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АНГЛИЙСКИЙ ЯЗЫК

**Методические рекомендации для студентов 1 курса
фармацевтического факультета
(часть II)**

Под общей редакцией Р.В. Кадушко

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Методические рекомендации по английскому языку предназначены для студентов, имеющих фоновые знания по английскому языку. Они могут быть использованы как для работы в аудитории, так и для управляемой самостоятельной работы. Представленная в методических рекомендациях тематика текстов позволит студентам сформировать навыки понимания и перевода аутентичной литературы по специальности «Фармация» с опорой на знание профессиональной лексики и грамматических структур, характерных для научного стиля. Методические рекомендации состоят из 2 разделов.

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ПРЕДИСЛОВИЕ

Методические рекомендации по английскому языку предназначены для студентов 1 курса фармацевтического факультета как для работы в аудитории, так и для самостоятельной работы.

Целью данных методических рекомендаций является ознакомление студентов с терминологической лексикой по специальности «Фармация», развитие навыков чтения текстов на основе изученной лексики и грамматики с последующим обсуждением прочитанного в форме беседы на определенную тему.

Методические рекомендации состоят из 2 разделов: “In the chemical laboratory”, “Chemical elements”, что отражает познавательную и профессиональную направленность языкового материала.

Каждый раздел методических рекомендаций состоит из следующих частей:

- 1) “Grammar practice” – изучение и узнавание грамматических структур с помощью таблиц и упражнений с последующим использованием их в речевой деятельности;
- 2) “Vocabulary learning” – изучение профессиональной лексики и её закрепление при выполнении серии упражнений;
- 3) “Reading comprehension” – чтение текстов для развития навыков как изучающего, так и просмотрового чтения;
- 4) “Rendering” – развитие навыков интерпретации текста на английском языке;
- 5) “Speaking” – развитие навыков монологической и диалогической речи.

Тексты для чтения подобраны из аутентичных источников путем компиляции с соблюдением методического принципа “от простого к сложному”. Все разделы методических рекомендаций содержат текстовый материал для самостоятельного изучения студентами.

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SECTION 3

ORAL TOPIC: IN THE CHEMICAL LABORATORY

Grammar: Participle II (Past Participle). Indefinite Passive voice. Words-substitutes “one”, “ones”, “that of”, “those of”. Imperative Mood. Grammar homonyms.

PART I. GRAMMAR PRACTICE

PARTICIPLE II

Study Table 1. Read the following regular verbs and pay attention to the pronunciation of the suffix – ed.

Table 1

[-d]	[-d]	[-t]	[-id]
studied played stayed freed engaged	prolonged informed revised organized failed	helped worked stopped produced missed	waited generated graduated

Study Table 2 and say what functions Participle II may perform in a sentence. Pay attention to the mode of translation of Participle II.

Table 2

Функции	Пример	Перевод
определение (attribute)	<p>The standard buffer solution <u>formed</u> by a mixture of acid and its salt contains a base and its salt.</p> <p>The experiments <u>made</u> were of great importance.</p> <p>Experiments <u>made</u> by the students were discussed at the Department of Organic Chemistry.</p>	<p>Стандартный буферный раствор, <u>образованный</u> смесью кислоты и ее солей, содержит основание и соль.</p> <p><u>Проводимые</u> эксперименты имели большое значение.</p> <p>Эксперименты, <u>выполненные</u> (выполняемые) студентами, обсудили на кафедре органической химии.</p>

обстоятельство (adverbial modifier) с союзами <i>if, when</i> (with conjunctions <i>if, when</i>)	<p><u>When heated</u>, albumin hardens into a solid mass.</p> <p><u>If boiled</u> with dilute nitric acid, the solution decomposes.</p>	<p><u>При нагревании</u> альбумин затвердевает в плотную массу.</p> <p><u>Когда</u> альбумин <u>нагревают</u>, он затвердевает в плотную массу.</p> <p><u>Если</u> раствор <u>кипятить</u> с разбавленной азотной кислотой, то он разлагается.</p>
<составная часть глагола- сказуемого (part of a predicate in Passive Voice, Perfect Tenses Active Voice)	At present impurities in the chemical substances are easily <u>established</u> .	В настоящее время примеси в химических веществах легко установить (устанавливаются).

Exercise 1. Give three forms of the following irregular verbs:

to seem, to break, to make, to give, to leave, to speak, to keep, to ride, to say, to send, to build, to take, to do, to put, to know, to hold, to tell, to choose, to think, to eat, to drink, to run, to wear, to shut, to be.

Exercise 2. Read and translate the following word combinations with Participle II.

a) *as an attribute*:

A student admitted to the university, passed credit-tests, the arranged meeting, a lecture delivered, a seen film, a broken glass, a well-made test, the task explained, a given food, elements discovered by scientists, beautifully colored leaves, a mixture placed in a cool place, the supplied reagents, the given amount of the substance, the obtained data, substances called reagents.

b) *as an adverbial modifier*:

When spoken to; when mixed; if done incorrectly; when fulfilled in time; if stored correctly; when kept ventilated; if kept in non-metallic containers; if used as indicated.

Exercise 3. Translate the following sentences and define functions of Participle II.

1. The information presented in the article was of great importance for the pharmacy students. 2. When poured into a container, liquids take the shape of the container. 3. In the 20th century the vitamins and the elements required only in small amounts were discovered. 4. Reagents are usually supplied in boxes. 5. Silver dissolved in water kills many harmful bacteria. 6. Despite the health risk associated with lead, it was used by doctors for around 2000 years. 7. All the life on Earth – human beings, animals and plants – depends on the heat, light and other kinds of energy given off by the sun. 8. Hydrogen explodes easily when mixed with air or oxygen. 9. Cellulose is the most abundant substance found in the plant kingdom. 10. When heated, dry ice (solid CO₂) becomes a gas. 11. Most poisonous plants are poisonous only if eaten.

INDEFINITE PASSIVE

Table 3

to be (present, past, future) + Participle II		
Утвердительная форма (Affirmative)	1. This effect is associated with the low temperature. 2. New substances were discovered at our laboratory. 3. The apparatus will be modified .	1. Этот эффект зависит от низкой температуры. 2. Новые вещества были открыты в нашей лаборатории. 3. Прибор будет модифицирован .
Вопросительная форма (Interrogative)	1. Is this effect associated with the low temperature? 2. Were new substances discovered at our laboratory? 3. Will the apparatus be modified ?	1. Этот эффект зависит от низкой температуры? 2. Новые вещества были открыты в нашей лаборатории? 3. Прибор будет модифицирован ?
Отрицательная форма (Negative)	1. This effect is not associated with low temperature. 2. New substances were not discovered at our laboratory. 3. The apparatus will not be modified .	1. Этот эффект не зависит от низкой температуры. 2. Новые вещества не были открыты в нашей лаборатории. 3. Прибор не будет модифицирован .

Exercise 4. Remember the following phrases and make up your own sentences with them:

It is said that ... – Говорят, что ...

It is reported that ... – Сообщают, что ...

It was announced that ... – Объявили, что ...

Exercise 5. Add a statement to the one given in the model.

Model:	They discussed this question last week. - So the question was discussed after all. He asked them to come. - So they were asked to come after all.
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1. He finished this experiment last night. 2. They made the report on Tuesday. 3. I asked them to arrive here. 4. He wrote the article for the newspaper. 5. She answered the letter yesterday.

Exercise 6. Express your satisfaction (удовлетворение) according to the model.

Model:	We decided to translate this article. – I'm glad it will be translated. He made up his mind to help me with the report. – I'm delighted I will be helped to make the report.
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1. They decided to do this job at once. 2. She decided to finish the article. 3. He made up his mind to deliver this lecture. 4. She made up her mind to send an e-mail to Sam.

Exercise 7. Express your surprise (удивление) in response to the statements. Use the model.

Model:	They will make the report in time. – Will the report really be made? He sent the telegram at once. – Was the telegram really sent? They make the experiment. – Is the experiment really made?
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1. They built this house in the last century. 2. We will finish the work today. 3. He prepared the report 2 days ago. 4. She'll take her final exams next month. 5. The anatomical museum greatly impressed them. 6. The results of the experiment may be used in practice. 7. He fulfilled all the tasks on his own.

Exercise 8. Practise using verb-preposition combinations in the Passive voice. Change the active construction into a passive one as in the model.

Model:	They immediately sent for a doctor. – The doctor was immediately sent for.
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Mind the translation of the following verbs:

laugh at – смеяться над;
 look for – искать;
 look through – просматривать;
 look at – смотреть на что-либо, кого-либо;
 look after – присматривать за кем-либо;
 take care of – заботиться о ком-либо;
 listen to – слушать;
 call for – заходить за кем-либо;
 put aside – откладывать в сторону.
 rely on – полагаться на.

1. They often laugh at this guy. 2. He will look for these documents. 3. We will take care of your son. 4. The professor will operate on this woman. 5. We attentively looked through these scientific articles. 6. They listened to the speaker with great interest. 7. We hurriedly put aside books and note-books. 8. The nurse will look after these patients. 9. Did you call for them yesterday? 10. I'll take care of the patient. 11. They didn't look at him. 12. I will rely on your findings.

Exercise 9. Find the sentences with the verbs in Indefinite Passive. Translate them into Russian.

1. The work at the botanical stations helps the students acquire deep knowledge of botany and pharmacognosy. 2. Chemistry is defined today as the study of formation, composition, structure and reactions of the chemical elements and their compounds. 3. Great number of new compounds was described and important work was carried out on the determination of their atomic weights. 4. Each period of development of medicine contributed to the store of medical knowledge. 5. The year of 1887 may be considered as the date of appearance of physical chemistry. 6. Galenical preparations will be produced according to the needs of medical knowledge. 7. In ancient time the most important examinations were spoken, not written. 8. The written examination was probably not known until the 19th century.

Exercise 10. Translate the sentences into Russian. Pay attention to the use of Indefinite Passive.

1. Many experiments are carried out by the pharmaceutical students during their studies. 2. Chemical laboratories are equipped with different apparatuses. 3. Negative effect was associated with the high temperature. 4. Pharmacy is defined as the science of recognizing, identifying, collecting, selecting, preparing and compounding substances. 5. First educational establishments with proper course for pharmacists were opened in Montpellier. 6. Thousands of future specialists are trained at the higher educational establishments. 7. Chemical and physical properties of inorganic substances were thoroughly studied during practical classes in chemistry. 8. Drug effects will be described after a number of experiments.

Exercise 11. Open the brackets using the verbs in the Passive Voice.

1. The academic year in all Belarusian educational institutions (divide) into two semesters.
2. A laboratory is a place where experiments (carry out).
3. State universities partly (subsidize) by state governments.
4. Periodic Law (study) by millions of secondary school children and by students at higher educational establishments of natural sciences and engineering.
5. In British universities some university teachers (call) tutors.
6. A lecture - room is a place where lectures (deliver).
7. A students' conference on this problem (hold) next month.
8. Pharmacy (define) as the science of drugs.
9. Great attention in his lectures (give) to inorganic chemistry.
10. In the 18th century the General Pharmaceutical Association of Great Britain (form).
11. The Fahrenheit thermometric scale and some new methods of study (introduce) in the 18th century.

Exercise 12. Change the voice of a verb-predicate as in the model.

Model:	Students <u>carry out</u> many experiments in the chemical laboratory. Many experiments <u>are carried out</u> by the students in the chemical laboratory.
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1. After each class we ventilate our laboratory. 2. The students place laboratory vessels on the special table. 3. In a year we will equip our chemical laboratory with modern apparatuses. 4. Fahrenheit introduced new scale into the experimental work in the 18th century. 5. The students take written exams at the

end of the term. 6. The instructor gave the students an interesting problem to solve. 7. The scientists regularly discuss the results of their experiments. 8. A librarian offered him many periodicals on the subject of his report. 9. The Dean thanked the students for their timely help. 10. After the experiment was over we recorded all the findings.

WORDS-SUBSTITUTES “one”, “ones”, “that (of)”, “those (of)”

Exercise 13. Read the sentences in the model and find nouns which are substituted by the words “one”, “ones”, “that of”, “those of”. Translate the sentence given below.

Model:	<p>1. The laboratory tables are higher than the usual ones. Лабораторные столы выше, чем обычные (столы).</p> <p>2. As the body changes from a state of rest to that of activity, its requirements alter. По мере того как организм переходит от пассивного состояния к активному (состоянию), его потребности меняются.</p> <p>3. The simplest atom is that of hydrogen. Самый простой атом – атом водорода.</p> <p>4. Plants are divided into two main groups, those that have flowers, and those that do not. Растения делятся на две основные группы, растения у которых есть цветы и растения, у которых их нет.</p>
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1. The mercury thermometer is more accurate than the alcohol one. 2. I don't like this test-tube. Can you give me another one? 3. It was necessary to use hydrochloric acid instead of sulphuric one. 4. Synthesis is the use of chemical reactions to build larger molecules from smaller ones. 5. Within six months or so, 90 percent of molecules that make up our bodies are replaced by the new ones. 6. Simple microscopes – ones with only one lens – are actually no more than the magnifying glasses. 7. A compound has properties that can differ from those of its component elements. 8. One of the periods in the history of chemistry was that of alchemists, 500-1600 A.D. 9. It is evident that the earliest known system of classification is that of Aristotle.

