДИЯ В ПРЕДЛОЖЕНИИ

В предложении герундий выполняет следующие функции:

1) подлежащего:

Reading is a great help in study.	Чтение очень помогает в учебе.

2) именной части сказуемого:

My favourite occupation is **reading.**	Мое любимое занятие — чтение.

3) определения:

а) без предлога

Timber is a useful **building** material (material for building).	Древесина — ценный строительный материал.

б) с предлогами **in, of, for:**

There are some devices *for* **measuring** air pressure.	Есть несколько приборов **для** измерения давления воздуха.

4) дополнения:

а) прямого:

He likes **singing.**	Он любит петь.

б) с предлогами **in, of, from:**

We are fond *of* **reading** English books.	Мы любим читать английские книги.

б) обстоятельства:

а) времени с предлогами **in, on, upon, after, before:**

In **designing** the construction the engineer applied a new method.	Проектируя эту конструкцию, инженер использовал новый метод.

б) образа действия с предлогом **by:**

By **applying** the new method the engineer achieved better results.	Применив новый метод, инженер добился лучших результатов.

в) цели с предлогом **for:**

Young people enter higher schools *for* **studying** some **speciality**.	Молодежь поступает в вузы, чтобы получить специальность.

г) сопутствующих обстоятельств с предлогами **besides, instead of, without:**

He translated the text *without* **using** the dictionary.	Он перевел текст, не пользуясь словарем (без словаря).

III. КАК ОТЛИЧИТЬ ПРИЧАСТИЕ ОТ ГЕРУНДИЯ

Формы причастия совпадают с формами герундия, но по смыслу причастие отличается от герундия. Причастие обладает признаками глагола и прилагательного, в предложении употребляется в функции определения и обстоятельства. Герундий обладает признаками глагола и существительного, в предложении выполняет функции существительного.

Предлог употребляется только перед герундием. Если же герундий в функции определения употребляется без предлога, его легко отличить от причастия: причастие указывает на действие, которое выполняется существительным, а герундий указывает на принадлежность предмета, выраженного существительным. Так, a reading boy *мальчик, который читает* — причастие, reading material *материал для чтения* — герундий.

Во всех остальных функциях, где герундий употребляется без предлога (подлежащее, прямое дополнение и др.), причастие не употребляется.

Перед герундием может стоять притяжательное местоимение или существительное в притяжательном или общем падеже, а перед причастием — нет.

§ 25. ОТГЛАГОЛЬНОЕ СУЩЕСТВИТЕЛЬНОЕ (THE VERBAL NOUN)

В английском языке есть еще одна ing-форма — отглагольное существительное, которое имеет все признаки существительного: перед ним может стоять артикль, прилагательное. Оно может иметь во множественном числе окончание -s. Переводится отглагольное существительное на русский язык только существительным:

The **cutting** out of the woods results in the destruction of the soil.	*Вырубка* лесов приводит к истощению почвы.

§ 26. ИНФИНИТИВ (THE INFINITIVE)

Формы инфинитива

Tense	Active Voice	Passive Voice
Indefinite:	to write	to be written
Continuous:	to be writing:	—
Perfect:	to have written	to have been written
Perfect Continuous:	to have been writing	—

Инфинитив — неличная форма глагола, которая называет действие, не указывая ни лица, ни числа. Происходит английский инфинитив от отглагольного существительного, поэтому он обладает признаками существительного и глагола. Формальным признаком инфинитива является частица **to**, которая не имеет самостоятельного значения. Частица **to** перед инфинитивом часто опускается.

1. ОСОБЕННОСТИ ИНФИНИТИВА

1. Глагольные признаки инфинитива.

Инфинитив может иметь:

а) форму времени и залога: время указывает на действие, которое происходит или одновременно с действием сказуемого, или предшествует ему:

We are glad **to do** this work.	Мы с удовольствием *выполняем* эту работу.
We are glad **to have done** this work.	Мы довольны, что выполнили эту работу.

б) прямое дополнение:

He likes **to read** *books.* Он любит **читать** *книги.*

в) обстоятельство:

He likes **to read** *aloud.* Он любит **читать** *вслух.*

2. Обладая свойствами существительного, инфинитив может быть в предложении подлежащим, именной частью сказуемого, дополнением, определением, обстоятельством цели.

II. ФУНКЦИИ ИНФИНИТИВА В ПРЕДЛОЖЕНИИ

Инфинитив выполняет в предложении следующие функции:

1) подлежащего:

To master a foreign language is necessary for every student.	Каждому студенту необходимо овладеть иностранным языком.

2) обстоятельства:

To master a foreign language, it is necessary **to work** hard.	Чтобы изучить иностранный язык, нужно упорно работать.

3) составной части сказуемого:

To live **is to work.**	Жить — значит работать.
You must **do** all the exercises.	Нужно выполнить все упражнения.

4) дополнения:

He decided **to take part** in the discussion.	Он решил принять участие в дискуссии.

5) определения:

He was the first **to introduce** this method.	Он первым внедрил этот метод.
The question **to be discussed** is of great importance.	Вопрос, который нужно обсудить, очень важен.

III. ОБЪЕКТНЫЙ ИНФИНИТИВНЫЙ ОБОРОТ (THE OBJECTIVE INFINITIVE CONSTRUCTION)

Объектный инфинитивный оборот состоит из двух элементов: существительного в общем падеже (или личного местоимения в объектном падеже) и инфинитива. Он выступает как единый член предложения — сложное дополнение:

We *know* comrade Petrov (him) to be a good engineer.	Мы знаем, что товарищ Петров (он) хороший инженер.

Оборот «comrade Petrov (him) to be a good engineer» является объектным инфинитивным оборотом и выполняет в предложении функцию дополнения. Переводится этот оборот на русский язык придаточным дополнительным предложением, которое вводится союзами «*что*», «*чтобы*», «*когда*», «*как*». Обратите внимание, в этом обороте действие, выраженное инфинитивом, относится не к подлежащему (we), а к дополнению (comrade Petrov, him). Употребляется объектный инфинитивный оборот после определенных глаголов в действительном залоге:

1) после глаголов, выражающих желание, волю:

to want	хотеть
to wish	желать
to desire	
to prefer	отдавать предпочтение

2) после глаголов, выражающих умственное восприятие:

to know	знать
to find	находить
to think	думать
to believe	думать, считать, полагать
to consider	считать, рассматривать
to expect	ожидать
to remember	помнить
to assume	допускать
to suspect	подозревать, думать

3) после глаголов, выражающих эмоциональные отношения:

to like	любить, нравиться
to dislike	не любить, не нравиться
to hate	ненавидеть

4) после глаголов о чем-то сообщающих:

to announce	объявлять, сообщать
to declare	заявлять

5) после глаголов, выражающих позволение, поощрение:

to let	позволять
to make	заставлять

6) после глаголов, выражающих восприятие с помощью органов чувств:

to see	видеть
to watch	наблюдать
to hear	слышать
to feel	чувствовать

После слов, которые выражают физическое восприятие, разрешение, инфинитив в обороте употребляется без частицы to:

We *saw* the machine run. Мы видели, как работает машина.

IV. СУБЪЕКТНЫЙ ИНФИНИТИВНЫЙ ОБОРОТ (THE SUBJECTIVE INFINITIVE CONSTRUCTION)

Инфинитив, который входит в состав субъектного инфинитивного оборота, выражает действие или состояние лица или предмета, которое является подлежащим предложения.

Инфинитив в этом обороте употребляется с частицей to и стоит сразу же после сказуемого, состоящего из глаголов обычно в пассивной форме, которые выражают желание, умственное и физическое восприятие, т. е. из тех же глаголов, с которыми употребляется объектный инфинитивный оборот:

is known	известно
is reported	сообщают
is supposed	ожидают
to be sure	наверное
to be likely	похоже, вероятно и др.
He is *known* to be a good student.	Известно, что он хороший студент.

Перевод таких предложений начинаем со сказуемого, которое переводится безличным предложением, а оборот переводится придаточным дополнительным предложением, в котором подлежащим является подлежащее предложения, а сказуемым — инфинитивный оборот.

Субъектный инфинитивный оборот употребляется также в предложениях, в которых сказуемое выражено глаголами в активной форме:

to seem	казаться
to appear	случаться
to prove	оказываться
This student *proves* **to possess** profound knowledge.	Оказывается, что этот студент обладает глубокими знаниями.

IV. ИНФИНИТИВНЫЙ ОБОРОТ С ПРЕДЛОГОМ

Оборот for + существительное (местоимение) + инфинитив часто встречается в английской научной и технической литературе для упрощения сложных предложений. Этот оборот может выполнять функцию любого члена предложения и обычно переводится придаточным предложением соответствующего типа:

The first thing **for you to do** is to learn all the new words.	Прежде всего вам необходимо выучить все новые слова.
This is **for you to decide.**	Вы должны это решить.

Раздел V

АНГЛО-РУССКИЙ СЛОВАРЬ

A

ability [ə'bɪlɪtɪ] *n* способность
able [eɪbl] *a* умелый, способный
abolish [ə'bɔlɪʃ] *v* отменять, ликвидировать
about [ə'baut] *prep* приблизительно
above [ə'bʌv] *prep* над
absent ['æbsənt] *a* отсутствующий
absorb [eb'sɔ:b] *v* впитывать, поглощать
abstract ['æbstrækt] *n* часть; отрывок; абзац
academician [ə,kædə'mɪʃən] *n* академик
accelerate [æk'seləreɪt] *v* ускорять
accelerator [æk'seləreɪtə] *n* ускоритель
access ['ækses] *n* доступ
accomplish [ə'kɔmplɪʃ] *v* выполнять, завершать
according [ə'kɔ:dɪŋ] *prep* согласно
accounting [ə'kauntiŋ] *n* подсчет, учет
accumulate [ə'kju:mjuleɪt] *v* накапливать, собирать
accuracy ['ækju:rəsɪ] *n* точность
accurate ['ækju:rɪt] *a* точный
achive [ə'tʃi:v[*v* достигать
acid ['æsɪd] *n* кислота
acquire [ə'kwaɪə] *v* овладевать, приобретать
across [ə'krɔs] *prep* через
act [ækt] *v* действовать
actually ['æktjuəlɪ] *adv* фактически, действительно
acute [ə'kju:t] *a* острый
add [æd] *v* прибавлять, добавлять
additional [ə'dɪʃənl] *a* дополнительный
address [ə'dres] *v* обращаться
admiration [,ædmɪ'reɪʃn] *n* восхищение
admit [əd'mɪt] *v* допускать, разрешать
adopt [ə'dɔpt] *v* принимать
advanced [əd'vɑ:nst] *a* передовой
advantage [əd'vɑntɪdʒ] *n* преимущество
advise [əd'vaɪz] *v* советовать
aerodynamics [,eərəudaɪ'næmɪks] *n* аэродинамика
affair [ə'feə] *n* дело, занятие
affect [ə'fekt] *v* влиять, действовать на
after ['ɑ:ftə] *prep* после, потом, затем
afternoon ['ɑ:ftə'nu:n] *n* полдень
again [ə'geɪn] снова, опять
against [e'geɪnst] *prep* против
age [eɪdʒ] *n* возраст, век эпоха
agency ['eɪdʒənsɪ] *n* фактор; средство; агенство
agriculture ['ægrɪkʌltʃə] *n* сельское хозяйство
agreement [ə'gri:mənt] *n* соглашение, договор
aid [eɪd] *n* помощь; *v* помогать
air [eə] *n* воздух
alchemist ['ælkɪmɪst] *n* алхимик
all [ɔ:l] *a* весь
allow]ə'lau] *v* разрешать, позволять
allowance [ə'lauəns] *n* стипендия; разрешение
alloy ['ælɔɪ] *n* сплав
all-round ['ɔ:l'raund] *a* всесторонний
almost ['ɔ:lmoust] *adv* почти
alone [ə'loun] *a* один
along [ə'lɔŋ] *prep* только, исключительно; вдоль
alphabet ['ælfəbɪt] *n* алфавит
already [ɔ:l'redɪ] *adv* уже

also ['ɔ:lsou] *adv* также
alter ['ɔ:ltə] *v* изменять
alternating ['ɔ:ltəneɪtɪŋ] *a* изменяющийся
although [ɔ:l'ðou] *cj* хотя, несмотря на
altitude ['æltɪtju:d] *n* высота
altogether [ˌɔ:ltə'geðə] *adv* вполне, всецело
always ['ɔ:lwəz] *adv* всегда
among [ə'mʌŋ] *prep* среди
amount [ə'maunt] *n* количество, величина
amplify ['æmplɪfaɪ] *v* усиливать
amplifier ['æmplɪfaɪə] *n* усилитель
analyser ['ænəlaɪzə] *n* анализатор
analyse ['ænəlaɪz] *v* анализировать
ancinet ['eɪnʃənt] *a* древний
angular ['æŋgjulə] *a* угловой
anniversary [ˌænɪ'vɜ:sərɪ] *n* годовщина, юбилей
anode ['ænoud] *n* анод
another [ə'nʌðə] *pron* другой
answer ['ɑ:nsə] *n* ответ; *v* отвечать
anywhere ['enɪweə] *adv* где-нибудь, куда-нибудь
apart from [ə'pɑ:tfrəm] *adv* кроме
apparatus [ˌæpə'reɪtəs] *n* прибор, аппарат
apparently [ə'pærəntlɪ] *adv* очевидно, по-видимому
appear [ə'pɪə] *v* появляться, казаться
appearance [ə'pɪərəns] *n* появление; внешность
application [ˌæplɪ'keɪʃn] *n* применение, использование
apply [ə'plaɪ] *v* использовать, употреблять
appraise [ə'preɪz] *v* оценивать
appreciate [ə'pri:ʃɪeɪt] *v* оценивать, ценить
apprentice [ə'prentɪs] *n* ученик, подмастерье
approach [ə'proutʃ] *n* подход, приближение
appropriate]ə'proupriit] *a* соответствующий
approximate [ə'prɔksɪmɪt] *a* приблизительный
arbitrarily ['ɑ:bɪtrərɪlɪ] *adv* произвольно
architectural [ˌɑ:kɪ'tektʃərəl] *a* архитектурный
area ['eərɪə] *n* район; площадь; область
arise (arose, arizen) [ə'raɪz, ə'rouz, ə'rɪzn], *v* возникать
arithmetic [ə'rɪθmətɪk] *n* арифметика
armament ['ɑ:məmənt] *n* вооружение
armature ['ɑ:mətjuə] *a* якорь; арматура
around [ə'raund] *prep* вокруг
arrow ['ærou] *n* стрела, стрелка
arrange [ə'reɪndʒ] *v* размещать, приводить в порядок
arrive (in, at) [ə'raɪv] *v* приезжать, прибывать
art [ɑ:t] *n* искусство
article ['ɑ:tɪkl] *n* статья
artificial [ˌɑ:tɪ'fɪʃəl] *a* искусственный
artistic [ɑ:'tɪstɪk] *a* художественный
as [æz, əz] *cj* как; так как; когда
as well as ['æz wel'æz] *cj* также; так же как и
ask [ɑ:sk] *v* спрашивать
assemble [ə'sembl] *v* собирать; монтировать
assist [ə'sɪst] *v* помогать
assistant professor [ə'sɪstənt prə'fesə] *n* доцент
associate [ə'souʃɪɪt] *n* товарищ, коллега
associated [ə'souʃɪeɪtɪd] *a* связанный
astonish [əs'tɔnɪʃ] *v* удивлять, изумлять(ся)
assume [ə'sju:m] *v* предполагать, допускать
astronautics [ˌæstrə'nɔ:tɪks] *n* астронавтика, космонавтика
astronomer]əs'trɔnəmə] *n* астроном
Atlantic [ət'læntɪk] *a* атлантический
atmosphere ['ætməsfɪə] *n* атмосфера
atomic [ə'tɔmɪk] *a* атомный, ядерный
atomic engineering [ˌendʒɪ'nɪərɪŋ] ядерная техника

attach [ə'tætʃ] *v* присоединять, прикреплять
attain [ə'tein] *v* достигать
attempt [ə'tempt] *n* попытка; *v* пытаться
attend [ə'tend] *v* посещать
attention [ə'tenʃn] *n* внимание
attraction [ə'trækʃn] *n* притяжение, привлекательность
auditorium [ˌɔ:di:'tɔ:riəm] *n* аудитория
author ['ɔ:θə] *n* автор
automate ['ɔ:təmeit] *v* автоматизировать
available [ə'veiləbl] *a* доступный; имеющийся в наличии
average ['ævəridʒ] *a* средний
avoid [ə'vɔid] *v* избегать
award [ə'wɔ:d] *v* награждать; *n* награда
auxiliary [ɔ:g'ziljəri] *a* вспомогательный
azimuth ['æziməθ] *n* азимут

B

back [bæk] *adv* обратно, назад
bacteria (*pl* от **bacterium**) [bæk'tiəriə] *n* бактерии
ball [bɔ:l] *n* шар, мяч
banner ['bænə] *n* знамя
bar [bɑ:] *n* брусок
base [beis] *n* основание; *v* базироваться
basic ['beisik] *a* основной
basis ['beisis] *n* основание
bath [bɑ:θ] *n* ванна
battle [bætl] *n* битва
beam [bi:m] *n* луч
beauty ['bju:ti] *n* красота
because [bi'kɔz] *cj* потому что, так как
become (became, become) [bi'kʌm, bi'keim] *v* становиться, делаться
bed [bed] *n* кровать; слой
begin (began, begun) [bi'gin] *v* начинать(ся) [bi'gæn, bi'gʌn]
behest [bi'hest] *n* завет
believe [bi'li:v] *v* верить, думать, полагать
below [bi'lou] *prep* под, ниже
benzene ['benzi:n] *n* бензол
besides [bi'saidz] *prep* кроме того, кроме
between [bi'twi:n] *prep* между
beyond [bi'jɔnd] *prep* за, по ту сторону
big [big] *a* большой
binary ['bainəri] *a* бинарный, двойной
bind (bound) [baind, baund] *v* соединять, связывать
binomial [ˌbai'noumjəl] *n* бином, двучлен
biochemistry ['baiou'kemistri] *n* биохимия
blacksmith [blæksmiθ] *n* кузнец
block [blɔk] *v* преграждать
blue [blu:] *a* синий, голубой
board [bɔ:d] *n* борт *(корабля)*; доска; совет
body ['bɔdi] *n* тело
boil [bɔil] *v* кипятить
bold [bould] *a* смелый
bombard [bɔm'bɑ:d] *v* бомбардировать
bond [bɔnd] *n* связь
bookbinder ['buk,baində] *n* переплетчик
border ['bɔ:də] *n* граница
both [bouθ] *prep* оба; и тот и другой
boulevard ['bu:lvɑ:] *n* бульвар
bourgeoisie [ˌbuəʒwɑ:'zi:] *n* буржуазия
brain [brein] *n* мозг
branch [brɑ:ntʃ] *n* отрасль, область
break (broke, broken) [breik, brouk, broukn] *v* ломать, разбивать
break down ['breik'daun] *v* распадаться на составные части
break through ['θru:] *v* прорываться
break up ['breik'ʌp] *v* расщепляться, распадаться
break [breik] *n* пауза, перерыв
breathe [bri:ð] *v* дышать
bridge [bridʒ] *n* мост
breefly ['bri:fli] *adv* кратко
bright [brait] *a* яркий; способный, смышленый
brilliant ['briljənt] *a* блестящий
bring (brought) [briŋ], brɔ:t] *v* приносить, приводить
British Museum [mju:'ziəm] Британский музей
brittle [britl] *a* хрупкий, ломкий

broad [brɔ:d] *a* широкий
broadcast ['brɔ:dkɑ:st] *v* передавать по радио
broadcasting ['brɔ:dkɑ:stiŋ] *n* радиовещание
brotherhood ['brʌðəhud] *n* братство
build (built) [bild, bilt] *v* строить
building ['bildiŋ] *n* здание
building site [sait] *n* строительная площадка
bureau [bjuə'rou] *n* бюро
burn (burnt) [bə:n, bə:nt] *v* гореть
bury ['beri] *v* хоронить
business ['biznis] *n* дело, занятие
buy (bought) [bai, bɔ:t] *v* покупать

C

calcium ['kælsiəm] *n* кальций
calculate ['kælkjuleit] *v* вычислять, подсчитывать
call [kɔ:l] *v* называть
call for ['kɔ:l 'fɔ:] *v* призывать, требовать
camera ['kæmərə] *n* камера, фотоаппарат
capable [keipəbl] *a* способный
capacitance [kə'pæsitəns] *n* ёмкость, вместимость
capital ['kæpitəl] *n* столица; *a* главный, основной
carbon ['kɑ:bən] *n* углерод
carbon-dioxide [dai'ɔksaid] *n* двуокись углерода
care [kɛə] *n* забота, внимание
career [kə'riə] *n* карьера
careful ['kɛəful] *a* заботливый, осторожный
carry ['kæri] *v* нести
carry on ['kæri 'ɔn] *v* заниматься *(чем-л.)*; продолжать
carry out ['kæri 'aut] *v* проводить *(исследование)*
case [keis] *n* случай, обстоятельство
catalyst ['kætəlist] *n* катализатор
cathode-ray tube ['kæθoud] электронно-лучевая трубка
cause [kɔ:z] *n* причина; дело; *v* заставлять
cell [sel] *n* элемент, клетка
central ['sentrəl] *a* центральный
centre ['sentə] *n* центр; *v* сосредоточивать
century ['sentʃəri] *n* столетие, век
ceramics [si'ræmiks] *n* керамика
certain [sə:tn] *a* определенный, известный
certainly ['sə:tnli] *adv* конечно
certainty [sə:tnti] *n* уверенность
chain [tʃein] *n* цепь
chair [tʃɛə] *n* кафедра
channel [tʃænl] *n* канал
chance [tʃɑ:ns] *n* возможность; случай
change [tʃeindʒ] *n* изменение
chaos ['keiɔs] *n* хаос
characteristic [,kæriktə'ristik] *n* характеристика
characterize ['kæriktəraiz] *v* характеризовать
charge [tʃa:dʒ] *n* заряд; *v* заряжать
cheap [tʃi:p] *a* дешевый
check [tʃek] *v* проверять, контролировать
chemical ['kemikəl] *a* химический
chemist ['kemist] *n* химик
chemistry ['kemistri] *n* химия
chiefly ['tʃi:fli] *adv* главным образом
chlorine ['klɔ:ri:n] *n* хлор
choice [tʃɔis] *n* выбор
choose (chose, chosen) [tʃu:z, tʃouz] *v* выбирать
church [tʃə:tʃ] *n* церковь
cinema ['sinimə] *n* кино
circle [sə:kl] *n* круг
circuit ['sə:kit] *n* электрическая цепь, контур
circulate ['sə:kjuleit] *v* циркулировать
circumstance ['sə:kəmstəns] *n* обстоятельство
citizen ['sitizn] *n* гражданин
civilized ['sivilaizd] *a* цивилизованный
classes ['klɑ:siz] *n* занятия
classify ['klæsifai] *v* классифицировать
clean [kli:n] *v* чистить; *a* чистый
clear [kliə] *a* ясный, чёткий
close [klous] *a* близкий
closed ['klouzd] *a* замкнутый
cloud [klaud] *n* туча, облако
coarse [kɔ:s] *a* грубый

co-existence ['kouig'zistəns] *n* сосуществование
coincide (with) ['kouinsaid] *v* совпадать (с)
cold [kould] *a* холодный
colleague ['kɔli:g] *n* коллега
collect [kə'lekt] *v* собирать
collide [kə'laid] *v* сталкиваться
colossal [kə'lɔsl] *a* колоссальный, огромный
colour ['kʌlə] *n* цвет; *v* красить
column ['kɔləm] *n* столб, колонна
combine [kəm'bain] *v* соединять, объединять
combustion [kəm'bʌstʃən] *n* горение
come (came, come) [kʌm, keim] *v* приходить, приезжать
come back ['kʌm'bæk] *v* возвращаться
come true ['kʌm'tru:] *v* осуществляться
comfort ['kʌmfət] *n* удобство, комфорт
comfortable ['kʌmfətəbl] *a* удобный, комфортабельный
commercial [kə'mə:ʃəl] *a* промышленный, торговый
committee [kə'miti] *n* комитет
common ['kɔmən] *a* общий
communicate]kə'mju:nikeit] *v* общаться, сообщать
compact ['kɔmpækt] *a* компактный, сложный
comparable ['kɔmpərəbl] *a* сравнимый
compare [kəm'pɛə] *v* сравнивать
comparison [kəm'pærisn] *n* сравнение
compete [kəm'pi:t] *v* соревноваться
compile [kəm'pail] *v* накапливать, собирать
complete [kəm'pli:t] *a* весь, полный
complex ['kɔmpleks] *a* сложный
complicated ['kɔmplikeitid] *a* сложный, запутанный
component [kəm'pounənt] *n* составная часть
compose [kəm'pouz] *v* составлять
composite ['kɔmpəzit] *a* сложный, комбинированный
compound ['kɔmpaund] *n* соединение
compression [kəm'preʃn] *n* сжатие, давление
compute [kəm'pju:t] *v* считать, вычислять
concentrate ['kɔnsentreit] *v* сосредоточивать
concern [kən'sə:n] *v* касаться, относиться
conclude [kən'klu:d] *v* делать вывод
conclusion [kən'klu:ʒn] *n* вывод
condition [kən'diʃn] *n* условие, состояние
conduct [kən'dʌkt] *v* проводить
conductor [kən'dʌktə] *n* проводник
confidently ['kɔnfidəntli] *adv* уверенно
confidence ['kɔnfidəns] *n* доверие, уверенность
confine [kən'fain] *v* ограничивать
confront [kən'frʌnt], *v* стоять лицом к лицу
confuse [kən'fju:z] *v* путать
connect [kə'nekt] *v* соединять, связывать
conquer ['kɔŋkə] *v* завоевывать, побеждать
conquest ['kɔŋkwest] *n* завоевание
conscious ['kɔnʃəs] *a* сознательный
consequence ['kɔnsikwəns] *n* последствие
consequently ['kɔnsikwəntli] *adv* следовательно
consider [kən'sidə] *v* считать, полагать
considerable [kən'sidərəbl] *a* значительный
consideration [kən,sidə'reiʃn] *n* рассмотрение
consist (in) [kən'sist] *v* заключаться в
consist of [kən'sist] *v* состоять из
constant ['kɔnstənt] *a* постоянный
constituent [kən'stitjuənt] *n* составная часть
constitute ['kɔnstitjut] *v* составлять, образовывать
construct [kən'strʌkt] *v* строить
constructive [kən'strʌktiv] *a* конструктивный, творческий
construction [kən'strʌkʃn] *n* конструкция, сооружение