IMPERATIVE MOOD

The imperative sentences are sentences that give a command or make a request.

Stop doing the experiment. Clean the tables and carefully wash your hands.

Occasionally, to give emphasis, the addressee may be mentioned:

You follow my instructions, Jane.

Exercise 14. Ask your partner:

- to apply for the vacancy;
- to imitate the native speaker's pronunciation.
- to give comments on the project;
- to give your own point of view;
- to choose a better option;
- to reject the proposal.

Study negative imperative sentences:

Don't make such noise, stay calm.

Don't imitate others, be yourself.

Exercise 15. Ask your groupmate:

- not to butt in (вмешиваться в разговор);
- not to speak so loud;
- not to give advice if you are not asked for;
- not to accept the proposal;
- not to rely on that man;
- not to make a fool of oneself (ставить себя в глупое положение).

Exercise 16. Learn some of the informal uses of imperatives.

Think nothing of it. (acknowledging apology, thanks).

Do it my way. (advice).

(Do) forgive me. (apologizing).

Excuse me. (apologizing, starting to speak to a stranger).

Please do. (giving permission).

Look here. (attention-getting).

Tell me another. (disbelief).

Look out! / Watch out! (warning).

Take care. (saying farewell).

Check out! (focusing).

Imperative Mood in instructions and regulations.

Exercise 17. Read:**A. General Lab Safety Rules** and say if you always follow them.

1. Work in the lab when the instructor is present.
2. Walk! Do not run in the lab.
3. Do not eat, drink beverages, or chew gum in the lab.
4. Never taste chemicals.
5. Avoid contact with chemicals. Wear safety glasses whenever necessary.
6. Clean and dry your lab table.
7. Never rely on the shape, size or color of the bottle. Read the label.
8. Always wash hands after experiments.
9. Report any accident or injury to the instructor immediately.
10. Carefully follow all instructions.

B. The following instructions and translate them into Russian.**If you see the fire:**

1. Stay calm, don't panic.
2. Shut the door to the room with the fire.
3. Tell other people about the fire as soon as possible.
4. Leave the building immediately.
5. Do not run. Walk quickly but calmly.
6. Do not use lifts.
7. Move near the floor. The best air is at floor level.
8. Close all doors behind you.

Task: Make up instructions for the students (schoolchildren) working in the physics laboratory.

PART II. SPEECH PATTERNS

TALKING ABOUT THE TEMPERATURE.

I. Read the following short dialogues.

1. – What is the temperature today?
– It is ten degrees above zero Celsius (C).
2. – What will be the temperature tomorrow?
– It will be nine degrees above zero Celsius (Centigrade).
3. – What is the average winter temperature in Belarus?
– It ranges from five to eight degrees below zero Celsius (C).
4. – What's the average summer and winter temperature in London?
– Annual weather averages for London are from +60⁰ to +66⁰ Fahrenheit (F) (+16⁰ - +19⁰C) and -45⁰ Fahrenheit (-7⁰C).

above zero – выше нуля;

below zero – ниже нуля;
average – средний.

II. Ask your partner about the following using indirect questions. In your answer use the phrases: *As far as I remember...; If my memory serves me right...; I suppose that...; I'm not sure...; I don't know, I'm afraid.* The first question has been done for you.

5. – What is the average summer temperature in Egypt?
– I'd like to know what the average temperature in Egypt is?
– As far as I know, it is from +35⁰C to + 40⁰C.
6. – At what temperature are chemical reagents kept?
– Do you know at what ...?
7. – What is the boiling point of mercury?
– Do you remember ...?
8. – What is the solidifying point of mercury?
– Do you happen to know ...?
9. – At what temperature does water evaporate?
– Can you tell me ...?
10. – What is the sub febrile temperature of a man?
– I wonder ...?

PART III . VOCABULARY LEARNING

Exercise 1. Words to be remembered:

a) names of chemical substances and reagents:	
liquid	[ˈlɪkwɪd] <i>n., a.</i> – жидкость, жидкий;
reagent	[ˈriːeɪdʒənt] <i>n.</i> – реактив, реагент;
potassium	[pəˈtæsiəm] <i>n.</i> – калий;
ammonium	[əˈmɒniəm] <i>n.</i> – аммоний;
sodium	[ˈsəʊdiəm] <i>n.</i> – натрий;
alkali	[ˈælk(ə)laɪ] <i>n.</i> – щёлочь;
nitric	[ˈnaɪtrɪk] <i>acid</i> – азотная кислота;
sulphuric	[sʌlˈfjuːrɪk] <i>acid</i> – серная кислота;
hydrochloric	[ˈhaɪdrəˈklɔːrɪk] <i>acid</i> – соляная кислота, хлористоводородная кислота;
methylene green	[ˈmeθɪlɪːn ˈɡriːn] – метиленовый зелёный;
methylene blue	[ˈmeθɪlɪːn ˈbluː] – метиленовый синий;
phenolphthalein	[ˌfiːnəl ˈ(f)θaliːn, - ˈ(f)θeɪl-] – фенолфталеин;
mercury	[ˈmɜːkjəri] <i>n.</i> – ртуть; ртутный столб, температура или давление.
b) names of glassware and vessels:	
test-tube	[ˈtest ˈtjuːb] <i>n.</i> – пробирка;

flask [flɑːsk] <i>n.</i> – колба;
volumetric [ˌvɒljuˈmetrɪk] flask – мерная колба;
glass [glɑːs] <i>n.</i> – стакан;
measuring glass [ˈmeɪzərɪŋ ˈglɑːs] – мензурка;
glass cap [ˈglɑːs ˈkæp] – стеклянная крышка;
pipette [pɪˈpet] <i>n.</i> – пипетка;
funnel [ˈfʌnl] <i>n.</i> – воронка;
glassware [ˈglɑːswɛə] <i>n.</i> – стеклянная посуда;
retort [rɪˈtɔːt] <i>n.</i> – реторта;
graduated cylinder [ˈgrædʒueɪtɪd ˈsɪlɪndə] – мерный цилиндр;
burette [bjʊəˈret] <i>n.</i> – бюретка;
beaker [ˈbiːkə] <i>n.</i> – лабораторный стакан, мензурка.
c) <i>names of laboratory materials, instruments and equipment:</i>
separation [ˌsep(ə)ˈreɪʃ(ə)n] <i>n.</i> – отделение, разложение на части;
rack [ræk] <i>n.</i> – полка (узкая);
shelf [ʃelf] <i>n.</i> – полка,
pullout ~ выдвижная полка,
lipped ~ выступающая полка;
water supply [ˈwɔːtəsəˈplaɪ] <i>n.</i> – водопровод;
running water – проточная вода;
instrument [ˈɪnstrəmənt] <i>n.</i> – прибор;
tool [tuːl] <i>n.</i> – инструмент;
stand [ˈstænd] <i>n.</i> – штатив;
balance [ˈbæləns] <i>n.</i> – весы;
burner [ˈbɜːnə] <i>n.</i> – горелка;
scale [skeɪl] <i>n.</i> – шкала;
device [dɪˈvaɪs] <i>n.</i> – приспособление;
stopcock [ˈstɒpkɒk] <i>n.</i> – запорный кран, пробка;
stopper [ˈstɒpə] <i>n.</i> – пробка, затычка.
d) <i>names of processes and actions connected with the work in the laboratory:</i>
waste [weɪst] <i>n.</i> – отходы,
industrial wastes – промышленные отходы;
steam [stiːm] <i>n.</i> – пар, дым;
accessory [əkˈses(ə)rɪ] <i>a.</i> – вспомогательный;
weigh [wei] <i>v.</i> – взвешивать;
weight [weɪt] <i>n.</i> – вес;
record [rɪˈkɔːd] <i>v.</i> – регистрировать;
obtain [əbˈteɪn] <i>v.</i> – получать;
supply [səˈplaɪ] <i>v.</i> – снабжать;
clamp [klæmp] <i>v.</i> – скреплять;

melting-point [ˈmeltɪŋˈpɔɪnt]	<i>n.</i> – точка плавления;
boiling-point [ˈbɔɪlɪŋˈpɔɪnt]	<i>n.</i> – точка кипения;
amount [əˈmaʊnt]	<i>n.</i> – количество;
dissolve [dɪˈzɒlv]	<i>v.</i> – растворять (<i>ся</i>);
findings [ˈfaɪndɪŋz]	<i>n.</i> – данные;
measure [ˈmeɪʒə]	<i>v.</i> – измерять;
accurate [ˈækjʊrɪt]	<i>a.</i> – точный;
contamination [kənˌtæmɪˈneɪʃ(ə)n]	<i>n.</i> – загрязнение;
under the supervision	– под руководством;
safety [ˈseɪftɪ]	<i>n.</i> – безопасность, сохранность;
datum [ˈdeɪtəm] (<i>pl.</i> data)	– данная величина, данное;
calculation [ˌkælkjuˈleɪʃ(ə)n]	<i>n.</i> – вычисление; подсчёт, расчёт;
complete [kəmˈplɪ:t]	<i>v.</i> – заканчивать, завершать, комплектовать.

Exercise 2. Read the words of Latin and Greek origin and translate them.

Special [ˈspeʃ(ə)], laboratory [ləˈbɒrət(ə)rɪ], ventilate [ˈventɪleɪt], group [gru:p], analysis [əˈnæləsis], cylinder [ˈsɪlɪndə], pipette [pɪˈpet], accurate [ˈækjʊrɪt], experiment [ɪkˈsperɪmənt], apparatus [ˌæp(ə)ˈreɪtəs], instrument [ˈɪnstəmənt], thermometer [θəˈmɒmɪtə], accessory [əkˈses(ə)rɪ], material [məˈtɪəriəl], reaction [rɪˈækʃ(ə)n], separation [ˌsep(ə)ˈreɪʃ(ə)n], basic [ˈbeɪsɪk], function [ˈfʌŋkʃ(ə)n], category [ˈkætɪg(ə)rɪ], concept [ˈkɒnsept], component [kəmˈpəʊnənt], procedure [prəˈsɪːdʒə].

Exercise 3. Form the derivatives from the next words:

Model:	measure, measurment, measuring.
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Measure, volume, pharmacy, practice, chemist, equip, find, contaminate, boil, melt, determine, react, separate, clean, heat, work, harm, burn, observe.

Exercise 4. Make up word combinations and translate them into Russian.

to make	observations	scientific	methods
	discoveries		laws
	inventions		studies
	experiments		theories
	tests		research
	sure		achievements

			breakthrough
to do	research lessons one's work smb. good smb. harm one's best	accurate	measuring weight findings calculations analysis (es) instrument
to perform	Order promise experiment role play	safety	glass lamp equipment rules
to take	measurements temperature exams (credit- tests) for granted	general	glassware safety rules information subjects

Exercise 5. *Make up the word combinations:*

Practical, chemical, harmful, unpleasant, analytical, general, special, molecular, quantitative, greatest, essential, digital, graduated, accurate, efficient, basic, laboratory, working.

Conditions, classes, reaction, substances, accessories, odor, materials, work, thermometer, pipette, equipment, measurement, apparatus, accuracy, use, weight, analysis, glassware.

Exercise 6. *Translate the following word combinations:*

Different reactions; chemical substances; a room for carrying out experiments; a room for weighing; a room for storing substances; to ventilate a room; equipment of a laboratory; to carry out volumetric analyses; to measure a volume; accurate measuring; with the greatest accuracy; a specific volume; essential equipment; heating equipment; basic materials; laboratory accessories; non-essential things; steam-heated devices; to improve working conditions; to avoid injuries; the laboratory safety equipment; to influence the research work; melting-point; boiling-point; solidifying-point, quantitative analysis, digital instruments.

Exercise 7. *Answer the questions using the suitable alternatives.*

- Which of the glassware is used for measuring?
a) a pipette; b) a thermometer; c) a test-tube; d) a volumetric flask.

2. Which of the glassware is most widely used by pharmaceutical students during experiments?
a) test-tubes; b) retorts; c) funnels; d) flasks; e) burettes; f) pipettes; g) graduated cylinders.
3. Which of these are generally available for the students in the chemical laboratory?
a) slides; b) buffer solutions; c) alkali; d) scales; e) scissors; f) litmus; g) microscope; h) distillators.

PART IV. READING COMPREHENSION

Read and translate text 1.

Text 1

IN THE CHEMICAL LABORATORY

The chemical laboratory is a place where you can perform *in actual* the different reactions that you had learnt in the books or heard in lectures. The students of the pharmaceutical faculty often have practical classes in chemistry in the chemical laboratory. There they carry out various experiments, work with different chemical substances.

The chemical laboratory consists of several *rooms*: a room for storing the necessary substances, a room for recording the obtained findings and a room for washing laboratory vessels. These rooms are large and light, well ventilated because chemists often work with harmful substances that have a strong and unpleasant odor.

A good chemical laboratory is fully equipped with the basic measuring and analytical apparatuses that allow a good study of all the branches of chemistry. However all experiments should be performed under the supervision of the lab instructor only.

The laboratory is equipped with special tables which are higher than usual ones. On each of the tables one can see shelves and racks with laboratory vessels and glassware of all kinds, some of them are empty, while others contain the reagents.

The most widely used *reagents* which are available at every laboratory are: acids (nitric, sulphuric, and hydrochloric); alkali (ammonium solution, potassium solution, sodium solution); oxides, inorganic salts, indicators (phenolphthalein, methylene green).

Reagents which are used in large amounts are supplied in big boxes or bottles. Reagents which are seldom used are supplied in amounts up to 10 or 11g or even less.

The most common and widely used equipment is that made of glass. With glassware it is easy to spot what is happening inside. The laboratory vessels and glassware are divided into three groups: *glassware for general use*, *glassware for special use*, and *glassware for measuring*. *Glassware for general use* includes test-tubes, funnels, flasks of different shape and size, retorts, etc. *Special glassware* includes things necessary for carrying out different analyses. For example, special vessels for determination of molecular weights, for the determination of melting- and boiling-points, etc. *The glassware for measuring* includes graduated cylinders, burettes, graduated flasks, measuring glasses, pipettes and others. *Burettes* are used for very accurate measurements of volumes, as in volumetric analysis. *Volumetric flasks* are used to measure specific volumes accurately, especially for preparing solutions in quantitative analysis. *Pipettes* provide a means for greatest accuracy in measuring volume. *Thermometers* and pipettes are essential equipment for many chemistry laboratories. There are the standard lab thermometers for traditional measurements or the digital instruments for very accurate and easy recording of temperature or pH level. The simplest and most common of all is a liquid thermometer. Mercury is a particularly suitable liquid because of its high boiling-point – +357,25°C, and its low solidifying-point – -39°C. The mercury thermometer is more accurate than the alcohol one. *Graduated pipettes* allow for very accurate liquid measurements. A *balance* is used to measure out small amounts of chemicals.

Laboratory heating equipment is used to generate the heat required to effect a reaction or a separation. The broad range of heating equipment can be divided into two broad categories: steam-heated devices and electrically heated devices.

There are many types of materials that are not basic but are not less important than basic. They are called *laboratory or lab accessories*. They may include pullout shelves, lipped shelves, laboratory stands, clamps, stopcocks or laboratory stoppers.

The laboratory stands are used to hold test tubes, beakers, etc. Laboratory clamps are used to hold the apparatus.

The work in the chemical laboratory requires cleanliness. It is necessary to keep the working place clean. Glass tubes, vessels, bottles, funnels, etc. should be clean and ready for use. It is recommended to close the glass bottles with glass caps to prevent their contamination from air.

Exercise 1. Find the corresponding definitions.

1. test- tube	a) a thing that burns or works by heat.
2. glassware	b) a substance used to show the presence of another by reaction.

3. funnel	c) a glass tube closed at one end, used in chemical experiments.
4. reagent	d) tools and instruments that help in performing and improving the core function.
5. burner	e) a thing that is used to hold test-tubes, beakers.
6. accessories	f) things made of glass.
7. stand	g) a vessel wide and round at the top and narrowing to a small tube at the bottom used for pouring liquids into a small opening.

Exercise 2. Match the English word combinations with the Russian ones:

1. is equipped with	a) хорошо проветриваются;
2. is performed under the supervision	b) воздействует;
3. are divided into	c) должны быть чистыми;
4. are used for	d) будет выполняться;
5. is recommended	e) требуются;
6. should be clean	f) рекомендуется;
7. are required	g) выполняется под руководством;
8. is affected by	h) делятся на;
9. will be carried out	i) оснащена;
10. are well ventilated	j) используются для.

Exercise 3. Fill in the gaps with the verbs in a corresponding form: **perform, recommend, allow, equip, use, include, divide, influence.**

1. A good chemical laboratory is ...with the basic measuring and analytical apparatuses.
2. All the experiments should be ...under the supervision of the lab instructor.
3. The laboratory vessels and glassware are ...into three groups.
4. Special glassware ...things necessary for carrying out different analyses.
5. Burettes are ...for very accurate measurements of volume.
6. Graduated pipettes ...for very accurate liquid measurements.
7. Certain tools and instruments do not directly ...the research work in a laboratory.
8. It is ... to close the glass bottles with glass caps to prevent their contamination from air.

Exercise 4. Give English equivalents to the given word combinations.

Выполнять различные эксперименты, полученные данные, работать с химическими веществами, хорошо проветриваемая комната, сильный и

неприятный запах, лабораторная посуда всех видов, специальные сосуды, измерять специфический объем, основное (вспомогательное) оборудование, цифровой термометр, точное измерение, нагревательное оборудование, вырабатывать тепло, эффективно выполнять работу, основные материалы, улучшать процесс работы в лаборатории, сохранять рабочее место в чистоте, закрывать бутылки стеклянными крышками.

Exercise 5. *Complete the following sentences according to the text.*

1. In the chemical laboratory the students carry out 2. The rooms of the chemical laboratory are 3. A good chemical laboratory is fully equipped with 4. The most common and widely used equipment 5. With glassware it is easy to 6. The broad range of heating equipment 7. There are certain tools and instruments 8. Laboratory accessories may include 9. The work in the chemical laboratory requires

Exercise 6.

A. *Answer the questions to the text.*

1. Where do pharmacy students have practical classes in chemistry?
2. What kind of place is a chemical laboratory?
3. How many rooms does a typical chemical laboratory consist of?
4. What is the most common equipment in the laboratory?
5. What groups is all the glassware divided into?
6. What vessels does the glassware for measuring include?
7. What vessels does the special glassware include?
8. Why is it necessary to close the glassware with glass caps?
9. Does the work in the laboratory require cleanliness? Why?

B. *Name all types of equipment that you can find in the laboratory.*

C. *Explain the use of different types of equipment (burettes, volumetric flasks, thermometers, a balance, heating equipment, laboratory stands (clamps)).*

Exercise 7. *Translate into English.*

1. На полках в химической лаборатории можно видеть все необходимые для опытов реактивы. 2. Во время работы в лаборатории студенты часто используют стеклянную посуду всех видов. 3. Шкалу Фаренгейта стали использовать в науке в 18-м веке. 4. Комнаты лаборатории должны хорошо проветриваться, т.к. химики часто работают с вредными веществами, имеющими неприятный запах. 5. Хорошая химическая лаборатория полностью оснащена основными измерительными приборами и инструментами. 6. Когда мы проводим измерения, мы пользуемся различными измерительными приборами: мерными колбами, пипетками,

бюретками, термометрами, весами. 7. Вспомогательное оборудование используется для улучшения условий работы в лаборатории. 8. Работа в химической лаборатории требует знаний об условиях эксперимента и соблюдения определенных правил.

Exercise 8. Read the text “*THERMOMETER SCALES*” and say:

1. What thermometer scales were established? 2. Who proposed them? 3. What was taken as limits? 4. What limits are for each of the scales?

THERMOMETER SCALES

The concept of temperature variation dates from antiquity, although early measurements were based solely on the subjective sense of touch. Touch is only capable of detecting temperature differences between objects; it cannot provide quantitative temperature data. For example, you may be able to tell if a person has a fever by placing a hand on his forehead (лоб), but exactly how high is the fever? That question requires quantitative data; our senses can mislead us, but a thermometer can give us that data.

Gabriel Fahrenheit (German, 1686-1736) devised (придумывать, изобретать) the Fahrenheit scale, the oldest common temperature scale, in about 1714. (Prior to this, Galileo Galilei had invented an open tube thermometer in about 1593.) One of Fahrenheit's innovation was to use mercury (ртуть), which made the liquid column easy to see. Previously, people had had difficulty sealing mercury-containing tubes.

Fahrenheit established his temperature scale by selecting reference points (ориентиры) he could reproduce. He designated (обозначать) a freezing ice-snow-salt-water mixture as 0°F because this was the lowest temperature he could create in his workshop. Several stories purport (иметь целью) to explain his selection of the reference point for 100°F; my favorite is that he selected the body temperature of a cow, a measurement that interested him and others in the agricultural community. Starting with these primary reference points, Fahrenheit determined values of 32°F for the freezing point and 212°F for the boiling point of water.

Anders Celsius (Swedish astronomer, 1701-1744) developed a different thermometer scale in 1742. Celsius designated the freezing and boiling points of water as 0°C and 100°C, respectively. His scale was originally called the Centigrade scale because *centi* means 1/100th part, and the reference points span 100 degrees. The Celsius scale has been adopted worldwide and is the official metric temperature scale.

The third temperature scale was the invention of Englishman **Lord Kelvin** (born William Thompson, 1824-1907). Lord Kelvin devised his scale in 1848. It is identical to the Celsius scale, but all temperatures are 273 degrees higher. Thus,

the freezing point of water is 273 degrees K, the boiling point 373 degrees K. This thermometer scale was derived from (устанавливать, выводить) observation of gases.

Exercise 9. Translate the following passage using a dictionary.

THE MICROSCOPE

1. The most important single piece of apparatus in a laboratory is the microscope, and it must be used and cared for accordingly. 2. It is used to magnify and to make visible to the eye very small bodies, such as bacteria, the eggs of intestinal parasites, and the material found in urine sediments. 3. A simple microscope is nothing more than a single magnifying lens. 4. A compound microscope, which is the type used in medical laboratories, consists of a number of such lenses arranged in line so as to give a very great magnification. 5. Complete and detailed descriptions of microscopes may be found in all books on laboratory work. 6. Before attempting to use a microscope for the first time one should read over a description of its parts and their functions in order to adjust the light and the lenses properly. 7. There are a few important things to keep in mind regarding its use, and they are: never leave the microscope exposed to direct sunlight, excessive heat, or splashing water; never use ether, alcohol or xylol to clean it; never pick it up by any of the movable parts; never leave immersion oil on the lens or objective, as it is called, but wipe it off immediately after use with a fine, soft cloth or with special lens paper; when not in use see that it is well covered to protect it from dust.

Read Text 2 and be ready for a comprehension check-up.

Text 2

CHEMISTRY: AN EXPERIMENTAL SCIENCE

Chemistry deals with all substances that make up our environment. It also deals with the changes that take place in these substances – changes that make the differences between a cold and lifeless planet and one that teems* with life and growth. Chemistry helps us understand and benefit from nature's wondrous* ways.

Chemistry is an important part of science. Since every phase of our daily life is affected by the fruits of scientific activity, everyone should know what scientific activity is, what it can do, and how it works. The study of chemistry helps you learn these things. The most enjoyable part of chemistry is

experimentation. Unifying principles are developed, with the laboratory work providing the basis for the development. To see these principles* grow out of observations you have made in the laboratory gives you a valid* picture of how all scientific advances begin. It permits you to engage in scientific activity and to start becoming a scientist yourself.

Most of the students will not become scientists. But all of you live in a world greatly influenced by science. You will read the newspapers about many scientific advances, and sometimes you will be asked to vote on important technical subjects. You will be asked to consider the effect of aerosol sprays on the earth's atmosphere, cancer-producing chemicals in water supplies*, the bad effects of industrial wastes, and the advantages* and possible dangers of nuclear power production. All these are important problems that require two major efforts. First, scientists must collect enough good information so that the real danger and possible solutions are known. Second, a political decision has to be made* about what society wants. Every citizen should be involved in the second effort. For this reason it is important to understand how scientists go about solving problems. To understand the world, a scientist: 1. *Makes experiments and gathers information through observation.* 2. *Organizes this information and looks for regularities.* 3. *Wonders why the regularities exist.* 4. *Communicates the findings to others.*

These are the basic activities of science. Observation is the starting point. Observation is most useful when the conditions which affect the observation are controlled carefully. A condition is controlled when it is fixed, known, and can be varied deliberately*. All science is built upon the results of experiments performed under controlled conditions. Regularities provide an efficient way to summarize the results of many experiments and also allow us to predict the results of experiments that we have not carried out before. The fourth activity of science is the most important one of all. It is only through communicating ideas to others that a strong framework* can be provided for science. Experimental results must be confirmed and explanations* must be tested by others. If it were not for* this aspect of science, each generation of scientists would have to start from the beginning.

Notes:

- * deal with – рассматривать вопрос;
- * teem – кишеть, изобиловать;
- * wondrous – удивительный, чудесный;
- * to see these principles – понимание этих принципов;
- * water supplies – водоснабжение;
- * advantages – преимущества;
- * has to be made – необходимо принять (решение)
- * valid – действительный, обоснованный;
- * wonder – интересоваться, желать знать;

- * deliberately – обдуманно, осторожно;
- * framework – структура;
- * explanations – толкования;
- * if it were not for– если бы не.