consultation [ˌkɔnsəl'teiʃn] *n* консультация
consumption [kən'sʌmpʃn] *n* потребление
contain [kən'tein] *v* содержать
content ['kɔntənt] *n* содержание
continual [kən'tinjuəl] *a* непрерывный, постоянный
continue [kən'tinju:] *v* продолжать
continuous [kən'tinjuəs] *a* непрерывный, длительный
contradiction [ˌkɔntrə'dikʃn] *n* противоречие
contrary to ['kɔntrəri] *adv* вопреки
contribute [kən'tribju:t] *v* делать вклад
contribution [ˌkɔntri'bju:ʃn] *n* вклад
control [kən'troul] *v* управлять, руководить
controller [kən'troulə] *n* регулятор
convenient [kən'vi:njənt] *a* удобный
conventional [kən'venʃənl] *a* обычный, обусловленный
converge [kən'və:dʒ] *v* сходиться в одной точке
conversation [ˌkɔnvə'seiʃn] *n* беседа, разговор
conversely ['kɔn'və:sli] *adv* наоборот
convertion [kən'və:ʃn] *n* преобразование, превращение
convert (into) [kən'və:t] *v* превращать, переделывать
conviction [kən'vikʃn] *n* убеждение
cook [kuk] *v* варить
cool [ku:l] *v* охлаждать
co-operation [kouˌɔpə'reiʃn] *n* сотрудничество
copper ['kɔpə] *n* медь
corner ['kɔ:nə] *n* угол
correction [kə'rekʃn] *n* исправление, поправка
correspondence [ˌkɔris'pɔndəns] *n* переписка
correspondence education заочное обучение
corresponding [ˌkɔris'pɔndiŋ] *a* соответствующий
cosmis ['kɔzmik] *a* космический
cost (cost) [kɔst] *n* стоимость; *v* стоить
council ['kaunsl] *n* совет
count [kaunt] *v* считать
counter ['kauntə] *n* счётчик
country ['kʌntri] *n* страна; сельская местность
couple [kʌpl] *n* пара; *v* соединять
course [kɔ:s] *n* курс; направление
cover ['kʌvə] *v* закрывать, защищать
cradle [kreidl] *n* колыбель
create [kri:'eit] *v* создавать, творить
creative [kri:'eitiv] *a* творческий
credit ['kredit] *n* доверие, честь
crew [kru:] *n* экипаж, команда
critical ['kritikəl] *a* критический
crust [krʌst] *n* земная кора
crystal [kristl] *n* кристалл
culture ['kʌltʃə] *n* культура
culminate ['kʌlmineit] *v* достичь высшей точки
cup [kʌp] *n* чашка, кубок
current ['kʌrənt] *n* течение; ток
curious ['kjuəriəs] *a* любопытный, пытливый
curvilinear [ˌkə:vi'liniə] *a* криволинейный
customer ['kʌstəmə] *n* заказчик; покупатель
cut (cut) [kʌt] *v* резать
cybernetics [ˌsaibə'netiks] *n* кибернетика
cycle per second ['saikl pə'sekənd] *n* герц
cyclotron ['saiklətrɔn] *n* цилкотрон

D

dayly ['deili] *adv* ежедневно
danger ['deindʒə] *n* опасность
dangerous ['deindʒərəs] *a* опасный
dare [dɛə] *v* отваживаться, дерзать
dark [dɑ:k] *a* темный
data ['deitə] *n pl* данные, сведения
daughter ['dɔ:tə] *n* дочь
dead [ded] *a* мертвый
deal [di:l] *v* иметь дело
dear [diə] *a* дорогой
decade ['dekeid] *n* десятилетие

decisive [dɪ'saɪsɪv] *a* решительный
decorate ['dekəreɪt] *v* украшать; награждать
decrease [di'kri:s] *v* уменьшать
deep [di:p] *a* глубокий, темный *(о цвете)*
deepen ['di:pən] *v* погружать
defence [dɪ'fens] *n* оборона, защита
define [dɪ'faɪn] *v* определять
definite ['definɪt] *a* определенный
definition [,defɪ'nɪʃn] *n* определение
deflect [dɪ'flekt] *v* уклоняться, отклоняться
deformation [,di:fɔ:'meɪʃən] *n* деформация
delegate ['deligit] *n* делегат
deliver [dɪ'lɪvə] *v* вручать; снабжать
demand [dɪ'mɑ:nd] *n* требование
democracy [dɪ'mɔkrəsɪ] *n* демократия
democratic [,demə'krætik] *a* демократический
demonstrate ['demənstreɪt] *v* демонстрировать, показывать
dense [dens] *a* густой, плотный
density ['densɪtɪ] *n* плотность
department [dɪ'pɑ:tmənt] *n* факультет; отдел
depend (on, upon) [dɪ'pend] *n* зависеть (от)
dependence [dɪ'pendəns] *n* зависимость
deposit [dɪ'pɔzit] *v* осаждаться
describe [dɪs'kraib] *v* описывать
desert ['dezət] *n* пустыня
design [dɪ'zaɪn] *n* проект, план
designer [dɪ'zaɪnə] *n* конструктор
desirable [dɪ'zaɪərəbl] *a* желанный
desire [dɪ'zaiə] *n* желание
destroy [dɪ'strɔɪ] *v* разрушать
destructive [dɪs'trʌktɪv] *a* разрушительный
detain [dɪ'tein] *v* сдерживать
detect [dɪ'tekt] *v* обнаруживать, выявлять
determine [dɪ'tə:mɪn] *v* определять, устанавливать
develop [dɪ'veləp] *v* развивать(ся), разрабатывать
device [dɪ'vaɪs] *n* прибор
diagnose ['daiəgnouz] *v* ставить диагноз
diamagnetic [,daiəmæg'netik] *a* диамагнитный
diameter [daɪ'æmɪtə] *n* диаметр
dictatorship [dɪk'teɪtəʃɪp] *n* диктатура
dictionary ['dɪkʃənrɪ] *n* словарь
differ ['dɪfə] *v* отличаться
difference ['difrəns] *n* различие
different ['dɪfrənt] *a* разный, различный
differentiate [,dɪfə'renʃieɪt] *v* отличать(ся)
difficult ['dɪfɪkəlt] *a* трудный, тяжелый
difficulty ['dɪfɪkəltɪ] *n* трудность
dimention [dɪ'menʃən] *n* размер
diode ['daioud], *n* диод
dioxide [dai'ɔksaid] *n* двуокись
dip [dɪp] *v* опускать, погружать
diploma [dɪp'loumə] *n* диплом
direct [dɪ'rekt] *v* направлять; *a* прямой
direction [dɪ'rekʃn] *n* направление
dirty ['də:tɪ] *a* грязный, загрязненный
discover [dɪs'kʌvə] *v* открывать, обнаруживать
discovery [dɪs'kʌverɪ] *n* открытие
discuss [dɪs'kʌs] *v* обсуждать
disease [dɪ'zi:z] *n* болезнь, заболевание
displace [dɪs'pleɪs] *v* смещать, перемещать
display [dɪs'pleɪ] *v* выставлять, показывать
disseminate [dɪ'semineɪt] *v* распространять *(учение)*
dissolve [dɪ'zɔlv] *v* растворять
distance ['dɪstəns] *n* расстояние
distant ['dɪstənt] *a* далекий, дальний
distinguish [dɪs'tɪŋgwɪʃ] *v* отличать(ся)
distortion [dɪs'tɔ:ʃən] *n* искажение
distribution [,dɪstrɪ'bju:ʃən] *n* распределение
district ['dɪstrɪkt] *n* район, округ
disturb [dɪs'tə:b] *v* беспокоить
disturbance [dɪs'tə:bəns] *n* беспокойство
diversity [daɪ'və:sɪtɪ] *n* различие, разнообразие
divide [dɪ'vaɪd] *v* делить

divisibility [di,vizi'biliti] *n* делимость
divisible [di'vizibl] *a* делимый
division [di'viʒən] *n* деление
dock [dɔk] *n* док; *v* стыковаться
double [dʌbl], *a* двойной
doubt [daut] *n* сомнение
downward ['daunwəd] *adv* вниз, *a* спускающийся
dozen [dʌzn] *n* дюжина
draw (drew, drawn) [drɔ:, dru:, drɔ:n] *v* тянуть
dreadfully ['dredfuli] *adv* ужасно
dream [dri:m] *n* мечта
drill [dril] *v* сверлить; *n* сверло
drive (drove, driven) [draiv, drouv, drivn] *v* ехать; водить машину
drop [drɔp] *v* падать; *n* капля
due to ['dju:tə] *prep* благодаря
dull [dʌl] *a* тупой, скучный
dump [dʌmp] *v* сбрасывать, сваливать
durable ['djuərəbl] *a* длительный, долговременный
during ['djuəriŋ] *prep* в течение
dye [dai] *n* краситель
dynamics [dai'næmiks] *n* динамика

E

each [i:tʃ] *a* каждый
early ['ə:li] *a* ранний; *adv* рано
earth [ə:θ] *n* земля
ease [i:z] *n* лёгкость
east [i:st] *n* восток
echo ['ekou] *n* эхо
economy [i'kɔnəmi] *n* хозяйство: экономика
edition [i'diʃn] *n* издание
education [,edju':keiʃn] *n* образование; воспитание
effect [i'fekt] *n* действие, влияние; *v* влиять
efficiency [i'fiʃənsi] *n* коэффициент полезного действия
efficient [i'fiʃənt] *a* эффективный
effort ['efət] *n* усилие, попытка
either...or ['aiðə...'ɔ:] *cj* или... или
electricity [i,lek'trisiti] *n* электричество
electrify [i'lektrifai] *v* электрифицировать
electrolyte [i'lektroulait] *n* электролит
electromotive force [i'lektrəmoutiv] электродвижущая сила
electron [i'lektrən] *n* электрон
elementary [,eli'mentəri] *a* элементарный
eliminate [i'limineit] *v* устранять, ликвидировать
embrace [im'breis] *v* охватывать
emerge [i'mə:dʒ] *v* появляться, возникать
emit [i'mit] *v* выделять, испускать
empirical [em'pirikəl] *a* эмпирический
employ [im'plɔi] *v* использовать, применять
employer [im'plɔiə] *n* работодатель, предприниматель
empty ['empti] *a* пустой
enable [i'neibl] *v* давать возможность
enclose [in'klouz] *v* заключать, окружать
energy ['enədʒi] *n* энергия
enormous [i'nɔ:məs] *a* огромный
enough [i'nʌf] *adv* достаточно
enrichment [in'ritʃmənt] *n* обогащение
ensure [in'ʃuə] *v* обеспечивать
enter ['entə] *v* входить; поступать
enterprise ['entərpraiz] *n* предприятие
entry ['entri] *n* вход; вступление
enthusiasm [in'θju:ziæzm] *n* энтузиазм
entire [in'taiə] *a* весь, целый
entirely [in'taiəli] *adv* полностью, целиком
entrance ['entrəns] *n* вход; вступление
enunciation [i,nʌnsi'eiʃən] *n* провозглашение
environment [in'vaiərənmənt] *n* окружающая среда
envisage [in'vizidʒ] *v* рассматривать вопрос
equal ['i:kwəl] *a* равный
equality [i:'kwɔliti] *n* равенство
equator [i'kweitə] *n* экватор
equilibrium [,i:kwi'libriəm] *n* равновесие
equip [i'kwip] *v* снаряжать, оборудовать

equipment [i'kwipmənt] *n* снаряжение, оборудование
equivalent [i'kwivələnt] *n* эквивалент; *a* эквивалентный
era ['iərə] *n* эра
erect [i'rekt] *v* строить, сооружать
especial [is'peʃəl] *a* особенный
essence ['esns] *n* сущность
essential [i'senʃəl] *a* существенный
establish [is'tæbliʃ] *v* устанавливать, учреждать
etc.-and so on [it' setrə] и так далее
estimate ['estimeit] *v* оценивать
eternal [i'tə:nl] *a* вечный
ethylene ['eθili:n] *n* этилен
evaporate [i'væpəreit] *v* испарять
even ['i:vn] *adv* даже
even though ['i:vn'ðou] даже если
event [i'vent] *n* событие
eventually [i'ventjuəli] *adv* в конечном счете
ever ['evə[*adv* когда-нибудь
every ['evri] *pron* каждый
everybody ['evribɔdi] *pron* каждый, все
everything ['evriθiŋ] *pron* всё
everywhere ['evriweə] *adv* всюду
evident ['evidənt] *a* очевидный
evolve [i'vɔlv] *v* развиваться
exact [ig'zækt] *a* точный
examination [ig,zæmi'neiʃn] *n* экзамен; осмотр
examine [ig'zæmin] *v* экзаменовать; осматривать
exapmle [ig'zɑ:mpl] *n* пример
exceedingly [ik'si:diŋli] *adv* чрезвычайно, очень
excellent ['eksələnt] *a* отличный
except [ik'sept] *prep* за исключением
exchange [iks'tʃeindʒ] *n* обмен
exciting [ik'saitiŋ] *a* возбуждающий, волнующий
exclude [iks'klu:d] *v* исключать, не допускать
exclusive [iks'klu:siv] *a* исключительный
exhibition [,eksi'biʃn] *n* выставка
exist [ig'zist] *v* существовать
existence [ig'zistəns] *n* существование
expand [iks'pænd] *v* расширять(ся)
expect [iks'pekt] *v* ожидать, надеяться
expensive [iks'pensiv] *a* дорогой
experience [iks'piəriəns] *n* опыт
experiment [iks'perimənt] *n* эксперимент
explain [iks'plein] *v* объяснять
exploration [,eksplə'reiʃn] *n* исследование
express [iks'pres] *v* выражать
expression [iks'preʃn] *n* выражение
extend [iks'tend] *v* простираться, распространяться
extention [iks'tenʃn] *n* расширение, распространение
extensive [iks'tensiv] *a* просторный, обширный
external [eks'tə:nəl] *a* внешний
extra ['ekstrə] *a* дополнительный
extract [iks'trækt] *v* извлекать, добывать
extramural departmet ['ekstrə'mjuərəl] заочный факультет
extraordinary [iks'trɔ:dnri] *a* необычный, чрезвычайный
extremely [iks'tri:mli] *adv* чрезвычайно, крайне
eye [ai] *n* глаз