Exercise 1. Find in the text English equivalents for the following word combinations:

Научная деятельность, вовлекать в научную деятельность, научный прогресс, научное наблюдение, собирать информацию посредством наблюдения, возможное решение, решать проблемы, заниматься решением проблем, проводить эксперименты в контролируемых условиях, промышленные отходы, оценить действие аэрозольных спреев на атмосферу планеты, производство ядерной энергии, обобщать информацию, искать закономерности, передавать данные экспериментов, знать возможные решения, эффективный способ, подтверждать результаты эксперимента.

Exercise 2. Look through the text and find the sentences in which Participle II and the verbs in the Passive voice are used. Translate the sentences.

Exercise 3. Agree or disagree with the following statements. Use the phrases: *I suppose (think) so. That's true. Exactly so. I don't think so. I'm afraid I can't agree with you. I don't believe that.*

1. Chemistry is not a very important science.
2. The most enjoyable part of chemistry is the study of theory.
3. The observations made in the chemical laboratory help understand how all scientific advances begin.
4. Most of the students will become scientists.
5. You must be involved in a political decision about what society wants.
6. It is not important for every citizen to consider the problems of the world.
7. To understand the world a scientist makes experiments and gathers information.
8. All science is built on the results of experiment.
9. Observation is the most important one of all.

Exercise 4. Answer the following questions:

1. What does chemistry deal with?
2. What does the study of chemistry help you learn?
3. What is the most enjoyable part of chemistry?

4. What gives you a valid picture of how all scientific advances begin?
5. Is it necessary to become a scientist to understand the world problems?
6. How does a scientist solve the problems?
7. What is the base of all science?
8. What do the regularities provide?
9. Why are communicating ideas so important for scientists?
10. Are you thinking of becoming a scientist? If yes, why?
11. What principles can you use in your work in the chemical laboratory?

Text 3

*HOW TO PREPARE FOR CHEMISTRY LAB **

Read the title of the text and say what this text will be about? Read the text and do the tasks which follow it.

Chemistry lab is a required component of most chemistry courses. Learning about lab procedures and performing experiments helps you to learn techniques and reinforces textbook concepts.

1. Make the most of* your time in the lab by coming to lab prepared. Review these pre-lab tips before starting an experiment. Complete any pre-lab assignments or homework. The information and calculations are intended to make the lab exercise quicker and easier.
2. Know the location of the lab safety equipment and understand how to use it. In particular, know the location of the emergency exit, fire extinguisher, eye-wash station and safety shower.
3. Read through the experiment before going to lab. Make sure you understand the steps of the experiment. Jot down* any questions you have so that you can ask them before starting lab.
4. Start filling out your lab book with information about the experiment. It's a good idea to draw out your data table in advance so all you need to do in lab is to fill it in with numbers.
5. Review the Material Safety Data Sheets* (MSDSs) of the chemicals you will be using during the lab.
6. Make certain you have all the glassware, materials and chemicals needed to complete the lab before starting any part of the procedure.
7. Understand disposal* procedures for the chemicals and other items used in your experiment. If you are unclear about what to do with your experiment after it has been completed, ask your instructor about it. Don't throw items in the trash or dump liquids down the drain* or waste disposal containers until you are certain it is acceptable to do so.

8. Be prepared to take data in the lab. Bring your notebook, a pen and a calculator.
9. Have personal safety gear*, such as a lab coat and goggles*, clean and ready to use before lab.

Notes:

- * make the most of – полностью (максимально) использовать
- * chemistry lab = laboratory work in chemistry;
- * jot down = put down in short;
- * sheets = tables = charts;
- * disposal – избавление, удаление;
- * drain – водосток;
- * gear – одежда;
- * goggles – очки.

Exercise 1. Find in the instruction sentences in Imperative mood and translate them.

Exercise 2.

A. Answer the following questions.

1. What is necessary to know before starting an experiment?
2. What kind of experiments do you carry out in the chemical laboratory?
3. Is it necessary to use any equipment in the experiments? What type of equipment?
4. What must you know about safety equipment and safety data?

B. Find in this instruction some rules of work in the laboratory. Do you agree that these rules help you perform your experiments successfully? Support your answer with some arguments.

Exercise 3. Look through the text again and summarize in your own words how students are supposed to prepare for the chemistry lab. Use the following phrases:

Firstly, secondly, thirdly ...

Everybody should know ...

It is necessary (important) to ...

It is evident that ...

Not less important is ...

Thus, these are ...

Use the following key words: pre-lab assignment; to use lab safety equipment; to understand the steps of the experiment; to fill out a laboratory book; to have necessary glassware, materials and chemicals; to know disposal procedures for

the chemicals; after the experiment; to take data in the lab; to use clean lab coat and goggles.

Exercise 4. Tell your groupmates how you prepare for your chemistry lab.

PART V. RENDERING

Read the following information and render it into English.

ВЫБИРАЕМ ТЕРМОМЕТР

Измерить температуру у ребенка – задача не из легких, Не удивительно, что современные модели термометров, которые позволяют измерить температуру буквально за секунду, пользуются таким спросом.

И все же, несмотря на все достижения науки и техники, старые ртутные (mercury) термометры остаются самыми точными (accurate) и самыми дешевыми. И, к великому сожалению, самыми опасными (dangerous), особенно когда речь идет о детях. Разбить хрупкий (fragile) стеклянный корпус (coating) ничего не стоит, но избавиться (dispose) потом от ртутных шариков, мгновенно, зная, что испарения (evaporation) этого металла смертоносны (fatal), – очень сложно. Кроме того, чтобы достоверно узнать температуру, ртутный термометр нужно держать под мышкой (under the armpit) (или в анальном отверстии (anus)) не менее пяти минут, а то и все десять.

Цифровые (digital) термометры – другое дело. Потребуется (it will take) всего лишь 3 минуты, чтобы измерить (to take) температуру, а для некоторых людей даже полторы. Наряду с этим замечательным преимуществом (advantage) они обладают массой дополнительных возможностей (additional functions): запоминают предыдущие (previous) значения температуры (readings), звуком сообщают о готовности к работе и о том, что градусники пора вынимать (get out of), автоматически выключаются (switch off) и зачастую снабжены подсветкой (illumination), чтобы использовать прибор ночью, не доставляя неудобств (disturb) другим членам семьи.

Для самых маленьких пациентов изобрели термометр-соску (soother). К сожалению, показания такого термометра могут быть не очень точными (accurate), особенно если малыш плачет или дышит (breathe) ртом.

Еще одно полезное изобретение – цифровой индикатор. Но индикатор – он и есть индикатор, то есть дает приблизительные (approximate) данные (data) о температуре.

Самые удобные модели – ушные (aural) инфракрасные термометры. Одно плохо – эта почти фантастическая новинка отличается и фантастически высокой ценой (high price).

PART VI. SPEAKING

Exercise 1. Read and say which of the following statements are interpretations rather than observations?

- a) Gases are made of tiny particles in random (беспорядочный) motion.
- b) Gases fill their container.
- c) A gas can be compressed.
- d) Some gases are colored.
- e) The particles that make up a gas are far apart.

Exercise 2. Comment on the following. Make use of the introductory phrases: ***In my opinion ...; As far as I know...; I believe/suppose...; It is said that...***

1. Chemists often function as detectives with molecules as their suspect. Each molecule can be identified by its own unique behavior.
2. To learn the nature of chemistry is possible only through your own experience.
3. "... those sciences are vain (пусты, напрасны) and full of errors which are not born from experiment, the mother of all certainty..." Leonardo da Vinci.

Exercise 3. Prove that:

1. A well- equipped laboratory is the base for every successful experiment.
2. Lab accessories are not less important than basic ones.
3. The work in the chemical lab requires cleanliness.

Exercise 4. Ask your groupmates questions concerning:

- the organization of a chemistry laboratory;
- the equipment of a laboratory;
- the instruments and tools;
- the laboratory glassware;
- the rules of work in the laboratory.

Exercise 5. Get ready to speak on the topic "In the chemistry laboratory" using exercise 4 as an outline.

SECTION 4

ORAL TOPIC: CHEMICAL ELEMENTS

Grammar: Pronoun “it” and its functions. Participle I (Present Participle). Continuous Active and Passive voice.

PART I. GRAMMAR PRACTICE

PRONOUN “IT”

Table 1

ФУНКЦИИ	УПОТРЕБЛЕНИЕ	ПРИМЕР	ПЕРЕВОД
Личное местоимение (он, она, оно, его, ему, им, ее, ей, ею).	Вместо неодушевленных существительных в качестве подлежащего или дополнения.	Special branch of chemistry studies carbon compounds. It is called organic chemistry. We study it in the second year.	Специальный раздел химии изучает углеродные соединения. Он называется органической химией. Мы изучаем ее на втором курсе.
Указательное местоимение (это).	Подлежащее утвердительного предложения.	It is pure water in the glass.	Это чистая вода в стакане.
Формальное (служебное) подлежащее в безличных оборотах неопределенно-личных предложениях	Как вводящее инфинитивную фразу после оценочных прилагательных.	It is not easy to carry out this experiment.	Этот эксперимент выполнить нелегко.
	Как вводящее придаточное предложение после оценочных прилагательных.	It is possible that the reaction will require special conditions.	Возможно, что реакция потребует специальных условий.
	Как вводящее придаточное предложение после сказуемого в форме страдательного залога.	It is reported that two million carbon compounds were described in literature.	Сообщается, что 2 миллиона углеродных соединений было описано в литературе.

Эмоционально- усилительная	В конструкции It is (was) ... that (who) для выделения любого члена предложения кроме сказуемого.	It was D.I. Mendeleyev who arranged all chemical elements in the table of elements	Именно Д.И. Менделеев расположил все химические элементы в таблице элементов.
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Exercise 1. Read the sentences. Translate them. Define the function of the pronoun "it".

1. Sodium, a silver-coloured metal, is very soft. It is also known that it is a very reactive substance. 2. The river or lake water is a mixture of substances, some dissolved in it, others suspended in it. 3. It is generally recognized that the primeval life forms developed in the waters of the earth. 4. It is necessary to store the buffer solution in a dark place. 5. It was commonly believed that milk contained an acid. 6. To demonstrate coagulation he diluted milk with a little water, brought it to the boiling-point, and to portions of it added various mineral acids. 7. It is recommended to close the glass bottles with glass caps.

Exercise 2. Read the sentences containing the construction **it is (was) ... that (who)** and translate them into Russian.

1. It was in the second half of the 19th century that chemistry began its rapid growth.
2. It is in the chemical laboratory that the students learn to carry out different experiments in chemistry.
3. It was Marie Curie who won two Nobel Prizes in Physics (1903) (together with her husband Pierre Curie) and in Chemistry (1911).
4. It was Peter I who with his decree laid the foundation of pharmacy as a branch of science in Russia.
5. It is pharmacology that is having so great an effect on medicine today.
6. It was the Emperor of Holy Rome who separated pharmacy from medicine.
7. It was the Medical Act of 1540 that permitted practice of medicine by any person having the experience, or knowledge of herbs, roots, or waters.
8. It was only after gallium, scandium and germanium were discovered and after the properties of a number of elements predicted by Mendeleyev were confirmed that Mendeleyev was recognized as the author of the Periodic Law.

PARTICIPLE I

Table 2

Функции	Пример	Перевод
определение (attribute)	The element <u>forming</u> this compound is easily oxidized.	Элемент, <u>образующий</u> это соединение, легко окисляется.
обстоятельство (adverbial modifier) с союзами <i>if, while</i> (with the conjunctions <i>if, while</i>)	<u>Distilling</u> water we produce a pure substance. While <u>boiling</u> the mixture he used special chemical glassware.	<u>Дистиллируя</u> воду, мы производим чистое вещество. <u>Во время</u> кипячения смеси он пользовался специальной химической посудой.
составная часть глагола сказуемого (part of a predicate) (Continuous Active and Passive voice, Perfect Continuous)	The 5 th year students are <u>acquiring</u> now practical skills in preparing medicines at the chemist's.	Студенты пятого курса приобретают сейчас практические навыки приготовления лекарств в аптеке.

Exercise 3. Read and translate the following word combinations containing Participle I and Participle II

a) as an attribute:

burning sulfur, drinking water, a mixture placed in a cool place, a very low boiling point of liquid air, a colorless liquid boiling at about 190° C, a table consisting of vertical groups, the number of elements discovered, educational establishments training pharmacists, chemists contributing to the development of science, elements introduced by Empedocles, scientists discovering new elements and their properties, the lightest gas known, strong acidifying agents, crystallized form, the hardest natural substance known.

b) as an adverbial modifier:

while carrying out the test, when passing through liquid air, while repeating the operation several times, when heated strongly under certain conditions, while making X-ray pictures, when boiled with dilute nitric acid, when mixed with air and oxygen, while preparing the solution.

Exercise 4. Translate the following word combinations with Participle I or Participle II into Russian.