F

face [feis] *n* лицо
facilitate [fə'siliteit] *v* облегчать, способствовать
facility [fə'silити] *n* лёгкость; способность
facilities [fə'silitiz] *n* удобства; льготы
factory ['fæktəri] *n* фабрика
fail [feil] *v* разрушаться; терпеть неудачу
failure ['feiljə] *n* разрушение; неудача, провал
fall (fell, fallen) [fɔ:l, fel 'fɔ:ln] *v* падать
fall behind ['fɔ:l bi'haind] *v* отставать
fall of ['fɔ:l 'ɔf] *v* уменьшаться; опадать
familiar [fə'miljə] *a* знакомый

far [fɑ:] *a* далёкий; *adv* далеко
feature ['fi:tʃə] *n* особенность, характерная черта
feedback circuit ['fi:dbæk 'sə:kɪt] схема обратной связи
feedback control ['fi:dbæk kən'troul] система управления с обратной связью
feel (felt) [fi:l, felt] *v* чувствовать
few [fju:] *a* мало
a few [ə'fju:] несколько
fibre ['faɪbə] *n* волокно, нить
field [fi:ld] *n* поле, область, отрасль
fight [faɪt] *n* борьба
figure ['fɪgə] *n* число; рисунок; фигура
filament ['fɪləmənt] *n* нить накала
fill [fɪl] *v* заполнять
fill the needs [ni:dz] удовлетворять потребности
filter ['fɪltə] *n* фильтр
final ['faɪnəl] *a* конечный, заключительный
finally ['faɪnəlɪ] *adv* наконец, в конечном счете
find (found) [faɪnd, faund] *v* находить
find out ['faɪnd aut] *v* узнавать, оказаться
fine [faɪn] *a* красивый, тонкий
finger ['fɪŋgə] *n* палец; стрелка
finish ['fɪnɪʃ] *v* заканчивать, кончать
finite ['faɪnaɪt] *a* ограниченный
fire [faɪə] *n* огонь
first [fə:st] *num* первый; *adv* сначала
fission ['fɪʃn] *n* расщепление
fit out ['fɪt 'aut] *v* снабжать, оборудовать
flat [flæt] *n* квартира; *a* плоский
flexible ['fleksɪbl] *a* гибкий
flight [flaɪt] *n* полёт
float [flout] *v* плавать, всплывать
floor [flɔ:] *n* этаж; пол
flourish [flʌrɪʃ] *v* расцветать
flow [flou] *n* течение; *v* течь
flower [flauə] *n* цветок; *v* цвести
fluently ['flu:əntlɪ] *adv* плавно
fluid ['flu:ɪd] *n* жидкость
fluorescent [flua'resnt] *a* флуоресцентный
focus (*pl* **-es, foci**) ['foukəs, fousaɪ] *n* фокус; *v* фокусировать
foil [fɔɪl] *n* фольга
fog [fɔg] *n* туман
follow ['fɔlou] *v* следовать; следить
food [fu:d] *n* еда, пища
foot [fut] *n* фут
for [fɔ:, fə] *prep* для; *cj* потому что
forever [fər'evə] *adv* навсегда
force [fɔ:s] *n* сила; *v* заставлять
forget (forgot, forgotten) [fə'get, fə'gɔt, fə'gɔtn] *v* забывать
form [fɔ:m] *n* форма; *v* формировать
formal ['fɔ:məl] *a* формальный, официальный
former ['fɔ:mə] *a* бывший
formulate ['fɔ:mjuleit] *v* формулировать
found [faund] *v* основывать, создавать
foundation [,faun'deɪʃən] *a* основа, фундамент
founder ['faundə] *n* основатель
fountain-pen ['fauntɪnpən] *n* авторучка
four [fɔ:] *num* четыре
fraction ['frækʃən] *n* дробь, часть
fragment ['frægmənt] *n* осколок, частичка
framework ['freɪmwə:k] *n* конструкция, структура
France [frɑ:ns] *n* Франция
fraternity [frə'tə:nɪtɪ] *n* братство
free [fri:] *a* свободный
free of charge ['fri: əv'tʃa:dʒ] бесплатно
freeze (froze, frozen) [fri:z, frouz] *v* замораживать
frequency ['fri:kwənsɪ] *n* частота
frequently ['fri:kwəntlɪ] *adv* часто
fresh [freʃ] *a* свежий
friction ['frɪkʃn] *n* трение
friend [frend] *n* друг
friendship ['frendʃɪp] *n* дружба
front [frʌnt] *n* фронт; *a* передний
fruitful ['fru:tful] *a* плодотворный

fuel ['fju:əl] *n* топливо
full [ful] *a* полный
fully ['fuli] *adv* полностью
function ['fʌŋkʃən] *v* действовать; *n* функция
fundamental [,fʌndə'mentl] *a* основной
furnish ['fə:niʃ] *v* снабжать, доставлять
furniture ['fə:nitʃə] *n* оборудование
further ['fə:ðə] *adv* дальше, потом
furthermore ['fə:ðə'mɔ:] *adv* кроме того
fusion ['fju:ʒn] *n* плавка; синтез
future ['fju:tʃə] *n* будущее

G

gain [gein] *v* достигать; приобретать
galvanometer [,gælvə'nɔmitə] *n* гальванометр
gaseous ['geizjəs] *a* газообразный
gate [geit] *n* ворота; щит; затвор
gene [dʒi:n] *n* ген
general ['dʒenərəl] *a* главный; общий
generate ['dʒenəreit] *v* генерировать, производить
generator ['dʒenəreitə] *n* генератор
genius ['dʒi:njəs] *n* гений
genuine ['dʒenjuin] *a* настоящий, искренний
geochemistry [,dʒi:ou'kemistri] *n* геохимия
geometry [dʒi'ɔmitri] *n* геометрия
geophysicist [,dʒi:o'fizisist] *n* геофизик
Georgia ['dʒɔ:dʒiə] *n* Грузия
germanium [dʒə:'meiniəm] *n* германий
get (got) [get, gɔt] *v* получать, доставать
get along ['get ə'lɔŋ] *v* жить; делать успехи
giant ['dʒaiənt] *v* гигант
gigantic [dʒai'gæntik] *a* гигантский
give (gave, given) [giv, geiv, givn] *v* давать
give off ['giv'ɔf] *v* выпускать, выделять
glass [glɑ:s] *n* стекло
global ['gloubəl] *a* глобальный
glue [glu:] *n* клей
go in for sports ['gou'in fə'spɔ:ts] заниматься спортом
gold [gould] *n* золото
go on ['gou 'ɔn] *v* продолжать
govern ['gʌvən] *v* управлять
government ['gʌvnmənt] *n* правительство
governor ['gʌvənə] *n* регулятор
gradual ['grædjuəl] *a* постепенный
graduate ['grædjueit] *n* окончить *(институт)*
grain [grein] *n* зерно
grand [grænd] *a* огромный, большой
gravity ['græviti] *n* сила тяжести
great [greit] *a* великий
greatly ['greitli] *adv* очень; весьма
Greek [gri:k] *a* греческий
grid [grid] *n* сетка
grim [grim] *a* жестокий, страшный
grind (ground) [graind, graund] *v* шлифовать, дробить
grip [grip] *n* сжатие
ground [graund] *n* земля
group [gru:p] *n* кружок; группа
grow (grew, grown) [grou, gru:] *v* расти, развиваться
growth [grouθ] *n* рост, развитие
guide [gaid] *v* управлять, руководить

H

habitable ['hæbitəbl] *a* обитаемый, годный для жилья
half [hɑ:f] *n* половина
handle ['hændl] *v* управлять *(машиной)*
happen [hæpn] *v* случаться, происходить
happiness ['hæpinis] *n* счастье
hard [hɑ:d] *a* твердый, прочный; тяжелый
hardly ['hɑ:dli] *adv* едва
hardness ['hɑ:dnis] *n* твердость, прочность
harmful ['hɑ:mful] *a* вредный

harmony ['hɑ:mənɪ] *n* согласие, гармония
harness ['hɑ:nɪs] *v* использовать *(энегию солнца, рек)*
harvest ['hɑ:vɪst] *n* урожай
health [helθ] *n* здоровье
hear (heard) [hɪə, hə:d] *v* слышать
heart [hɑ:t] *n* сердце
heat [hi:t] *n* тепло; *v* нагревать
heavy ['hevi] *a* тяжелый
height [haɪt] *n* высота
helium ['hi:ljəm] *n* гелий
help [help] *v* помогать; *n* помощь
helpless ['helplɪs] *a* беспомощный
hence [hens] *adv* следовательно
here [hɪə] *adv* тут, здесь; сюда
heritage ['herɪtɪdʒ] *n* наследство
hero ['hɪərou] *n* герой
heroic [hɪ'rouɪk] *a* героический
heterogeneous ['hetərə'dʒi:njəs] *a* разнородный
hide (hid) [haɪd, hɪd] *v* прятать
high [haɪ] *a* высокий
highly ['haɪlɪ] *adv* очень, чрезвычайно
historic [hɪs'tɔrɪk] *a* исторический
history [hɪstərɪ] *n* история
honest ['ɔnɪst] *a* честный
honour ['ɔnə] *n* честь, уважение
hope [houp] *n* надежда; *v* надеяться
hostel ['hɔstəl] *n* общежитие
horisontal [ˌhɔrɪ'zɔntəl] *a* горизонтальный
hot [hɔt] *a* горячий
hour [auə] *n* час
how [hau] *adv* как
however [hau'evə] *cj* однако, тем не менее
h. p. (horse power) ['hɔ:s'pauə] лошадиная сила
huge [hju:dʒ] *a* огромный
human ['hju:mən] *a* человеческий
human being ['hju:mən'bi:ɪŋ] *n* человек
humanity [hju:'mænɪtɪ] *n* человечество
hundred ['hʌndrɪd] *num* сто
hydrocarbon ['haɪdrou'kɑ:bn] *n* углеводород
hydrogen ['haɪdrɪdʒən] *n* водород
hydroxide [haɪ'drɔksaɪd] *n* гидроокись

I

ice [aɪs] *n* лёд
ice-breaker ['aɪs,breɪkə] *n* ледокол
idea [aɪ'dɪə] *n* идея, мысль
ideal [aɪ'dɪəl] *a* идеальный
identical [aɪ'dentɪkəl] *a* идентичный, одинаковый
illegal [ɪ'li:gəl] *a* нелегальный, незаконный
illiteracy [ɪ'lɪtərəsɪ] *a* неграмотность
illiterate [ɪ'lɪtərɪt] *n* неграмотный
illuminate [ɪ'lju:mɪneɪt] *v* освещать
illustrate ['ɪləstreɪt] *v* иллюстрировать, объяснять
image ['ɪmɪdʒ] *n* изображение
imagination [ɪˌmædʒɪ'neɪʃn] *n* воображение
imagine [ɪ'mædʒɪn] *v* представлять себе
immediate [ɪ'mi:djət] *a* неотложный
immense [ɪ'mens] *a* огромный, громадный
immerse [ɪ'mə:s] *v* погружать
imperative [ɪm'perətɪv] *a* крайне необходимый
importance [ɪm'pɔ:təns] *n* значение, важность
important [ɪm'pɔ:tənt] *a* значительный, важный
impossible [ɪm'pɔsɪbl] *a* невозможный
impress [ɪm'pres] *v* производить впечатление
improve [ɪm'pru:v] *v* усовершенствовать
inaccessible [ˌɪnæk'sesəbl] *a* недоступный
inalienable [ɪn'eɪljənəbl] *a* неотъемлемый
inch [ɪntʃ] *n* дюйм
include [ɪn'klu:d] *v* включать
income ['ɪnkəm] *n* доход
incomparable [ɪn'kɔmpərəbl] *a* несравненный
incompatible [ˌɪnkəm'pætəbl] *a* несовместимый
incorporate [ɪn'kɔ:pəreɪt] *v* соединять, объединять