Известные всем факты; взятая ею пробирка; ученые, проводящие эксперимент; Менделеев, располагая элементы в таблице; используемый в фармации опыт; таблица, состоящая из вертикальных групп; вещества, встречающиеся на земле; жидкость, закипающая при температуре;

используя различные методы; тестируемый раствор; хорошо известный факт.

Exercise 5. *Translate the following sentences and define the functions of Participle I.*

1. Solutions of acids have a sour taste and produce a burning feeling when they touch skin.
2. Oxygen is a highly reactive substance, readily combining with many other elements in the process of oxidation.
3. Using different methods chemists isolated and identified about six million substances.
4. In naturally occurring compounds, boron exists as a mixture of two stable isotopes with atomic weights of 10 and 11.
5. An atom is a basic structural unit of the matter, being the smallest particle of an element that can enter into chemical combination.
6. While establishing impurities it is necessary to use special methods.
7. An isotope of a chemical element consists of atoms having the same number of neutrons.
8. While burning, magnesium emits large quantities of ultraviolet rays and heat.

Exercise 6. *Insert the forms of the Present or the Past Participle using the verbs given in brackets. Translate the sentences into Russian.*

1. Alcohol is a colorless liquid (to have) characteristic odor.
2. Ethyl alcohol is a colorless liquid the (to boil) point of which is 78°C.
3. In the laboratory work the students used test-tubes, (to graduate) cylinders and other glassware.
4. Hydrochloric acid if not (to use) with great care may cause burns.
5. A committee (to consist) of 4 members was formed to hold the meeting.
6. Free phosphorus combines directly with many simple substances, (to give) a large amount of heat.
7. The Periodic Law allowed D.I. Mendeleev to put into one orderly table almost all (to know) chemical elements.
8. Add 3 ml of hydrochloric acid while (to carry out) the test.

CONTINUOUS (ACTIVE VOICE)

Table 3

P R E S E N T	I	am working	in the laboratory now.
	Now the process of crystallization	is taking place	in this test-tube.
	Modern chemistry and biology	are developing	very quickly at present.
P A S T	She	was sitting	in the lecture hall and writing something in her note-book.
	The students	were making	their experiments from 12 till 2 p.m.
F U T U R E	I	will be waiting	for you in the reading hall at 5 p.m.
	He	will be preparing	for his class in chemistry all day tomorrow.

Time markers:

Present – now, at the present moment, all day long, the whole week (month, year);

Past – at 7 o'clock, at that moment, from 7 till 8 last evening, when I came, while, all day long, the whole week (month, year);

Future – at 7 o'clock tomorrow, when I come, while.

Mind verbs which do not take Continuous Tense: to know, to understand, to believe, to doubt, to like, to love, to hate, to remember, to seem, to belong, to mean, to want, to wish, to see, to hear, to prefer, to have, etc.

Exercise 7. Read and translate the following sentences. Define the tense form of a predicate in each sentence.

1. Ancient men knew and used at least 12 elements. 2. Many articles are published each year in the scientific journals. 3. Pharmacists are working at a number of research projects. 4. When the assistant entered the laboratory the students were still fulfilling their task. 5. She is preparing for her laboratory work in organic chemistry that will take place in our chemical laboratory

tomorrow. 6. The plants which we used in this test were growing under special conditions. 7. Did you pass all the examinations successfully?

Exercise 8. Combine the following sentences as in the model using *Present Continuous* or *Past Continuous*.

Model 1:	One student speaks (spoke). The other students listen (listened) to him. While one student is (was) speaking , the other students are (were) listening to him.
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1. The professor delivers a lecture. The students take notes.
2. One student reads the text. The other student translates it.
3. Some students make experiments. The other students record their findings.
4. Some students take their exams. The other students wait their turn.
5. The students wait for the lecture to begin. The instructor gets ready some slides for demonstration.
6. One student shook the solution before heating it. The other student prepared the burner.
7. The student put down the results of the experiment. The laboratory assistant checked them up carefully.

Model 2:	She left the anatomical theater. Her groupmates worked there. When she left the anatomical theater, her groupmates were still working there.
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1. We came into the office. Our colleagues discussed the problem.
2. The doorbell rang. We had dinner.
3. You called for my sister. She took a walk with a dog.
4. My friends visited me. I revised for the exams.
5. I left the hostel. My roommates cooked dinner.
6. He arrived at the station. The passengers waited for the train to come.
7. I left the university. The students of our group took the credit-test in chemistry.

Exercise 9. Make up questions to these answers as in the model.

Model:	Who _____? I'm meeting my colleague. Who are you meeting tonight?
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1. Where _____? My colleague works in the central scientific laboratory.

2. How _____? Students come to the university clinic by bus.
3. Which _____? I'm working the night shift tomorrow.
4. What _____? She is washing the laboratory vessels now.
5. What time _____? Our classes begin at 8 o'clock.
6. What _____? I'm going to check the obtained data.
7. How _____? I'm not feeling well today.

Exercise 10. *Choose the correct tense.*

1. When *do you/are you going* to get an appointment with the doctor?
2. She *doesn't use /isn't using* this method in her practical work.
3. What *are you doing/do you usually do* when you have a high temperature?
4. We *were gathering/gathered* medicinal plants when it started to rain.
5. While she *was planting/planted* flowers, her daughter was watering them.
6. This time next Friday we *will be making /will make* a report.
7. Mikhail *is working/works* in the pathology laboratory at the Regional Hospital.
8. My friend *enjoys/is enjoying* his work though sometimes he is working */works* at weekends.

Exercise 11. *Complete the situation.*

1. Tomorrow when I come to the University I know that my group mates:
 - a) будут повторять правила;
 - b) будут готовиться к контрольной работе;
 - c) будут выполнять тесты в компьютерном классе;
 - d) будут слушать лекцию по неорганической химии;
 - e) во время перерыва будут разговаривать по мобильному телефону с друзьями;
 - f) во время перерыва будут перекусывать (to have a snack) в столовой.

Exercise 12. *Open the brackets and put the verb in the proper tense form (Indefinite or Continuous Active voice).*

1. A stable balance between acids and bases in the body (to be) essential to life.
2. Many science articles (to appear) each year in the medical journals.
3. The scientists of VSMU (to work) now on a number of research projects.
4. In his first article D.I. Mendeleev (to point out) the similarities of a number of properties of certain elements and (to change) the order of atomic weights where necessary.
5. The atoms of radioactive elements such as uranium and radium are very unstable; they continuously (to break apart).
6. In the second half of the 19th century, modern botany (to develop) rapidly and (to branch) into many specific

fields. 7. If we change the conditions of the experiment, the findings (to be different).

CONTINUOUS (PASSIVE VOICE)

Table 4

P R E S E N T	Chemical analyses	are being performed	at the Pharmaceutical faculty during the whole course of study.
	New scientific experiment	is being prepared	in the laboratory of organic chemistry now.
P A S T	The students	were being examined	from 9 a.m. till 3 p.m. yesterday.
	The exhibition of economic achievements	was being taken place	in various cities of Belarus.

Exercise 13. Read the sentences and translate them into Russian. Define the tense form of a predicate in each sentence.

1. Now the volumetric analysis is being carried out in the chemical laboratory.
2. Yesterday at 6 o'clock the solution was being boiled in the water-heater system.
3. Tomorrow at 2 o'clock plant constituents will be extracted using water.
4. When the professor came, the examination questions were being distributed among the students by the assistant.
5. Yesterday at 5 p.m. a very important problem was being discussed at the meeting.
6. Chemical laboratories are equipped with different instruments and apparatuses.
7. Some herbal preparations which were known to primitive men are still used at present in a modified form.
8. Drug effects will be described after a number of experiments.

Exercise 14. You have just entered the chemical laboratory. The work in the lab is practically over. What is being done by the students at their working places? Make up sentences in Present Continuous Passive voice using the following word combinations:

to wash the laboratory glassware, to put away the reagents, to close the bottles containing reagents with caps, to put safety glasses in their proper place, to clean and to dry the lab tables, to wash hands with running water after work.

Exercise 15. Read the following sentences and rewrite them in *Passive voice*:

Model:	The nurse is sterilizing a new set of instruments. A new set of instruments is being sterilized by the nurse.
---------------	--

1. They are washing the glassware and cleaning the lab tables now.
2. The laboratory assistant was preparing the manganese solution when the telephone rang.
3. The students are taking notes of the lecture now.
4. We were carrying on the experiment when the lights went down.
5. He was learning Latin terms the whole evening.
6. Tomorrow at 5 o'clock I will be delivering lecture on inorganic chemistry.
7. Yesterday at 9 o'clock the students were identifying herbs.

Exercise 16. Answer the questions either in *Present or Past Continuous Passive voice*, using the word combinations in brackets.

Model:	What is going on in the laboratory? (to carry on the experiments). The experiments are being carried on here.
---------------	--

1. Why is your friend in hospital right now? (to treat for acute poisoning).
2. What is going on in the assembly-hall now? (to hold a meeting of the pharmaceutical faculty).
3. Who is being examined in the classroom? (the second-year pharmacy students).
4. What is being demonstrated by the lecturer? (a new video film).
5. What television program was being watched when you entered the room? (a talk-show devoted to the problem of high school reform).
6. What sort of problems were being discussed when you joined the conversation? (problems concerning general lab safety rules).
7. Why is student X. absent? (to be examined by the doctor for his burn on the arm).

PART II. SPEECH PATTERNS

Present Continuous and Present Indefinite for the future actions.

Farewell.

I. Practise the dialogues paying attention to the use of Present Continuous and Present Indefinite for the future actions.

I

A: I've come to say good-bye.

B: When are you leaving for Minsk?

A: I'm **going** home tomorrow.

B: Good-bye then, and all the very best.

A: Cheerio. Say good-bye to the rest of the family for me, will you?

II

A: I'd like to say good-bye to you.

B: When are you off?

A: My coach **leaves** at 8 a.m.

B: Good-bye and have a nice trip.

A: Good-bye. All the best.

III

A: I'm ringing to say good-bye.

B: When **are** you **setting off**?

A: I'm **catching** the 10.25 train.

B: Good-bye and keep in touch.

A: Good-bye. Thanks a lot.

IV

A: I've just dropped in to say good-bye.

B: What time **are** you **leaving**?

A: I'm **going** to try to get away by ten.

B: Good-bye. My best regards to your parents.

A: Good-bye. See you next year.

to be off	отправляться;
all the best;	всего хорошего;
remember me to your parents	передай привет своим родителям;
to set off	уезжать, отправляться;
I'm catching the 10.25 train	я отправляюсь поездом в 10.25;
to keep in touch	зд.: сообщить о себе (досл.: держать связь);
to drop in	заходить, забегать;
to try to get away	пытаться уехать.

II. Compose your own dialogues about your plans for the nearest future. Use the word combinations in the box and the verbs in the Present Continuous or Past Indefinite tenses to express future.

PART III. VOCABULARY LEARNING

Exercise 1. Learn the words of the active vocabulary.

a) names of chemical elements and their compounds:	
	lead [led] <i>n.</i> – свинец;
	diamond ['daɪəmənd] <i>n.</i> – алмаз, бриллиант;
	copper ['kɒpə] <i>n.</i> – медь;
	iron ['aɪən] <i>n.</i> – железо;
	fluorine ['fluəri:n] <i>n.</i> – фтор;
	fluoride ['fluəraɪd] <i>n.</i> – фтористое соединение, фторид;
	gold [gəʊld] <i>n.</i> – золото;
	caustic soda ['kɔ:stɪk 'səʊdə] – едкий натр, каустическая сода, каустик;
	carbon dioxide ['kɑ:b(ə)n daɪ'ɒksaɪd] – углекислота, углекислый газ;
	nitrogen ['naɪtrədʒən] <i>n.</i> – азот.
b) names of substances:	
	poison ['pɔɪzn] <i>n.</i> – яд;
	solid ['sɒlɪd] <i>n.</i> – твердое тело, вещество;
	fluid ['flu:ɪd] <i>n.</i> – 1) текучая среда (<i>жидкость, газ</i>).
c) names of parts of the human body and processes within the body:	
	brain [breɪn] <i>n.</i> – мозг;
	heart [hɑ:t] <i>n.</i> – сердце (<i>орган тела</i>);
	blood vessel ['vesl] <i>n.</i> – кровеносный сосуд;
	urine ['juəri:n] <i>n.</i> – моча;
	digest [dɪ'dʒest] <i>v.</i> – переваривать (<i>пищу</i>);
	cavity ['kævɪtɪ] <i>n.</i> – полость;
	cutaneous [kju:'teɪniəs] <i>a.</i> – кожный;
	bone [bəʊn] <i>n.</i> – кость;
	osseous ['ɒsiəs] <i>a.</i> – костный;
	cancer ['kænsə] <i>n.</i> – рак;
	cell [sel] <i>n.</i> – клетка;
	tissue ['tɪʃu:] <i>n.</i> – ткань.
d) words relating to physical and chemical properties of substances:	
	sense [sens] <i>n., v.</i> – чувство, ощущение; ощущать;
	taste [teɪst] <i>n., v.</i> – вкус; пробовать на вкус;
	odo(u)r ['əʊdə] <i>n.</i> – запах;