increase [in'kri:s] *v* увеличивать
incredible [in'kredəbl] *a* невероятный
indebted [in'detid] *a* обязанный
indeed [in'di:d] *adv* действительно
indefinite [in'definit] *a* неопределенный
independent [,indi'pendənt] *a* независимый
indicate ['indikeit] *v* указывать
indirect [,indi'rekt] *a* косвенный
indispensable [,indis'pensəbl] *a* необходимый
individual [,indi'vidjuəl] *a* отдельный
indivisible [,indi'vizəbl] *a* неделимый
industrial ['indʌstriəl] *a* промышленный
industry ['indəstri] *n* промышленность
inequality [,ini:'kwɔliti] *n* неравенство
inevitable [in'evitəbl] *a* неизбежный
inexhaustible [,inig'zɔ:stəbl] *a* неисчерпаемый
infinite ['infinit] *a* безграничный, бесконечный
influence ['influəns] *n* влияние; *v* влиять
inform [in'fɔ:m] *v* информировать, сообщать
infrared [,infræ'red] *a* инфракрасный
inhabit [in'hæbit] *v* населять, жить
inhabitant [in'hæbitənt] *n* житель
input ['input] *n* ввод
inquire [in'kwaiə] *v* спрашивать
inseparable [in'sepərəbl] *a* неразрывный
inside ['in'said] *adv* внутри
insoluble [in'sɔljubl] *a* нерастворимый
install [in'stɔ:l] *v* устанавливать, монтировать
installation [,instə'leiʃn] *n* установка
instance ['instəns] *n* пример, случай
instead of [in'sted əv] *adv* вместо
institution [,insti'tju:ʃn] *n* учреждение
instruction [in'strʌkʃn] *n* обучение
instructor [in'strʌktə] *n* преподаватель
instrument ['instrumənt] *n* прибор, инструмент
insufficient [,insə'fiʃənt] *a* недостаточный
insulation [,insju'leiʃn] *n* изоляция
insulator ['insjuleitə] *n* изолятор
intellectual [,inti'lektjuəl] *a* умственный
intelligentsia [in'teli'dʒensiə] *n* интеллигенция
intend [in'tend] *v* намереваться
intense [in'tens] *a* интенсивный
intensity [in'tensiti] *n* интенсивность
interaction [,intər'ækʃn] *n* взаимодействие
inter-continental ['intə,kɔnti'nentl] *a* межконтинентальный
interference [,intə'fiərəns] *n* вмешательство
intermediate [,intə'mi:djət] *a* промежуточный
interplanetary [,intə'plænitəri] *a* межпланетный
introduce [,intrə'dju:s] *v* вводить
introduction [,intrə'dʌkʃn] *n* введение
invader [in'veidə] *n* завоеватель
invent [in'vent] *v* изобретать
investigate [in'vestigeit] *v* исследовать
investigation [in,vesti'geiʃn] *n* исследование
invincible [in'vinsəbl] *a* непобедимый
invisible [in'vizəbl] *a* невидимый
involve [in'vɔlv] *v* включать в себя
ionize ['aiənaiz] *v* ионизировать
iron [aiən] *n* железо
irradiate [i'reidieit] *v* излучать
irrespective (of) [,iris'pektiv'əv] *a* независимый (от)
irrigate ['irigeit] *v* орошать
island ['ailənd] *n* остров
isotope ['aisoutoup] *n* изотоп
issue ['isju:] *v* выпускать, издавать

J

job [dʒɔb] *n* работа
joint [dʒɔint] *a* объединенный
just [dʒʌst] *a* справедливый; *adv* только что
justify ['dʒʌstifai] *v* оправдывать
justifiable ['dʒʌstifaiəbl] *a* законный, дозволенный

K

keen [ki:n] *a* острый
keep (kept) [ki:p, kept] *v* держать; хранить
key [ki:] *a* основной; *n* ключ
kind [kaind] *n* вид, сорт; *a* добрый
king [kiŋ] *n* король
kingdom ['kiŋdəm] *n* королевство
kitchen ['kitʃən] *n* кухня
know (knew, known) [nou, nju, noun] *v* знать
knowledge ['nolidʒ] *n* знание

L

laboratory (lab) [lə'bɔrətəri] *n* лаборатория
labour ['leibə] *n* труд
labour productivity [ˌprɔdʌk'tiviti] производительность труда
lamp [læmp] *n* лампа
land [lænd] *n* земля, страна
landing ['lændiŋ] *n* посадка, приземление
landlord ['lændlɔ:d] *n* помещик
language ['læŋgwidʒ] *n* язык
large [lɑ:dʒ] *a* большой
laser ['leizə] *n* лазер, квантовый усилитель
last [lɑ:st] *v* длиться; *a* последний
lasting ['lɑ:stiŋ] *a* прочный, длительный
late [leit] *a* поздний; *adv* поздно
latter ['lætə] *a* последний *(из названных)*
launch [lɔ:ntʃ] *v* развязать *(войну)*; запустить
law [lɔ:] *n* закон
lay (laid) [lei, leid] *v* класть, закладывать
lead (led) [li:d, led] *v* вести
lead [led] *n* свинец
leader ['li:də] *n* руководитель, вождь
leap [li:p] *n* прыжок
learn [lə:n] *v* учить, узнавать
leave (left) [li:v, left] *n* отпуск; *v* оставлять
lecture ['lektʃə] *n* лекция
length [leŋθ] *n* длина
lens [lenz] *n* линза
lessen ['lesn] *v* уменьшать
lesson ['lesn] *n* урок
level ['levl] *n* уровень
liberate ['libəreit] *v* освобождать
library ['laibrəri] *n* библиотека
life [laif] *n* жизнь
lift [lift] *v* поднимать; *n* лифт
light [lait] *n* свет; *v* освещать; *a* лёгкий
light beam ['lait 'bi:m] световой луч
lightning ['laitniŋ] *n* молния
like [laik] *a* подобный; *adv* подобно; *v* любить
likewise ['laikwaiz] *adv* подобно, так же
limit ['limit] *n* граница, предел
limitation [ˌlimi'teiʃn] *n* ограничение
linear ['liniə] *a* линейный
line of force ['lain ev'fɔ:s] силовая линия
linguistics [liŋ'gwistiks] *n* языкознание, лингвистика
link [liŋk] *n* звено; *v* связывать
liquid ['likwid] *n* жидкость; *a* жидкий
list [list] *v* вносить в список; *n* список
listen (to) [lisn] *v* слушать
listener ['lisnə] *n* слушатель
literally ['litərəli] *adv* буквально
literary ['litərəri] *a* литературный
literate ['litərit] *a* грамотный
little [litl] *a* маленький; *adv* мало
live [liv] *v* жить
living-room ['livi]rum] *n* жилая комната
living-standard ['liviŋ'stændəd] жизненный уровень
load [loud] *v* нагружать; *n* нагрузка

locate [lou'keit] *v* определять местонахождение
location [lou'keiʃn] *n* местоположение
long [lɔŋ] *a* длинный
long ago ['lɔŋ ə'gou] *adv* давно; *a* давний
look after ['luk 'ɑ:ftə] *v* заботиться
look for ['luk'fɔ] *v* искать
loop [lu:p] *n* петля, контур
lose (lost) [lu:z, lɔst] *v* терять
loss [lɔs] *n* потеря, убыток
loudspeaker ['laud'spi:kə] *n* громкоговоритель
love [lʌv] *v* любить
low [lou] *a* низкий
lower ['louə] *a* снижать(ся), уменьшать(ся)
luck [lʌk] *n* удача, успех
lump [lʌmp] *n* кусок

M

machine [mə'ʃi:n] *n* машина; *v* обрабатывать
machinery [mə'ʃi:nəri] *n* механизм, машинное оборудование
magnification [,mægnifi'keiʃn] *n* увеличение
magnificent [mæg'nifisnt] *a* величественный
magnify ['mægnifai] *v* увеличивать
magnitude ['mægnitju:d] *n* величина
main [mein] *a* главный
maintain [men'tein] *v* поддерживать
maintenance ['meintinəns] *n* техническое обслуживание
major ['meidʒə] *a* главный, важный
majority [mə'dʒɔriti] *n* большинство
make ['meik] *v* делать
make up ['meik' ʌp] *v* составлять
make use of ['meik'ju:s əv] *v* использовать
management ['mænidʒmənt] *n* управление
manganese [,mæŋgə'ni:z] *n* марганец
mankind [mæn'kaind] *n* человечество
man-made ['mæn,meid] *a* искусственный
manner ['mænə] *n* способ, манера
manual ['mænjuəl] *a* ручной
manufacture [,mænju'fæktʃə] *n* производство
map [mæp] *n* карта; *v* наносить на карту
mark [ma:k] *n* оценка; *v* отмечать
mass [mæs] *n* масса
master ['mɑ:stə] *v* овладевать
mathematician [,mæθimə'tiʃn] *n* математик
mathematics [,mæθi'mætiks] *n* математика
matter ['mætə] *n* вещество; материя; дело
mean (meant) [mi:n, ment] *v* значить, иметь в виду
meaning ['mi:niŋ] *n* значение
means [mi:nz] *n* средство, способ
by means of [bai 'mi:nz əv] с помощью
measure ['meʒə] *n* мера
measurement ['meʒəmənt] *n* измерение
mechanics [mi'kæniks] *n* механика
mechanization [,mekənai'zeiʃn] *n* механизация
medicine ['medsin] *n* медицина
medium ['mi:djəm] *n* среда
meet (met) [mi:t, met] *v* встречать
meet the requirements удовлетворять требованиям
melt [melt] *v* плавить
member ['membə] *n* член; элемент
memorable ['memərəbl] *a* памятный, незабываемый
memory ['memərɪ] *n* память
mention ['menʃn] *v* упоминать
mercury ['mə:kjuri] *n* ртуть
merely ['miəli] *adv* только, лишь
metallic [mi'tælik] *a* металлический
metallurgy [me'tælə:dʒi] *n* металлургия
meteor [mi'i:tjə] *n* метеор
method ['meθəd] *n* метод
microbe ['maikroub] *n* микроб

microscope ['maikrəskoup] *n* микроскоп
mile [mail] *n* миля
mill [mil] *n* завод; *v* дробить
mind [maind] *n* разум
mine [main] *v* добывать из (шахты)
mineral ['minərəl] *n* минерал
minimum ['minimәm] *n* минимум
minute [mai'nju:t] *a* мелкий, маленький
miracle ['mirəkl] *n* чудо
miraculous [mi'rækjuləs] *a* чудесный
mirror ['mirə] *n* зеркало
missile ['misail] *n* управляемый снаряд, ракета
mix [miks] *v* смешивать
mixture ['mikstʃə] *n* смесь
mobile ['moubail] *a* мобильный, передвижной
mode [moud] *n* способ, метод
model [mɔdl] *n* модель, система
modern ['mɔdən] *a* современный
modernize ['mɔdənaiz] *v* модернизировать
modest ['mɔdist] *a* скромный
modify ['mɔdifai] *v* видоизменять
moist [mɔist] *a* влажный
molecular [mou'lekjulə] *a* молекулярный
molecule ['mɔlikju:l] *n* молекула
molten ['moultən] *a* расплавленный
molybdenum [mɔ'libdinәm] молибден
monolithic ['mɔnou'liθik] *a* монолитный
month [mʌnθ] *n* месяц
monthly ['mʌnθli] *a* ежемесячный
monument ['mɔnjumənt] *n* памятник
moon [mu:n] *n* луна
more [mɔ:] *pron* больше
moreover [mɔ:rouvə] *adv* более того, кроме того
mortal ['mɔ:tl] *a* смертный, смертельный
most of ['moust әv] *n* большинство
motion ['mouʃn] *n* движение
motionless ['mouʃnlis] *a* неподвижный
motor-car ['moutəkɑ:] *n* автомобиль
mould [mould] *n* форма; *v* формовать
mountain ['mauntin] *n* гора
move [mu:v] *v* двигаться
movement ['mu:vmənt] *n* движение
much [mʌtʃ] *adv* много
multinational ['mʌlti'næʃənl] *a* многонациональный
muscle [mʌsl] *n* мускул, мышца
mutual ['mju:tjuəl] *a* взаимный

N

namely ['neimli] *adv* а именно
narrow ['nærou] *a* узкий
nation ['neiʃn] *n* нация, народ
nationality [ˌnæʃə'næliti] *n* национальность
natural ['nætʃrəl] *a* естественный, обычный
nature ['neitʃə] *n* природа, характер
navigation [ˌnævi'geiʃn] *n* навигация
near [niə] *a* близкий
nearly ['niəli] *adv* почти; близко
necessary ['nesisəri] *a* необходимый, нужный
necessitate [ni'sesiteit] *v* делать необходимым
necessity [ni'sesiti] *n* необходимость
negative ['negətiv] *a* отрицательный, негативный
neither...nor ['naiðe...'nɔ:] *cj* ни...ни
neon ['ni:ən] *n* неон; *a* неоновый
nerve [nə:v] *n* нерв
network ['netwə:k] *n* сеть, система
neutral ['nju:trəl] *a* нейтральный
neutron ['nju:trɔn] *n* нейтрон
never ['nevə] *adv* никогда
nevertheless [ˌnevәðe'les] *adv* тем не менее
new [nju] *a* новый
next [nekst] *a* следующий
night [nait] *n* ночь
nitrogen ['naitridʒən] *n* азот
noble ['noubl] *a* благородный
nobody ['noubədi] *pron* никто
none [nʌn] *pron* никто
nonmetallic ['nɔnmi'tælik] *a* неметаллический

normal ['nɔ:məl] *a* нормальный, обычный
north [nɔ:θ] *n* север
notable ['noutəbl] *a* значительный, заметный
note [nout] *v* отмечать, обращать внимание
notwithstanding *prep* несмотря на
now [nau] *adv* сейчас
nowhere ['nouweə] *adv* нигде, никуда
nuclear ['njuklɪə] *a* ядерный
nucleus ['nju:klɪəs] *n* ядро
number ['nʌmbə] *n* количество; число; номер
numerous ['nju:mərəs] *a* многочисленный

O

obey [ɔ'bei] *v* покоряться, повиноваться
object ['ɔbdʒɪkt] *n* предмет; цель, объект
obligatory [ɔ'blɪgətərɪ] *a* обязательный
observation [ˌɔbze:'veɪʃən] *n* наблюдение
observatory [əb'zə:vətrɪ] *n* обсерватория
observer [əb'zə:və] *n* наблюдатель
obstacle ['ɔbstəkl] *n* преграда, препятствие
obtain [əb'tein] *n* получать
obvious ['ɔbviəs] *a* очевидный, явный
occupy ['ɔkjupai] *v* занимать
occur [ə'kə:] *v* иметь место, случаться
ocean ['ouʃn] *n* океан
odour ['oudə] *n* запах
odourless ['oudəlis] *a* не имеющий запаха
offer ['ɔfə] *v* предлагать
office ['ɔfis] *n* учреждение, контора
often [ɔfn] *adv* часто
oil [ɔɪl] *n* нефть
old [ould] *a* старый
once [wʌns] *adv* однажды; когда-то; один раз
only ['ounlɪ] *adv* только; *a* единственный
opaque [ou'peɪk] *a* непрозрачный
open ['oupn] *v* открывать
operate ['ɔpəreɪt] *v* работать, приводить в действие
operation [ˌɔpə'reɪʃn] *n* операция; работа; процесс
opinion [ə'pinjen] *n* мнение
opportunity [ˌɔpə'tju:nitɪ] *n* возможность
oppress [ə'pres] *v* угнетать
oppression [ə'preʃn] *n* угнетение
optical ['ɔptɪkəl] *a* оптический
optics ['ɔptɪks] *n* оптика
order ['ɔ:də] *n* порядок; приказ; орден
ordinary ['ɔ:dnrɪ] *a* обычный
organize ['ɔ:gənaiz] *v* организовывать
ore [ɔ:] *n* руда
original [ə'rɪdʒənl] *a* оригинальный, первоначальный
ornament ['ɔ:nəmənt] *n* украшение
oscillator [ə'sileitə] *n* осциллятор, генератор колебаний
ounce [auns] *n* унция
outer ['autə] *a* внешний
outer space ['autə'speɪs'] космос
output ['autput] *n* продукция; мощность
outside ['aut'said] *adv* извне
outstanding [aut'stændɪŋ] *a* выдающийся
over ['ouvə] *prep* над, сверх, через
overcome (overcame, overcome) [ˌouvə'kʌm] *v* преодолевать
overthrow (overthrew, overthrown) [ˌouvə'θrou] *v* сбрасывать
owe [ou] *v* быть обязанным; задолжать
own [oun] *a* собственный
oxygen ['ɔksidʒen] *n* кислород

P

Pacific Ocean [pə'sifik 'ouʃn] Тихий океан
page [peɪdʒ] *n* страница
palace ['pælis] *n* дворец
palm [pɑ:m] *n* пальма
paper ['peɪpə] *n* бумага; статья; газета
parents ['peərənts] *n* родители
part [pɑ:t] *n* часть

partial ['pɑ:ʃl] *a* частичный
participant [pɑ:'tisipənt] *n* участник
particle ['pɑ:tikl] *n* частица
particular [pə'tikjulə] *a* особый
pass [pɑ:s] *v* проходить мимо
passenger ['pæsindʒə] *n* пассажир
path [pɑ:θ] *n* путь
pave [peiv] *n* прокладывать путь
pay (paid) [pei, peid] *v* платить
peace [pi:s] *n* мир
peaceful ['pi:sful] *a* мирный
peasant ['peznt] *n* крестьянин
peculiar [pi'kju:liə] *a* особенный
penetrate ['penitreit] *v* проникать
people ['pi:pl] *n* люди, народ
per cent [pə'sent] процент
perform [pə'fɔ:m] *v* выполнять
performance [pə'fɔ:məns] *n* выполнение; действие
perhaps [pə'hæps] *adv* возможно
period ['piəriəd] *n* период
periodic [ˌpiəri'ɔdik] *a* периодический
periodicity [ˌpiəriə'disiti] *n* периодичность
permit [pə'mit] *v* позволять
perpetual [pə'petjuəl] *a* вечный, постоянный
persistent [pə'sistənt] *a* настойчивый
person ['pə:sn] *n* особа, лицо
phenomenon (*pl* **phenomena**) *n* явление
philosopher [fi'lɔsəfə] *n* философ
phosphorus ['fɔsfərəs] *n* фосфор
photograph ['foutəgra:f] *n* фотография; *v* фотографировать
physical ['fizikəl] *a* физический
physics ['fiziks] *n* физика
physicist ['fizisist] *n* физик
picture ['piktʃə] *n* картина
picturesque [ˌpiktʃə'resk] *a* живописный
piece [pi:s] *n* кусок, часть
pile [pail] *n* батарея
pine [pain] *n* сосна
pioneer [ˌpaiə'niə] *n* пионер
pipe [paip] *n* труба
place [pleis] *n* место
plaque [pleig] *n* чума
plane [plein] *n* самолет; *v* выравнивать
planet ['plænit] *n* планета
planetary ['plænitəri] *a* планетный, планетарный
planned ['plænd] *a* плановый
plant [plɑ:nt] *n* завод; растение
plastic ['plæstik] *n* пластик, пластмасса
platinum ['plætinəm] *n* платина
play [plei] *v* играть
pleasure ['pleʒə] *n* удовольствие
plenty ['plenti] *adv* много
pocket ['pɔkit] *n* карман
point [pɔint] *n* точка; кончик; суть
point out ['pɔint 'aut] *v* указывать
pole [poul] *n* полюс
policy ['pɔlisi] *n* политика
Polish ['pouliʃ] *a* польский
pollute [pə'lu:t] *v* загрязнять
pollution [pə'lu:ʃn] *n* загрязнение
polymer ['pɔlimə] *n* полимер
polymerisation [pɔˌlimərai'zeiʃn] *n* полимеризация
polymerize ['pɔliməraiz] *v* полимеризировать
poor [puə] *a* бедный; плохой
population [ˌpɔpju'leiʃn] *n* население
porcelain ['pɔ:slin] *n* фарфор
porous ['pɔ:rəs] *a* пористый
portion ['pɔ:ʃn] отрезок, часть
position [pə'ziʃn] *n* положение
positive ['pɔzətiv] *a* положительный
possess [pə'zes] *v* владеть, иметь
possibility [ˌpɔsə'biliti] *n* возможность
possible ['pɔsəbl] *a* возможный
post [poust] *n* столб, мачта
post-graduate ['poust' grædjuit] *n* аспирант
potassium [pə'tæsjəm] *n* калий
potential [pə'tenʃl] *n* потенциал
pound [paund] *n* фунт
pour [pɔ:] *v* лить, отливать
poverty ['pɔvəti] *n* бедность
powder ['paudə] *n* порошок
power [pauə] *n* энергия; сила; мощь; государство
power engineering [ˌendʒi'niəriŋ] энергетика
powerful ['pauəful] *a* мощный, сильный

power plant ['pauə'plant] электростанция
power station ['pauə ˌsteiʃn] электростанция
practical ['præktikəl] *a* практический, фактический
practice ['præktis] *n* практика
precise [pri'sais] *a* точный
precision [pri'siʒn] *n* точность
predict [pri'dikt] *v* предсказывать
preoccupied [pri'ɔkjupaid] *a* занятый; поглощённый
preparation [ˌprepə'reiʃn] *n* подготовка
preparatory [pri'pærətəri] *a* подготовительный
prepare [pri'pɛə] *v* готовить(ся)
present ['preznt] *a* настоящий, современный
to be present [tə' bi: 'preznt] присутствовать
present a thesis [ə'θi:siz] защищать диссертацию
preservation [ˌprezə:'veiʃn] *n* сохранение
preserve [pri'zə:v] *v* сохранять
pressure ['preʃə] *n* давление
prevent [pri'vent] *v* предотвращать; мешать
previous ['pri:vjəs] *a* предыдущий
primary ['praiməri] *a* основной, первоначальный
principal ['prinsəpl] *a* главный
principle ['prinsəpl] *n* принцип
print [print] *v* печатать
printer ['printə] *n* печатник
probable ['prɔbəbl] *a* вероятный
probe [proub] *n* автоматическая научно-исследовательская станция
procedure [prə'si:dʒə] *n* процесс производства, процедура
process ['prousəs] *n* процесс
processing [prə'sesiŋ] *n* обработка
proclaim [prə'kleim] *v* провозглашать
produce [prə'dju:s] *v* производить; вырабатывать
product ['prɔdəkt] *n* продукт; изделие
production [prə'dʌkʃn] *n* производство
productivity [ˌprɔdʌk'tiviti] *n* производительность
profitable ['prɔfitəbl] *a* выгодный
profound [prə'faund] *a* глубокий
progressive [prə'gresiv] *a* прогрессивный
project ['prɔdʒəkt] *n* проект
prominent ['prɔminənt] *a* выдающийся
promise ['prɔmis] *v* обещать
promote [prə'mout] *v* способствовать
pronounced [prə'naunst] *a* ясный, четкий
proof [pru:f] *n* доказательство
propagate ['prɔpəgeit] *v* распространять(ся)
proper ['prɔpə] *a* соответствующий, правильный
property ['prɔpəti] *n* свойство
proportion [prə'pɔ:ʃn] *n* пропорция; соотношение
directly proportional [di'rektli prə'pɔ:ʃənl] прямо пропорциональный
propose [prə'pouz] *v* предлагать
prospect [prɔs'pekt] *v* исследовать; *n* перспектива
protect [prə'tekt] *v* защищать
protein ['prouti:n] *n* протеин, белок
proton ['proutən] *n* протон
prototype ['proutətaip] *a* прототип
proud [praud] *a* гордый
prove [pru:v] *v* доказывать
provide [prə'vaid] *v* обеспечивать, снабжать
provided [prə'vaidid] *cj* при условии
provision [prə'viʒn] *n* обеспечение
publication [ˌpʌbli'keiʃn] *n* издание
publish ['pʌbliʃ] *v* издавать
pure [pjuə] *a* чистый
purpose ['pə:pəs] *n* цель
pursue [pə'sju] *v* проводить, преследовать
push [puʃ] *v* толкать
put into effect ['put intə i'fekt] воплощать в жизнь, исполнять
put together ['put tə'geðe] соединять, составлять

Q

qualification [ˌkwɔlifi'keiʃn] *n* квалификация
qualified ['kwɔlifaid] *a* квалифицированный
qualitative ['kwɔlitətiv] *a* качественный
quality ['kwɔliti] *n* качество
quantity ['kwɔntiti] *n* количество
quasar ['kweizə] *n* квазар
question ['kwestʃn] *n* вопрос
quiet ['kwaiət] *a* тихий, спокойный
quite ['kwait] *adv* вполне, совсем

R

race [reis] *n* раса
racial ['reiʃəl] *a* расовый
radar ['reidə] *n* радар
radiant ['reidiənt] *a* лучистый, излучающий
radiation [ˌreidi'eiʃn] *n* радиация
radiator ['reidieitə] *n* радиатор
radio ['reidiou] *n* радио
radioactive ['reidiou'æktiv] *a* радиоактивный
radioactivity ['reidiouæk'tiviti] *n* радиоактивность
radio set ['reidiou'set] радиоприемник
rage [reidʒ] *v* бушевать, неистовствовать
rail [reil] *n* рейка
railway ['reilwei] *n* железная дорога
raise [reiz] *v* поднимать; увеличивать
range [reindʒ] *n* диапазон, радиус
rapid ['ræpid] *a* быстрый
rare [reə] *a* редкий
rarefy ['reərifai] *v* разрежать
ratio ['reiʃiou] *n* отношение, пропорция; коэффициент
rational ['ræʃənl] *a* рациональный
raw material ['rɔ: mə'tiəriəl] сырье
ray [rei] *n* луч
reach [ri:tʃ] *v* достигать
reaction [ri:'ækʃn] *n* реакция
reactor [ri:'æktə] *n* реактор
read (read) [ri:d, red] *v* читать
readily ['redili] *adv* легко
reagent [ri:'eidʒənt] *n* реактив, реагент
real [riəl] *a* действительный
reality [ri'æliti] *n* действительность
realization [ˌriəlai'zeiʃn] *n* осуществление
realize ['riəlaiz] *v* осуществлять; понимать
reason ['ri:zn] *n* причина; основание; довод
receive [ri'si:v] *v* получать
receiver [ri'si:və] *n* приёмник
recent ['ri:snt] *a* недавний; новый; современный
recognize ['rekəgnaiz] *v* признавать, узнавать
recollection [ˌrekə'lekʃn] *n* воспоминание
recommend [ˌrekə'mend] *v* рекомендовать
record [ri'kɔ:d] *v* записывать, регистрировать
recording [ri'kɔ:diŋ] *n* запись
recreation [ˌrekri'eiʃn] *n* отдых развлечение
rectifier ['rektifaiə] *n* выпрямитель тока; детектор
rectilinear [ˌrekti'liniə] *a* прямолинейный
red [red] *a* красный
reduce [ri'dju:s] *v* сокращать, уменьшать
reduction [ri'dʌkʃn] сокращение; снижение
refer to [ri'fətə] *v* ссылаться (на), передавать
reflect [ri'flekt] *v* отражать
refractory [ri'fræktəri] *n* огнеупорный строительный материал
refrigerator [ri'fridʒəreitə] *n* холодильник
refuse [ri'fju:z] *v* отказывать(ся)
region ['ri:dʒən] *n* район, область
regular ['regjulə] *a* регулярный, правильный
regulator ['regjuleitə] n регулятор
rehabilitation [ˌri:ə,bili'teiʃn] *n* реконструкция
rejoice [ri'dʒɔis] *v* радоваться
relate [ri'leit] *v* относиться, иметь связь с