	break [breɪk] <i>v.</i> – ломать, разламывать;
	freeze [friːz] <i>v.</i> – замерзать;
	density ['densɪti] <i>n.</i> – плотность, удельный вес;
	soft [sɒft] <i>a.</i> – мягкий;
	pure [pjʊə] <i>a.</i> – чистый; беспримесный.
e)	<i>words relating to medicine:</i>
	ill [ɪl] <i>predic.</i> больной, нездоровый;
	affect [ə'fekt] <i>n., v.</i> – поражение; повреждение; поражать; влиять; воздействовать;
	pain [peɪn] <i>n., v.</i> – боль; страдание; причинять боль; болеть;
	cure [kjʊə] <i>n.</i> – лечение, курс лечения, способ лечения;
	intake ['ɪnteɪk] <i>n.</i> – 1) поглощение, потребление; 2) всасывание.
	prevent [prɪ'vent] <i>v.</i> – предотвращать, предупреждать;
f)	<i>general scientific words:</i>
	arrange [ə'reɪndʒ] <i>v.</i> – 1) приводить в порядок; 2) классифицировать, систематизировать;
	discover [dɪ'skʌvə] <i>v.</i> – обнаруживать, находить;
	maintain [meɪn'teɪn] <i>v.</i> – поддерживать, сохранять (<i>в состоянии, которое имеется на данный момент, особенно в хорошем</i>);
	contain [kən'teɪn] <i>v.</i> – 1) содержать в себе, включать, вмещать;
	pollution [pə'luːʃ(ə)n] <i>n.</i> – 1) загрязнение; загрязненность;
	occur [ə'kɜː] <i>v.</i> – встречаться; происходить, случаться;
	combine [kəm'baɪn] <i>v.</i> – объединять, сочетать;
	remove [rɪ'muːv] <i>v.</i> – передвигать, перемещать;
	infant ['ɪnfənt] <i>n.</i> – младенец, ребёнок;
	separate ['sepəreɪt] <i>v., ['sep(ə)rɪt] adj.</i> – отделять(ся), разъединять(ся); отдельный; обособленный;
	adult ['ædʌlt] <i>n, [ə'dʌlt] a.</i> – взрослый, совершеннолетний;
	detect [dɪ'tekt] <i>v.</i> – замечать, открывать, обнаруживать; определять.

Exercise 2. Read the words of Greek and Latin origin. Translate them.

Lithium ['lɪθiəm], magnesium [mæg'nɪːziəm], titanium [tɪ'teɪniəm], [taɪ'teɪniəm], radium ['reɪdiəm], polonium [pə'ləʊniəm], francium [ˌfransiəm], rhenium ['rɪːniəm], neon ['niːɔn], argentine [ɑː'dʒentəm], ferum ['ferəm], cuprum ['kjuːprəm], yttrium ['ɪtriəm], carbon ['kɑːb(ə)n], bicarbonate [baɪ'kɑːbənɪt], tungsten ['tʌŋstən], chlorine ['klɔːrɪn], abrasive [ə'breɪsɪv], conductor [kən'dʌktə], electricity [ˌelek'trɪsəti], magnet ['mæɡnət], caustic soda ['kɔːstɪk 'səʊdə], anemia [ə'niːmiə], excrete [ɪks'kriːt], [eks-], formula ['fɔːmjələ], electrolysis [ˌelɪk'trɒləsɪs], enzyme ['enzaim], thyroid ['θaɪrɔɪd], insulin ['ɪnsjəlin], blood [blʌd], hormone ['hɔːməʊn], deficiency

[dɪ'fɪʃ(ə)nsɪ], ceramic [sə'ræmɪk], nervous ['nɜ:vəs], system ['sɪstəm], urine ['juərɪn], hygiene ['haɪdʒɪ:n], decade ['dekeɪd], Sweden ['swɪ:d(ə)n], Germany ['dʒɜ:məni], Portugal [ˌpɔ:tʃʊɡ(ə)l, ˌpɔ:tʃʊ-], France [frɑ:ns], cerebral ['serəbr(ə)l], vascular ['væskjələ], infection [ɪn'fekʃ(ə)n], receptor [rɪ'septə], tract [trækt], organ ['ɔ:gən], condense [kən'dens], isometric [ˌaɪsə'metrɪk], abrasive [ə'breɪsɪv], resist [rɪ'zɪst], hemoglobin [ˌhɪ:mə(u)'gləubɪn], [ˌhe-], hypertension [ˌhaɪpə'tenʃ(ə)n], pressure ['preʃə].

Exercise 3. *Translate the words paying attention to their prefixes and suffixes:*

- Prefix **“non”** has negative meaning.
Nontoxic, nonflammable, nonreactive.
- **“co”**(**“com”**, **“col”**, **“con”**) means “together”.
Complex, combine, component, compound, collect.
- **“hydro”** means “water”.
Hydrogen, hydroxide, hydrolysis, hydrocarbon.
- **“di”** means “two”.
Dicyclic, dioxide, diacid.
- **“de”** means separation; lack of.
Decompose, decode, decarbonate.
- Suffix **“able”**, **“ible”** means capable of doing something.
Soluble, combustible, breakable, preventable.
- Suffix **“ous”** forms adjectives.
Gaseous, poisonous, precious, porous.

Exercise 4. *Match the verbs with the nouns and translate them.*

discover, predict, prevent, maintain, consider, take, combine, pollute, occur,
solidify, characterize, locate, deform, identify, separate, detect

separation, location, consideration, identification, solidification, combination,
detection, deformation, characterization, prediction, discovery, prevention,
intake, pollution, maintenance, occurrence

Exercise 5. *Learn the following pairs of words.*

Nose – nasal; mouth – oral; skin – dermal (cutaneous); bone – bony (osseous);
urine – urinary; digestion – digestive; olfactory – olfactory, vessel – vascular,
brain – cerebral, liver – hepatic; kidney – renal.

Exercise 6. *Match an adjective with the proper noun. Write down the word combination, substituting an adjective by a noun.*

Model:	oral cavity – cavity of the mouth.
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oral, nasal, digestive, olfactory, cerebral, dermal, osseous.

infection, cavity, receptors, damage, tract, hygiene, organs.

Exercise 7. Read and translate the following cognate words.

Active – activate – activation; connect – connection – connective; synthesis – synthesize – synthetic; oxygen – oxide – oxidize – oxidation; character – characterize – characteristics; pollute – pollution – pollutant; pure – impure – impurity; fluoride – fluoridation – fluoridated.

Exercise 8. Translate the following adverbs. Use the dictionary if necessary.

Easily, at least, strongly, finally, actually, perhaps, previously, similarly, roughly, generally, considerably, primarily, fairly, commonly, mainly, however, unfortunately, readily, nearly, especially, highly, chiefly, significantly, relatively, eventually.

Exercise 9. Study the mode of translation of nouns as modifiers. Translate the following word combinations.

Model:	laboratory work	лабораторная работа
	chemistry laboratory work	лабораторная работа по химии
	chemistry laboratory workbook	тетрадь для лабораторных работ по химии
	university chemistry laboratory workbook	тетрадь для лабораторных работ по курсу химии в университете

Tooth decay, lead pollution, lead poisoning, brain damage, hemoglobin production, protein synthesis, thyroid hormone, g/day requirements, red blood cells, plastic water pipes, excess sodium intake, central nervous system damage.

Exercise 10. Insert instead of gaps the names of chemicals.

1. Be careful when you are working with solution of ..., HCl, because you can burn yourself.
2. Hydrogen is prepared: 1) from water; 2) from acids such as ..., H₂SO₄, and ..., HCl; 3) from alkalies such as ..., NaOH.
3. In the free state as the gas..., H₂, occurs in volcanic gases as well as in different minerals, rocks and the atmosphere.

4. The addition of 1% or more ..., CO₂, to ..., O₂, stimulates the respiratory center.
5. Elementary..., C, occurs in the crystalline forms of diamond and graphite, and amorphous form as charcoal.
6. The bodies of plants and animals contain compounds of carbon with hydrogen, and sometimes ..., N, ..., S, and ..., P.

Key: 1) hydrochloric acid; 2) sulphuric acid, hydrochloric acid, caustic soda; 3) hydrogen; 4) carbon dioxide, oxygen; 5) carbon; 6) nitrogen, sulphur, phosphorus.

Exercise 11. Match the descriptions of the elements with their names.

1. A soft silver-white metallic element which occurs in nature only in compounds is essential for the growth of plants and oxidizes rapidly when exposed to the air. It is the lightest metal which belongs to the alkali metals.
2. An isometric crystallized form of pure carbon, used as a precious (драгоценный) stone and as an abrasive. It is the hardest natural substance known.
3. A shiny, bright-yellow, ductile (тягучий) and malleable (ковкий), precious metallic element which resists alteration (деформация).
4. A colorless, odorless, gaseous element that burns easily and is the lightest of all elements.
5. A colorless, odorless and tasteless gaseous element that forms about one fifth of the atmosphere by volume.
6. A colorless, odorless and tasteless gaseous element that forms about four fifth of the atmosphere by volume and it is a necessary part of all animal and plant tissues.
7. A tough, reddish-brown, ductile metallic element which occurs in different ores (руда). It resists rust (ржавчина) and is an excellent conductor of heat and electricity.

a) oxygen; b) gold; c) nitrogen; d) hydrogen; e) sodium; f) diamond; g) copper.

Key: 1) sodium; 2) diamond; 3) gold; 4) oxygen; 5) hydrogen; 6) nitrogen; 7) copper.

Exercise 12. Read the following information giving the names of symbols.

A. Elements in you

Very common	H, O, C, N
Scarce (редко встречающийся)	Na, Mg, P, S, Cl, K, Ca
Very scarce (but essential)	F, Si, V, Cr, Mn, Fe, Co, Cu, Zn, Se, Mo, Sn, I

The first four make up 63%, 25,5%, 9,5%, and 1,4% respectively, of your atoms. The other 20 elements account for the remaining 0,6%.

B. List of elements with single letter symbols:

H, B, C, O, N, F, P, S, K, V, Y, I, U, W

Key: hydrogen, boron, carbon, oxygen, nitrogen, fluorine, phosphorus, sulphur, potassium, vanadium, yttrium, iodine, uranium, tungsten.

Exercise 13. *Translate from Russian into English.*

1. Фтор – очень ядовитый газ зеленоватого цвета. 2. Сера практически не растворима в воде. 3. Химические свойства хлорида натрия и его состав отличаются от свойств чистого хлора и натрия. 4. Натрий и хлор быстро вступают в реакцию и образуют белое твердое вещество – хлорид натрия. 5. В твердом состоянии кислород окрашен в бледно- синий цвет. 6. Йод при комнатной температуре представляет собой темно-фиолетовые кристаллы. 7. Многие неорганические соединения хорошо растворимы в жидком фтористом водороде.

Exercise 14. *Answer the following questions:*

- All the following substances are called acids. What element do they have in common?

a) nitric acid (HNO_3);	b) hydrochloric acid (HCl);
c) acetic acid ($\text{HC}_2\text{H}_3\text{O}_2$);	d) sulfuric acid (H_2SO_4);
e) phosphoric acid (H_3PO_4).	
- What do the following symbols represent?
K, Ca, Co, Pb, Hf, Hg.
- Here are the names of some common chemicals and their formulas. What elements does each compound contain?

a) hydrogen peroxide (H_2O_2);	b) jeweler's rouge (красный полировальный порошок) (Fe_2O_3);
c) light-bulb filament (W);	d) tetraethyl lead ($\text{Pb}(\text{C}_2\text{H}_5)_4$);
e) baking soda (NaHCO_3);	f) octane (C_8H_{18});
g) household gas (methane) (CH_4).	
- A white substance, on heating, forms a colorless gas and a purple solid. Is the substance an element or a compound? Why do you think so?

PART IV. READING COMPREHENSION

Read the text and do exercises that follow it.

Text 1

CHEMICAL ELEMENTS AND COMPOUNDS

An element is a pure substance containing only one kind of atom. When two distinct elements are chemically combined the result is termed a *compound*.

The term element was first used by the Greek philosopher **Plato** in about 360 B.C. Plato believed that the elements introduced a century earlier by **Empedocles** were composed of small polyhedral forms: tetrahedron (fire), octahedron (air), icosahedrons (water), and cube (earth).

There are 118 elements known today. Some elements occur pure in nature and have been known for thousands of years. Elements like iron, silver, gold, mercury, lead, tin and sulphur were known to the ancients. They were given Latin names by the early chemists. For example, iron was called ferrum, silver was called argentum, and gold was called aurum.