relation [rɪ'leɪʃn] *n* отношение
relationship [rɪ'leɪʃənʃɪp] *n* отношение, связь
relative ['relətɪv] *a* относительный
release [rɪ'li:s] *v* освобождать; выделять
reliable [rɪ'laɪəbl] *a* надёжный
relibility [rɪ'laɪə'bɪlɪtɪ] *n* надёжность
remain [rɪ'meɪn] *v* оставаться
remarkable [rɪ'mɑ:kəbl] *a* замечательный
remember [rɪ'membə] *v* помнить
remote [rɪ'mout] *a* отдалённый
remove [rɪ'mu:v] *v* передвигать, удалять
repair [rɪ'peə] *v* чинить, ремонтировать
repeat [rɪ'pi:t] *v* повторять
repel [rɪ'pel] *v* отталкивать
replace [rɪ'pleɪs] *v* заменять
represent [ˌrepɪ'zent] *v* представлять, изображать
reproduce [ˌri:prə'dju:s] *v* воспроизводить
require [rɪ'kwaɪə] *v* требовать
requirement [rɪ'kwaɪəmənt] *n* потребность, требование
research [rɪ'sə:tʃ] *n* исследование; научная работа
resemble [rɪ'zembl] *v* иметь сходство, походить
reshape [ri:'ʃeɪp] *v* переделать
resin ['rezɪn] *n* смола
resist [rɪ'zɪst] *v* оказывать сопротивление
resistance [rɪ'zɪstəns] *n* сопротивление
resolve [rɪ'zɔlv] *v* решать; распадаться
resource(s) [rɪ'sɔ:s] *n* ресурс, средство
response [rɪs'pons] *n* ответ, отклик
responsibility [rɪsˌpɔnsə'bɪlɪtɪ] *n* ответственность
rest [rest] *n* отдых
restore [rɪs'tɔ:] *v* обновлять
restrict [rɪs'trɪkt] *v* ограничивать (ся)
result [rɪ'zʌlt] *n* результат
result from [rɪ'zʌlt frəm] *v* возникать
result in [rɪ'zʌlt ɪn] *v* приводить к чему-либо
retire [rɪ'taɪə] *v* удаляться, уходить
return [rɪ'tə:n] *v* возвращаться
reunion ['ri:'junjən] *n* воссоединение
reveal [rɪ'vi:l] *v* обнаруживать, открывать
reverse [rɪ'və:s] *a* обратный, противоположный
revolution [ˌrevə'lu:ʃn] *n* революция; оборот
revolutionary [ˌrevə'lu:ʃənərɪ] *n* революционер; *a* революционный
revolve [rɪ'vɔlv] *v* вращаться
rheostat ['ri:əstæt] *n* реостат
rich [rɪtʃ] *a* богатый
ridiculous [rɪ'dɪkjuləs] *a* нелепый, смехотворный
right [raɪt] *a* правый; правильный; прямой
rigidity [rɪ'dʒɪdɪtɪ] *n* жёсткость, твёрдость
ring (rang, rung) [rɪŋ], [ræŋ], [rʌŋ] *v* звонить; *n* кольцо круг
rise (rose, risen) [raɪz, rouz, rɪzn] *v* поднимать (ся), увеличивать (ся)
river ['rɪvə] *n* река
road [roud] *n* дорога, путь
rocket ['rɔkɪt] *n* ракета
role [roul] *n* роль
room [ru:m] *n* комната; место
rotate [rou'teɪt] *v* вращаться
rotation [rou'teɪʃn] *n* вращение, оборот
round [raund] *adv* вокруг; *a* круглый
row [rou] *n* ряд
rubber ['rʌbə] *n* резина; каучук
ruin ['ruɪn] *v* разрушать
rule [ru:l] *n* правило
run (ran, run) [rʌn, ræn] *v* бежать, работать, управлять
rust [rʌst] *n* ржавчина

S

safe [seɪf] *a* безопасный, надежный
safety ['seɪftɪ] *n* безопасность
salt [sɔ:lt] *n* соль
same [seɪm] *pron* тот самый, одинаковый

satellitte ['sætəlait] *n* спутник
satisfy ['sætisfai] *v* удовлетворять
save [seiv] *v* спасать; экономить
say (said) [sei, sed] *v* говорить
scale [skeil] *n* масштаб
scan [skæn] *v* рассматривать, изучать
scarcely ['skɛəslɪ] *adv* едва
scholar ['skɔlə] *n* ученый
science ['saiəns] *n* наука
scientific [ˌsaiən'tifik] *a* научный
scientist ['saiəntist] *n* ученый
scope [skoup] *n* кругозор; сфера; размах
screen [skri:n] *n* экран
sea [si:] *n* море
seal [si:l] *n* запайка; клеймо; печать
seaport ['si:pɔ:t] *n* морской порт
search [sə:tʃ] *v* искать
season ['si:zn] *n* сезон, время года
secondary education ['sekəndərɪ] среднее образование
secondary school ['sku:l] средняя школа
secret ['si:krɪt] *n* тайна, секрет
section ['sekʃn] *n* часть, раздел
security [si'kjuəritɪ] *n* безопасность
see (saw, seen) [si:, sɔ:, si:n] *v* видеть
seem [si:m] *v* казаться, представлять
seldom ['seldem] *adv* редко
select [sɪ'lekt] *v* выбирать
selection [sɪ'lekʃn] *n* выбор; подбор
selenium [si'li:niəm] *n* селен
sell (sold) [sel, sould] *v* продавать
shelf [ʃelf] *n* полка
semi- ['semi] *pref* полу-
semiconductor ['semikən'dʌktə] *n* полупроводник
send (sent) [send, sent] *v* посылать
sensitive ['sensitiv] *a* чувствительный
sensitivity [ˌsensɪ'tivɪtɪ] *n* чувствительность
sentence ['sentəns] *n* предложение
separate ['sepəreit] *v* разделять
series ['siəri:z] *n* серия; ряд; последовательное соединение
servant ['sə:vənt] *n* слуга
serve [sə:v] *v* служить
service ['sə:vɪs] *n* служба
servo-mechanism ['sə:vou, mekənizm] *n* сервомеханизм
set (set) [set] *v* устанавливать; размещать
set a problem ['set ə'prɔblem] поставить задачу
set forth ['set'fɔ:θ] *v* отправляться *(в путешествие)*; излагать
set-up ['set'ʌp] *v* основывать
several ['sevrəl] *pron* несколько
severe conditions [sɪ'viə] суровые условия
shade [ʃeid] *n* тень, оттенок
shaft [ʃɑ:ft] *n* вал
shake (shook, shaken) [ʃeik, ʃuk, ʃeikn] *v* трясти
shape [ʃeip] *n* форма, очертание
share [ʃeə] *v* делить, разделять
sheet [ʃi:t] *n* лист, страница
shine (shone) [ʃain, ʃoun] *v* светить (ся)
shift [ʃift] *v* передвигать, сдвигать
ship [ʃip] *n* корабль; *v* транспортировать
shop [ʃɔp] *n* магазин; мастерская
short [ʃɔ:t] *a* короткий
shortage ['ʃɔ:tidʒ] *n* нехватка, недостаток
show (showed, shown) [ʃou, ʃoud, ʃoun] *v* показывать
shower bath ['ʃauə bɑ:θ] *n* душ
shut off (shut) ['ʃʌt'ɔf] *v* выключать
side [said] *n* сторона; бок
sign [sain] *n* знак; символ; подпись
signal ['signəl] *n* сигнал; *v* сигнализировать
significance [sig'nifikəns] *n* значение; значительность
significant [sig'nifikənt] *a* многозначительный, важный
silicon ['silikən] *n* кремний
silvery ['silvərɪ] *a* серебристый
similar ['similə] *a* похожий, подобный, сходный
similarly ['similəli] *adv* так же, таким же способом

simple [simpl] *a* простой
simplicity [sim'plisiti] *n* простота
simulate ['simjuleit] *v* имитировать, модулировать
simultaneous [ˌsiməl'teinjəs] *a* одновременный
single ['siŋgl] *a* единственный, один
site [sait] *n* строительная площадка
sitting- room ['sitiŋru:m] *n* гостиная
situation [ˌsitju'eiʃn] *n* местоположение; положение
size [saiz] *n* размер; величина
skill [skil] *n* мастерство, искусство, умение
sky [skai] *n* небо
sleep (slept) [sli:p, slept] *v* спать
slogan ['sləugən] *n* лозунг
slow [slou] *a* медленный; тихий; медлительный
slow down ['slou 'daun] *v* замедлять
slums [slʌmz] *n* трущобы
small [smɔ:l] *a* маленький
smash [smæʃ] *v* ломать; разбивать, уничтожать
so-called ['sou'kɔ:ld] *a* так называемый
socialist ['souʃəlist] *a* социалистический
society [sə'saiəti] *n* общество
sodium ['soudjəm] *n* натрий
solar ['soulə] *a* солнечный
solid ['sɔlid] *n* твёрдое тело; *a* твёрдый
solubility [ˌsɔlju'biliti] *n* растворимость
soluble ['sɔljubl] *a* растворимый
solution [sə'lu:ʃn] *n* раствор
solve a problem ['sɔlv ə'prɔblem] решать вопрос, задачу
solvent ['sɔlvənt] *n* растворитель
some [sʌm] *a* какой-нибудь; *adv* несколько
soon [su:n] *adv* скоро, вскоре
sound [saund] *n* звук
source [sɔ:s] *n* источник
south [sauθ] *n* юг
space [speis] *n* пространство; космос
space·pilot ['speis 'pailət] лётчик-космонавт
spaceship ['speisʃip] *n* космический корабль
special ['speʃəl] *a* специальный
specialist ['speʃəlist] *n* специалист
specimen ['spesimin] *n* образец
spectrum ['spektrəm] *n* спектр
speed [spi:d] *n* скорость
speed ud ['spi:d'ʌp] *v* ускорять
speedy ['spi:di] *a* быстрый
spend (spent) [spend, spent] *v* тратить, расходовать
sphere [sfiə] *n* область, сфера
splendid ['splendid] *a* великолепный, роскошный
split (split) [split] *v* расщеплять
spoon [spu:n] *n* ложка
spot [spɔt] *n* место; пятно
spread (spread) [spred] *v* распространять (ся)
spring [spriŋ] *n* пружина
square [skweə] *n* площадь; квадрат
stable ['steibl] *a* устойчивый, стойкий
stage [steidʒ] *n* ступень, стадия
stand (stood) [stænd, stud] *v* стоять
standard ['stændəd] *n* стандарт; *a* стандартный
star [stɑ:] *n* звезда
start [stɑ:t] *v* начинать, стартовать
startle ['stɑ:tl] *v* испугать, поразить
state [steit] *n* состояние; государство
statics ['stætiks] *n* статика
stay on ['stei 'ɔn] *v* оставаться
steady ['stedi] *a* постоянный, неизменный
steam [st:m] *n* пар
steel [sti:l] *n* сталь
steeply ['sti:pli] *adv* круто
step [step] *n* шаг; поступь
still [stil] *adv* всё еще; однако; еще
stimulate ['stimjuleit] *v* стимулировать, возбуждать
stimulus ['stimjuləs] *n* стимул; возбудитель
stipend ['staipənd] *n* стипендия
stone [stoun] *n* камень
store [stɔ:] *v* запасать; накапливать
storage cell ['stɔ:ridʒ 'sel] *n* блок памяти

strange ['streindʒ] *a* странный; чужой
stratum (*pl* **strata**) ['strɑ:təm] *n* пласт; слой
stream [stri:m] *n* поток
street [stri:t] *n* улица
strenght [streŋθ] *n* сопротивление; сила; прочность
strengthen ['streŋθən] *v* усиливать, укреплять
stress [stres] *n* давление; напряжение
stretch [stretʃ] *v* простирать (ся), тянуть (ся)
strike (**struck**) [straik, strʌk] *v* бастовать, бить, ударять
strive (**strove, striven**) [straiv, strouv, strivn] *v* добиваться, стараться
stroke [strouk] *n* удар
strong [strɔŋ] *a* сильный
structure ['strʌktʃə] *n* структура; конструкция
struggle ['strʌgl] *n* борьба; *v* бороться
studies ['stʌdiz] *n* занятие, учёба
studio ['stju:diou] *n* студия
study ['stʌdi] *v* изучать, исследовать
subdivide ['sʌbdi'vaid] *v* подразделять
subdivision ['sʌbdi,viʒn] *n* подразделение
subgroup ['sʌbgru:p] *n* подгруппа
subject ['sʌbdʒikt] *n* предмет
substitute ['sʌbstitju:t] *v* заменять, замещать
succeed [sək'si:d] *v* преуспевать; добиваться цели
success [sək'ses] *n* успех
such [sʌtʃ] *a* такой
sudden ['sʌdn] *a* внезапный
sufficient [sə'fiʃent] *a* достаточный
sugar ['ʃugə] *n* сахар
suggest [sə'dʒest] *v* предлагать, советовать
suitable ['sju:təbl] *a* подходящий, соответствующий
sulphur ['sʌlfə] *n* сера
sum [sʌm] *n* сумма
summer ['sʌmə] *n* лето
sun [sʌn] *n* солнце
superior [sju:'piəriə] *a* превосходный; незаурядний
superiority [sju:,piəri'ɔriti] *n* превосходство
supersonic ['sjupə'sɔnik] *a* сверхзвуковой
supply [sə'plai] *n* запас; *v* снабжать
suppose [sə'pouz] *v* допускать
suburb ['sʌbə:b] *n* окраина
surface ['sə:fis] *n* поверхность
surprise [sə'praiz] *n* удивление; *v* удивляться
surround [sə'raund] *v* окружать
survive [sə'vaiv] *v* выживать, пережить
swift [swift] *a* быстрый
switch out ['switʃ'aut] *v* выключать
switch on ['switʃ'ɔn] *v* включать
symbol ['simbəl] *n* символ
synchronizer ['sinkrənaizə] *n* синхронизатор
synthesis ['sinθisis] *n* синтез
synthesize ['sinθisaiz] *v* синтезировать
synthetics [sin'θetiks] *n* синтетика
system ['sistəm] *n* система