The first modern list of chemical elements was given in **Antoine Lavoisier's** 1789 Elements of chemistry, which contained thirty-three elements, including light and caloric. During the 19th century there was an increase in the number of elements discovered as chemists began to adopt quantitative methods. **Dmitri Mendeleev** had sixty-six elements in his periodic table of 1869. By the end of the 19th century 81 elements had been known. Almost twice as many elements* were discovered in the 20th century as were discovered up to that time. Credit for proof of elemental character goes to scientists in England, France, Sweden, Germany, Portugal, and the United States. Three of those scientists were: **Marie Sklodowska Curie** (radium, polonium), **Maquerite Perey** (francium), and **Ida Tacke** (rhenium).

Each element has a name and has been given a shortened symbol of one or two letters. The element carbon is symbolized by the letter *C*, the element neon by letter *Ne*. Ten of the elements have symbols derived from the capitalized first letter of the Latin name of the element and, if necessary, by a second letter. Other elements have symbols that can be derived from their English names.

But now let's consider a substance like water. Water can be identified by its properties: colour, taste, melting and boiling temperatures, and ability to dissolve sugar and salt. A demonstration of electrolysis can easily show that water can be changed into other substances, hydrogen gas and oxygen gas. Since water can be decomposed into two other substances, water must contain at least two kinds of atoms. Water is a compound.

Sugar is another substance that you know. One property of sugar is its sweetness. Another property is that it dissolves in water. Still another is the way it behaves when heated. Under definite temperature sugar not only begins to melt to a liquid but it also begins to decompose. Sugar can be decomposed to form water and charcoal in definite amounts. Sugar is a compound.

Actually there is a set of characteristics, called properties that characterize each substance. Chemists sometimes speak about chemical changes and physical changes. Physical changes do not mean a change in the composition of a substance. For example breaking, freezing, melting, boiling, and deforming a substance such as lead are considered physical changes. A chemical change or chemical reaction, however, changes the composition and characteristic or special properties of a substance.

Note: almost twice as many elements – почти в два раза больше элементов.

Exercise 1. *Translate the following word combinations.*

to dissolve sugar and salt, to adopt quantitative methods, a set of characteristics, under definite temperature, to dissolve in water, to produce in definite amounts, to identify the substance by its properties, to derive the name from, melting and boiling temperatures, to consider a substance, elements occurring in nature.

Exercise 2. *Insert instead of gaps the proper words from the text.*

1. The term “element” was first introduced by 2. By the end of the 19th century ... elements had been known. 3. There are ... elements known today. 4. Elements like ..., ..., ..., ..., and ... were known to the ancient people. 5. Iron was called ..., silver was called ..., and gold was called ... in ancient times. 6. The first modern list of chemical elements was given by 7. Radium and polonium were discovered by Polish scientist ... in 1898. 8. Francium was discovered by ... in 1939. 9. Ida Tacke, a German scientist, discovered ... in 1925.

Exercise 3. *Define the following notions.*

1. An element. 2. A compound. 3. A periodic table. 4. A physical change. 5. A chemical reaction. 6. Sugar. 7. Water.

Exercise 4. *Answer the following questions.*

1. Who was the first to use the term “element”? 2. What is an element according to the current definition? 3. What is a compound? 4. What names did ancients give to such elements as iron, silver and gold? 5. What languages are chemical names of elements based on? 6. Why was there an increase in the number of elements discovered in the 19th century? 7. The scientists of what countries contributed to the discovery of elements? Give their names. 8. What is the most convenient and the most traditional presentation of elements? 9. How can water be identified? 10. In what way can one prove that water is a compound? 11.

What are the main properties of sugar? 12. What is the product of decomposition of sugar under definite temperature? 13. Are heating, freezing, melting, boiling and deforming chemical or physical changes? 14. What is a chemical change?

Exercise 5. Make up the outline to the text and speak about chemical elements and compounds according to it.

Exercise 6. Read the following passages and translate them with the help of a dictionary.

PERIODIC TABLE OF ELEMENTS

As chemists discovered new elements, they also discovered that certain elements behave in a similar manner. Beginning in the mid-1800's, several chemists suggested ways to organize the known elements into a periodic table so that those with similar properties would be grouped together. Chief among these researchers were Dmitri Ivanovich Mendeleev, a Russian chemist, and the German chemist Julius Lotcher Meyer. D.I. Mendeleev developed a form of a periodic law, a basic principal in chemistry. His law states that the properties of chemical elements reoccur in regular pattern when the elements are arranged according to their atomic weight. Mendeleev's work together with that of Meyer's led to the periodic table, a systematic arrangement of the elements.

In 1869, Mendeleev proposed his arrangements of the elements in order of increasing atomic weight and according to similarity in properties. Mendeleev's table has blank spaces for unknown elements. Later using the periodic law, he predicted the properties of these unknown elements. His predictions were confirmed by the discovery between 1875 and 1886 of three elements with these properties. Mendeleev also discovered the phenomenon of critical temperature, the temperature at which a gas or vapour may be liquefied by pressure.

TURNING THE TABLE ON REFRIGERANTS

The Freon compounds that are used to absorb heat in refrigerators and air conditioners were discovered in 1937 by Thomas Midgley, an American chemist. The following is his description of how the periodic table was used:

"What was wanted was obvious – a nontoxic, nonflammable refrigerant. The desired combination of properties was a boiling point between 0° and - 40°C, stability, nontoxicity, and nonflammability. I decided to bring into play the Periodic Table. Perhaps volatility could be related to it some way. It takes but a fraction of a second to see this is true. The elements on the right-hand side of the

Periodic table are the only ones which make compounds sufficiently volatile for the purpose in hand. In fact only a certain number of these elements need to be considered. Volatile compounds of boron, silicon, phosphorus, arsenic, antimony, bismuth, selenium, tellurium, and iodine are all too unstable and toxic to consider. Now look at the remaining elements – carbon, nitrogen, oxygen, fluorine, sulphur, chlorine and bromine. Every refrigerant used has been made from combinations of these elements. Flammability decreases from left to right. Toxicity usually decreases from the heavy elements at the bottom to lighter elements at the top. These two trends focus on fluorine. It was an exciting deduction. Seemingly no one previously had considered it possible that fluorine might be nontoxic in some of its compounds”.

Numerous Freons are now made to provide useful kinds of refrigerators, air conditioners and freezers for preparing or storing foods.

Read the text and do exercises that follow it.

Text 2

CHEMICAL ELEMENTS OF LIVING MATTER

1. Living matter contains about one-third of the elements of the Mendeleev Periodic Table. Only *hydrogen, carbon, nitrogen and iodine* are found in higher concentrations in the human body than in the earth. Six other elements are found in roughly the same proportions: *oxygen, phosphorus, sulphur, chlorine, potassium and calcium*.

2. Besides hydrogen, *oxygen* is the element present in the human body in the greatest amount. It constitutes about 65% of the total (by weight) amount. Most amount of oxygen is combined with hydrogen as water – the most abundant compound of the human body constituting 45% to 75% by weight. Water itself is essential to keep the body hydrated, but it also plays an absolutely vital role in respiration. The exact amount depends principally on age, sex and build; relatively, infants have more than adults, men more than women. There may also be considerable differences between healthy and ill people, and the water content of the body may be affected by drugs.

3. *Carbon* is the second most abundant element found inside the human body. Carbon is excreted from the body in the form of carbon dioxide, which is a waste product of respiration*. Carbon is also the main component of glucose and other sugars. The unique nature of living matter is due to its organic constituents i.e.* compounds based on a carbon chain.

4. There are some important organic chemicals, usually ions that are essential to health. For example, *calcium and phosphorus* for the teeth and bones, and

iron is essential in the hemoglobin of the blood transporting the oxygen throughout the body.

Sodium, potassium and chlorine ions deserve special emphasis because they regulate the electrolyte equilibrium in the blood and body tissues and help maintain proper fluid balance inside and outside the cells. This balance is controlled primarily by the Na^+/K^+ ion ratio which ideally is 0.6. *Potassium* is the major cation within cells; the 1,9 to 5,6 g/day requirements must be replenished* since the ion is excreted in the urine. Na^+/K^+ deficiency is fairly common in people using a diuretic to control body fluids.

The Na^+ (1-2g/day) and Cl^- (1.7-5.1 g/day) requirements are usually easy to meet since most foods contain NaCl ; in fact the average Na^+ intake* in the United States is about 10 g/day, between five and ten times the amount needed. Excess sodium intake may contribute to hypertension, or high blood pressure.

5. *Phosphorus* is another very important mineral. One of its functions involves energy production.

Other important ions occurring in living matter, besides those formed from organic acids and bases, are *bicarbonate, ammonium, phosphate and sulphate*. The bony skeleton and the teeth contain *lithium fluoride* as well. Additional important compounds include *carbon dioxide* and *oxygen*.

Notes:

- * waste product of respiration – продукт распада дыхания;
- * i.e. (id est) – that is, то есть;
- * to replenish – пополнять;
- * intake – потребление.

Exercise 1. Read the sentences translating the words given in brackets into English. Translate the sentences into Russian.

1. Oxygen is the element (составляющий) about 65% of the total body weight.
2. Six other elements (находящиеся) in roughly the same proportions in the human body as in the earth are oxygen, phosphorus, sulphur, chlorine, potassium and calcium.
3. Oxygen is combined with hydrogen (образуя) water – the most abundant compound of the human body.
4. Drugs (используемые) by ill people may affect the water content of the body.
5. Sodium, potassium and chlorine (регулирующие) electrolyte equilibrium in the blood and body tissues help maintain proper fluid balance.
6. Bicarbonate, ammonium, phosphate and sulphate are important ions (встречающиеся) in living matter.
7. Na^+/K^+ deficiency is fairly common in people (применяющих) diuretics.
8. The requirements of potassium (выделяемый) in the urine must be replenished.

Exercise 2. Define the statements as *TRUE* or *FALSE*. Correct the false statements.

1. Living matter contains about one-fourth of the elements of the Periodic Table.
2. Hydrogen, carbon, nitrogen and oxygen are found in high concentrations in the human body.
3. The most abundant compound in the human body is water.
4. The water content of the body depends on age, sex, build as well as people's state of health.
5. Sodium, potassium, chlorine are present as the ions, and so is part of calcium, magnesium, iodine and bromine.
6. Calcium and phosphorus are essential for the bones and teeth.
7. Potassium, sodium and chlorine regulate fluid balance inside and outside the cell.
8. Na^+/K^+ deficiency is common in people taking diuretics.
9. The daily requirement of NaCl is 1-5 g per day.
10. Excess sodium intake can't contribute to any pathology.
11. There are some other important ions occurring in living matter.

Exercise 3. Answer the questions.

1. What amount of chemical elements does living matter contain?
2. What elements are found in the human body in higher concentrations than in the earth?
3. What is the percentage of oxygen present in the human body?
4. What does the exact amount of water in adult and infant depend on?
5. Is there any difference in water content in healthy and ill people?
6. What organic chemicals present as ions are essential to health?
7. Why do sodium, potassium and chloride ions deserve special emphasis?
8. What is the ideal Na^+/K^+ ion ratio?
9. What is the daily requirement of potassium?
10. Is it easy to meet daily requirements of Na^+ and Cl^- ? Why?
11. What are the daily requirements of Na^+ ?
12. What may the excess of sodium intake result in?
13. What is the main function of phosphorus?

Exercise 4. Speak in short about chemical elements of living matter on the basis of the text read.

Text 3

TOXIC SUBSTANCES IN MAN'S ENVIRONMENT

1. Read the title of the text and say what it is about?
2. Name some toxic substances known to you.

3. *Say whether:*
 - a) *you have ever been in contact with any toxic substance (s);*
 - b) *you know how to act in case of poisoning.*
4. *Read the text and formulate its main idea.*

The human body is a complex system of chemical compounds. When an excessive amount of a single element or compound occurs in the body toxic reactions can be expected.

Sometimes chemicals, present in small amounts, affect the biochemical functions of the body. Lethal doses are usually expressed in milligrams (mg of substance per kilogram (kg) weight of the subject). For example cyanide ion (CN^-) is generally fatal to human in doses of 1 mg of CN^- per kg of body weight. For a 200-pound person, 0,00032 ounce* of cyanide is a lethal dose. Examples of somewhat less toxic substances and the probable lethal doses for an average person are: morphine 1-50 mg per kg; aspirin 50-500 mg per kg; methyl alcohol 0,5-5 g per kg; ethyl alcohol 5-15 g per kg.

Substances we take in through food and water or through the air we breathe may influence our health. While some substances are harmful, others can be beneficial, e.g. fluoride preventing caries, water disinfectants killing germs, etc.

Let's consider such toxic substances as arsenic, fluorides and mercury.

ARSENIC

1. Where is arsenic formed?

Arsenic is found in the natural environment. About one third of the arsenic in the atmosphere comes from natural sources, and the rest comes from man-made sources.

The amounts of arsenic found in living animals, plants and microbes vary.

2. What are the ways of arsenic exposure?

Humans are exposed mainly through food, water and cigarette smoking. Food is usually the largest source. Arsenic is one of many hundreds of chemicals present in cigarette smoke. The quantities of arsenic breathed in by non-smokers are very small, except in industrially polluted areas. Smokers inhale more because arsenic is one of many hundreds of chemicals present in cigarette smoke.