T

table ['teibl] *n* стол; таблица
take (**took, taken**) [teik, tuk, 'teikən] *v* брать
take a post-graduate course поступить в аспирантуру
take examinations [ig,zæmi'neiʃnz] сдавать экзамены
take into account [intə ə'kaunt] принимать во внимание
take part (**in**) ['teik' pa:t] принимать участие
talk [tɔ:k] *v* говорить
tape [teip] *n* лента
tape-recorder ['teipri,kɔ:də] *n* магнитофон
target ['tɑ:git] *n* цель
task [tɑ:sk] *n* задание
taste [teist] *n* вкус; проба; склонность
teach (**taught**) [ti:tʃ, tɔ:t] *v* учить, преподавать
teacher ['ti:tʃə] *n* учитель, преподаватель
technical ['teknikəl] *a* технический
technique [tek'ni:k] *n* техника; метод

technological [ˌteknəˈlɔdʒikəl] *n* технический
technology [tekˈnɔlədʒi] *n* т техника; технология
teens [ti:nz] возраст от 13 до 19 лет
telecast [ˈtelikɑ:st] *v* передавать по телевидению
television set [ˌtelivɪʒn,set] телевизор
temperature [ˈtemprɪtʃə] *n* температура
tendency [ˈtendənsi] *n* тенденция
terminal [ˈtə:mɪnl] *n* клемма, ввод, вывод
terrestrial [tɪˈrestriəl] *a* земной
test [test] *n n* эксперимент; *v* проверять
test tube [ˈtest tju:b] пробирка
textbook [ˈtekstbuk] *n* учебник
textile [ˈtekstaɪl] *n* ткань; *a* текстильный
theatre [ˈθɪətə] *n* театр
then [ðen] *adv* затем, потом, тогда
theoretical [θɪəˈretikəl] *a* теоретический
theorize [ˈθɪəraɪz] *v* создавать теорию
theory [ˈθɪəri] *n* теория
there [ðɛə] *adv* там
therefore [ˈðɛəfɔ] *adv* поэтому; следовательно
thermal [ˈθə:mal] *a* тепловой, термический
thermonuclear [ˈθə:mouˈnju:kliə] *a* термоядерный
thesis [*pl* **theses**] [ˈθi:sis] *n* диссертация
thickness [ˈθɪknɪs] *n* толщина
thin [θɪn] *n* тонкий
thing [θɪŋ] *n* вещь
think (thought) [θɪŋk, θɔ:t] *v* думать
thinker [ˈθɪŋkə] *n* мыслитель
thirst [θə:st] *n* жажда
thorough [ˈθʌrə] *a* старательный, прилежный
though [ðou] *cj* хотя
thought [θɔ:t] *n* мысль
thousand [ˈθauzənd] *num* тысяча
through [θru:] *prep* через
throw (threw, thrown) [θrou, θru:, θroun] *v* бросать
thus [ðʌs] *adv* так, таким образом
tide [taid] *n* прилив
tie [taɪ] *n* связь
timer [ˈtaɪmə] *n* синхронизатор
tiny [ˈtaɪnɪ] *a* крошечный
tip [tɪp] *n* кончик; наконечник
titanic [taɪtænɪk] *a* титанический; огромный
title [ˈtaɪtl] *n* заглавие; название
today [təˈdeɪ] *adv* сегодня
together [təˈgeðə] *adv* вместе
toiler [ˈtɔɪlə] *n* труженик
tongue [tʌŋ] *n* язык
tool [tu:l] *n* инструмент; орудие
topical [ˈtɔpɪkl] *a* злободневный
touch [tʌtʃ] *v* дотрагиваться, касаться
tour [tuə] *n* путешествие, поездка
tower [tauə] *n* башня; вышка
trace [treɪs] *n* след; черта
tracer (atom) [treɪsəˈætəm] меченый атом
track [træk] *v* прокладывать путь
traffic [ˈtræfɪk] *n* уличное движение
tragic [ˈtrædʒik] *a* трагический
train [treɪn] *n* поезд; *v* готовить специалистов
trajectory [ˈtrædʒɪktərɪ] *n* траектория
transfer [ˈtrænsfə] *n* передача
transform (into) [træns'fɔ:m] *v* преобразовать, превращать (в)
transformer [ˌtræns'fɔ:mə] *n* трансформатор
translate [trɑ:nsˈleɪt] *v* переводить
translator [trɑ:nsˈleɪtə] *n* переводчик
transmit [trænzˈmɪt] *v* передавать
transmitter [trænzˈmɪtə] *n* передатчик
transparent [trænsˈpɛərənt] *a* прозрачный
transuranium [ˌtrænzjuəˈreɪnɪəm] *a* трансурановый
trap [træp] *v* улавливать, удерживать
travel [ˈtrævl] *n* путешествие
traveller [ˈtrævlə] *n* путешественник
traverse [ˈtrævəs] *v* пересекать
treatment [ˈtri:tmənt] *n* лечение; обработка
treasure [ˈtreʒə] *n* сокровище

tremendous [trɪ'mendes] *a* огромный
trend [trend] *n* направление; тенденция
triode ['traɪoud] *n* триод
triumph ['traɪəmf] *n* триумф, победа, торжество
troop [tru:p] *n* отряд
true [tru:] *a* верный, действительный
truly ['tru:lɪ] *adv* действительно
tube [tju:b] *n* лампа (электронная); трубка
tuition [tju:'ɪʃn] *n* обучение
tungsten ['tʌŋstən] *n* вольфрам
turbine ['tə:baɪn] *n* турбина
turn [tə:n] *n* поворачивать
turn [tə:n] *n* оборот; **in turn** в свою очередь
turner ['tə:nə] *n* токарь
TV-television ['telɪ,vɪʒn] *n* телевидение
TV set ['ti:vi:'set] *n* телевизор
~pe [taɪp] *n* вид, тип
typical [of] ['tɪpɪkəl] *a* типичный (для)

U

ultimate ['ʌltɪmɪt] *a* конечный
ultimately ['ʌltɪmɪtlɪ] *adv* в конце концов
ultrasonics ['ʌtrə'sɔnɪks] *n* ультразвук; ультраакустика
ultraviolet ['ʌltrə'vaɪəlɪt] *a* ультрафиолетовый
unbreakable [,ʌn'breɪkəbl] *a* неразрывный
undergo [,ʌndə'gou] *v* подвергаться, претерпевать
underground [,ʌndə'graund] *a* подземный
understand (understood) [,ʌndə'stænd] *v* понимать
undertake (undertook, undertaken) [,ʌndə'teɪk] *v* предпринимать
unexpected [,ʌnɪks'pektɪd] *a* неожиданный
unimaginable [,ʌnɪ'mædʒɪnəbl] *a* невероятный
uninterrupted ['ʌn'ɪntə'rʌptɪd] *a* непрерывный
union ['ju:njən] *n* союз, объединение
unique [ju:'ni:k] *a* уникальный, единственный
unit ['ju:nɪt] *n* единица; часть блок, узел
unite [ju':naɪt] *v* объединять (ся)
unity ['ju:nɪtɪ] *n* единство
universe ['ju:nɪvə:s] *n* вселенная
university [,ju:nɪ'və:sɪtɪ] *n* университет
unless [ən'les] *cj* если не
unsuitable ['ʌn'sju:təbl] *a* непригодный, несоответствующий
up-to-date ['ʌptə'deɪt] *a* современный
uranium [juə'reɪnɪəm] *n* уран
urge [ə:dʒ] *v* понуждать, подгонять
use [ju:z] *v* использовать
useful ['ju:sful] *a* полезный
usefulness ['ju:sfulnɪs] *n* полезность, необходимость
usual ['ju:ʒuəl] *a* обычный
utilization [,ju:tɪlaɪ'zeɪʃn] *n* использование
utilize ['ju:tɪlaɪz] *v* применять, использовать

V

vacant ['veɪkənt] *a* свободный, незанятый
vacation [və'keɪʃn] *n* каникулы, отпуск
valley ['vælɪ] *n* долина
valuable ['væljuəbl] *a* ценный
value ['vælju:] *n* величина, значение; ценность
valve [vælv] *n* электронная лампа
vanguard ['vængɑ:d] *n* авангард
vaporization [,veɪpəraɪ'zeɪʃ] *n* испарение
vapour ['veɪpə] *n* пар
variable ['vɛərɪəbl] *n* переменная; параметр
variation [,vɛərɪ'eɪʃn] *n* изменение, перемена
various ['vɛərɪəs] *a* различный
vast [vɑ:st] *a* огромный
velocity [vɪ'lɔsɪtɪ] *n* скорость
Venus ['vi:nəs] *n* Венера
versatile ['və:sətaɪl] *a* многосторонний
very ['verɪ] *adv* очень; *a* самый, тот самый
vehicle ['vi:ɪkl] *n* летательный аппарат
vessel ['vesl] *a* судно, посудина
vibrate [vaɪ'breɪt] *v* колебаться

vibration [vaɪ'breɪʃn] *n* колебание
vice versa ['vaɪsɪ 'və:sə] *adv* наоборот
victorious [vɪk'tɔ:rɪəs] *a* победоносный
view [vju:] *n* вид
viewer ['vju:ə] *n* зритель
village ['vɪlɪdʒ] *n* деревня, село
violence ['vaɪələns] *n* сила
violet ['vaɪəlɪt] *a* фиолетовый
virtue ['və:tju:] *n* достоинство; добродетель
viscous ['vɪskəs] *a* вязкий
vision ['vɪʒən] *n* зрение; предвидение
visit ['vɪzɪt] *n* визит; *v* посещать
vital ['vaɪtl] *a* жизненный
vivid ['vɪvɪd] *a* яркий, живой
voltaic [vɔl'teɪɪk] *a* гальванический
volume ['vɔljum] *n* объем
voluntary ['vɔləntərɪ] *a* добровольный
voyage ['vɔɪdʒ] *n* плавание, морское путешествие

W

walk [wɔ:k] *v* ходить
war [wɔ:] *n* война
warm [wɔ:m] *v* нагревать; *a* теплый
wash [wɔʃ] *v* мыть
watch [wɔtʃ] *v* следить, наблюдать; *n* часы
water ['wɔ:tə] *n* вода
watt [wɔt] *n* ватт
wave [weɪv] *n* волна
way [weɪ] *n* путь; метод, способ
weak [wi:k] *a* слабый
weakness ['wi:knɪs] *n* слабость
wealth [welθ] *n* богатство
weapon ['wepən] *n* оружие
weather ['weðə] *n* погода
week [wi:k] *n* неделя
weigh [weɪ] *v* взвешивать, весить
weightlessness ['weɪtlɪsnɪs] *n* невесомость
weld [weld] *v* сваривать
well [wel] *adv* хорошо
well-being ['wel'bi:ɪŋ] *n* благосостояние
whatever [wɔt'evə] какой бы ни
wheel [wi:l] *n* колесо
whether ['weðə] *cj* ли
while [waɪl] *cj* в то время как
white [waɪt] *a* белый
whole [houl] *a* весь, целый
why [waɪ] *adv* почему
wide [waɪd] *a* широкий
wide-spread ['waɪd'spred] *a* распространенный
wife [waɪf] *n* жена
wild ['waɪld] *a* дикий; буйный
win (won) [wɪn, wʌn] *v* побеждать
window ['wɪndou] *n* окно
winter ['wɪntə] *n* зима
wire ['waɪə] *n* проволока; провод
wireless ['waɪəlɪs] *n* радио
wisdom ['wɪzdem] *n* мудрость
wish [wɪʃ] *v* желать, хотеть
with [wɪð] *prep* с
within [wɪð'ɪn] *prep* внутри, в пределах
without [wɪð'aut] *prep* без
withstand (withstood) [wɪð'stænd] *v* противостоять
wonder ['wʌndə] *v* удивляться
wonderful ['wʌndəful] *a* чудесный
wood [wud] *n* лес
word [wə:d] *n* слово
work [wə:k] *n* работа; *v* работать
workshop ['wə:kʃɔp] *n* мастерская
world ['wə:ld] *n* мир, свет
worth [wə:θ] *a* стоящий, заслуживающий
worry ['wʌrɪ] *v* беспокоиться
worse [wə:s] *a* худший
wrap [ræp] *v* завёртывать, упаковывать
wreath [ri:θ] *n* венок

X

X-rays ['eks'reɪz] *n pl* рентгеновские лучи

Y

year [jə:] *n* год
yet [jet] *adv* еще; все еще; однако
yield [ji:ld] *v* давать, приносить *(плоды)*
yoke [jouk] *n* иго, ярмо
youngster ['jʌŋstə] *n* юноша

Z

zero ['zɪerou] *n* ноль
zink [zɪŋk] *n* цинк

Содержание

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