Many arsenic compounds are quickly transformed and eliminated from the body via the urine.

3. What are the effects of arsenic exposure?

Many parts of the body may be affected by arsenic, including the skin, gut (кишка), lungs, heart, blood vessels, immune system, urinary system, reproductive organs and the nervous system.

Long-term exposure to high levels of arsenic in drinking water can cause thickening and pigment spots in the skin, and cancer of the skin, lungs, bladder or kidney.

FLUORIDES

1. What are fluorides?

Fluorides are organic and inorganic compounds containing the fluorine element.

Generally colourless, the different fluoride compounds are more or less soluble in water and can take the form of a solid, liquid, or gas. These are important industrial chemicals with a number of uses but the largest fluorides uses are for aluminum production, drinking water fluoridation, and the manufacture of fluoridated dental preparations.

2. How are humans exposed to fluorides?

Food and drinking water typically contain at least small amounts of fluorides.

In *drinking water* fluoride can either be naturally present or artificially added for the prevention of dental caries.

All *foodstuffs* contain at least small amounts of fluoride. Humans retain 60 to 90% of the fluoride taken in and accumulate almost all of it in their bones and teeth.

3. What effects have actually been seen in humans?

Fluoride can help prevent cavities, but as the amount taken in increases it can also harm teeth (dental fluorosis) and bones (skeletal fluorosis).

MERCURY

1. What is mercury?

Mercury is a chemical element with symbol Hg. It is a silver-coloured metal, and unlike any other metal, it is a liquid at room temperature. It flows so easily and rapidly that it is sometimes called quicksilver.

Mercury compounds have uses in agriculture and industry. Mercury, however, is extremely poisonous and can cause illness or death. After many people realized its dangers, industries and government agencies began trying to reduce the amount of mercury reaching the environment.

2. What are the main uses of mercury?

Mercury has many properties (qualities) that make it useful. For example, mercury expands and contracts evenly when heated or cooled. It also remains liquid over a wide range of temperatures. These properties have prompted its use in thermometers.

3. What compounds does mercury form? Can they be useful for people?

Chemists divide mercury compounds into two groups: (1) mercurous and (2) mercuric. Mercurous compounds include mercurous chloride (Hg_2Cl_2), also called calomel, and mercurous sulphate (Hg_2SO_4). Calomel is an antiseptic used to kill bacteria. Scientists use mercurous sulphate to speed up certain tests on organic compounds.

Mercuric compounds include mercuric chloride (HgCl_2), a powerful poison that surgeons once used to disinfect wounds. Several organic mercuric

compounds have important medical uses. For example, diuretics, which doctors use to treat kidney disease, contain these compounds. The antiseptic Mercurochrome is also a mercuric compound.

4. What effect may mercury have on plants, animals and the environment?

Mercury in the environment is harmful chiefly because its poisonous compounds have been found in plants and animals that people use for food. Scientists have discovered poisonous mercury compounds in such foods as eggs, fish, grain, and meat. Mercury acts as a cumulative poison – that is, the body has difficulty eliminating it. Thus, it may collect over a long time, eventually reaching dangerous levels.

Among the most dangerous mercury compounds are those containing methyl mercury. They can damage brain cells.

* ounce – унция (= 28 г);

* cavity – полость, впадина.

***Exercise 1.** Read the following sentences and ask your groupmates the questions to which the given sentence will be the answers.*

1. Some substances are harmful for the organism. (What ...?)
2. Fluoride can be beneficial in preventing caries. (What substance ...?)
3. About $\frac{1}{3}$ of the arsenic in the atmosphere comes from natural sources. (How much ...?)
4. Arsenic is one of the many hundreds of chemicals present in cigarette smoke. (Where ...?)
5. Many arsenic compounds are eliminated from the body via the urine (How ...?)
6. The skin, the heart, the lungs, the blood vessels, the immune system, the urinary system and some others may be affected by arsenic. (What ...?)
7. Fluorides are added to dental products to prevent cavities. (To what ...?)
8. Human retains 60% to 90% of the fluoride taken in. (What is the percentage ...?)
9. If taken in excess amount fluoride can harm teeth and bones. (In what case ...?)
10. Mercury flows so easily and rapidly that it is sometimes called quicksilver. (Why ...?)
11. Mercury remains liquid over a wide range of temperatures. (Does ... or ...?)
12. Mercuric chloride a powerful poison was used to disinfect wounds. (For what purpose ...?)
13. A mercuric compound Mercurochrome is used as antiseptic (What ...?)
14. Mercury acts as a cumulative poison. (Does ...?)

Exercise 2. Read the text once again and answer the questions asked in the text in short.

Exercise 3. Discuss the text expressing your own point of view concerning:

1. Very toxic substances;
2. Less toxic substances;
3. The risk of poisoning by toxic substances;
4. Beneficial effects of toxic substances;
5. The ways of preventing either acute or chronic poisoning.

Exercise 4. Translate the following information into English.

ДОГОВОРИТЬСЯ С ТАБЛИЦЕЙ МЕНДЕЛЕЕВА

1. Микроэлементы – химические соединения, в минимальном количестве содержащиеся в живых тканях.
2. Выделяют 4 группы макро-, микро- и ультраэлементов: эссенциальные; условно эссенциальные (при повышенной или пониженной концентрации вызывающие негативные изменения в организме); потенциально токсичные (при определенных условиях); токсичные.
3. Химические вещества контролируют важные реакции: серебро и селен поддерживают иммунный статус, хром не дает липидам оседать на стенках сосудов и регулирует уровень сахара в крови.
4. Благодаря марганцу у нас здоровый цвет лица и все в порядке с костной системой.
5. Медь влияет на эластичность сосудов. Но ее избыток – яд: возникают сбои в работе нервной системы и ЖКТ.
6. Цинк входит в состав более 200 ферментов; от него зависит здоровье глаз, кожи, волос и ногтей.
7. Ртуть, свинец, кадмий, мышьяк являются наиболее опасными. Но в малом количестве они есть в почве, водоемах, растениях и в человеческом организме.
8. Колебания концентрации каждого из названных элементов провоцируют многие болезни.
9. Мышьяк вызывает сбои в работе печени, почек, расстройства ЖКТ и неврологические нарушения.
10. Кадмий нарушает баланс жизненно важных химических элементов (цинк, селен, медь, железо, кальций).
11. Свинец накапливается в организме при недостатке железа, магния, кальция; приводит к патологии ЖКТ, нервной и сердечно-сосудистой систем.

PART V. RENDERING

МЕТАЛЛЫ ЖИЗНИ

Practise the pronunciation of the following words:

1.	blood [blʌd] <i>n.</i> – кровь;
2.	plasma ['plæzmə] <i>n.</i> – плазма;
3.	liver ['lɪvə] <i>n.</i> – печень;
4.	metabolism [me'tæbəlaɪzəm] <i>n.</i> – метаболизм, обмен веществ;
5.	activator ['æktɪveɪtə] <i>n.</i> – возбудитель, активатор;
6.	catalyst ['kæt(ə)lɪst] <i>n.</i> – катализатор;
7.	arterial [ɑ:'tɪəriəl] <i>adj.</i> – 1) артериальный; 2) разветвляющийся; 3) магистральный;
8.	pressure ['preʃə] <i>n.</i> – давление; сжатие;
9.	heart [hɑ:t] <i>n.</i> – сердце (орган тела);
10.	ischemia ['ɪski:mɪə] <i>n.</i> – ишемия, местное малокровие;
11.	infarct ['ɪnfɑ:kt, ɪn'fɑ:kt] <i>n.</i> – инфаркт;
12.	cretinism ['kretɪnɪz(ə)m] <i>n.</i> – кретинизм <i>Syn:</i> idiocy cretinism кретинизм, врожденный гипотиреоз, болезнь Фаре;
13.	oligophrenia [ˌɒlɪgə'fri:nɪə] <i>n.</i> – олигофрения, слабоумие;
14.	mental ['ment(ə)] <i>adj.</i> – умственный;
15.	retardation [ˌrɪ:tɑ:'deɪʃ(ə)n] <i>n.</i> – задерживание, замедление;
16.	bile [baɪl] <i>n.</i> – желчь;
17.	kidney ['kɪdnɪ] <i>n.</i> – почка;
18.	sweat [swet] <i>n.</i> – испарина, пот; потоотделение;
19.	gland [glænd] <i>n.</i> – железа;
20.	excrete [ɪks'kri:t], [eks-] <i>v.</i> – выделять;
21.	thyroid ['θaɪrɔɪd] <i>n.</i> – щитовидная железа;
22.	prevent [prɪ'vent] <i>v.</i> – предотвращать, предупреждать.

Read the following information in Russian and render it into English.

ТАБЛИЦА МЕНДЕЛЕЕВА В ОРГАНИЗМЕ.

О том, что в организмах содержатся металлы, было известно давно. Однако их исключительное значение для живой природы открылось на стыке наук физики, биологии, химии и медицины.

В организме человека, как и в водах Мирового океана, находятся все элементы таблицы Менделеева. Даже такой редкий и радиоактивный

металл, как уран, хотя количество его ничтожно мало – всего 0,00009 грамма.

Распределяются (distribute) элементы в нашем организме неравномерно (unevenly). Каждому органу, в зависимости от выполняемой функции, свойственны определенные химические элементы в необходимых концентрациях. Наибольшее их количество накапливается в печени (liver). В плазме крови (blood plasma) и в волосах химические элементы содержатся в незначительных количествах.

Все химические элементы нашего организма подразделяются на две неравные группы. Первая группа – макроэлементы, в которую входят 10 незаменимых элементов. Это – калий, натрий, кальций, железо, медь, магний, молибден, кобальт, цинк и марганец. Вторую группу – микроэлементов – составляют все оставшиеся элементы. В здоровом организме и макро- и микроэлементы сбалансированы.

Нарушение баланса микроэлементов, влечет за собой изменение функции (disfunction), в дальнейшем и морфологической структуры клетки, органа, организма, вызывая различные заболевания, в том числе и онкологические.

В крови больных ишемией (ischemia) и инфарктом (infarct), например, обнаружены повышенные концентрации марганца и никеля, но – дефицит магния, кальция, меди, железа и бария. Для нормального сердечного ритма (heart rate) необходимо достаточное поступление в организм именно кальция и магния, что обеспечивает правильный электролитический обмен

Недостаток цинка, селена и хрома указывает на пониженный иммунитет. Дефицит магния и избыток (excess) натрия влияют на уровень артериального давления (arterial pressure).

Йод.

Дефицит его в организме вызывает гипотиреоз (hypothyrosis), так как йод принимает участие в выработке тиреоидина (thyroidin). Недостаток тиреоидина ведет к нарушению интеллектуального и физического здоровья. Дефицит йода вызывает необратимые нарушения у новорожденных, умственную отсталость (mental retardation), кретинизм (cretinism), олигофрению (oligophrenia).

Исследования последних лет в разных странах мира показали, что в регионах с выраженным йодным дефицитом средние показатели умственного развития снижаются на 15-20%. По мнению ВОЗ, недостаток йода является самой распространенной (widespread) формой умственной отсталости, которую можно предупредить (prevent).

Дефицит йода в Беларуси пытаются предупредить добавлением к пищевой соли йодистого калия: 25 граммов на (per) тонну соли. Срок хранения такой соли не более 4-х месяцев, так как йод улетучивается (evaporate).

Какая-то часть дефицита йода восполняется за счет овощей и фруктов. Значительное количество йода содержится в чесноке (garlic), свекле. Много – в субтропических плодах фейхоа. Но особенно богаты им все морепродукты.

Выделяется (eliminate) йод из организма преимущественно через почки (kidneys) – до 80 %, а также через молочные (mammary), слюнные (salivary) и потовые железы (sweat glands), частично с желчью (bile).

PART VI. SPEAKING

Exercise 1. *Finish the following sentences adding to them two or more ones.*

1. Toxic substances can be classified into several categories according to ...
2. The amount of water in the body depends on ...
3. The average Na^+ intake is about ... and excess sodium intake may result in ...
4. There are some important organic chemicals that are essential to health. For example, ...
5. Sulphuric acid is the chief basic chemical in many countries. Other basic chemicals include ...

Exercise 2. *Agree or disagree with the following statements. Use the phrases: Yes, I fully (partially) agree; That's quite right; I think so; Right you are; I disagree, I'm afraid; That's wrong; Just on the contrary.*

1. D.I. Mendeleev was the only one who contributed to the development of the Periodic Table of elements.
2. List of elements is available by name, by symbol, by atomic number, by density, by melting point, and by boiling point.
3. There is no much difference between chronic and acute poisoning.
4. Lethal doses of toxic substances are usually expressed in grams.
5. The exact amount of water in the human body depends upon age, sex and build of a man.

Exercise 3. *Fulfill the following tasks:*

a) *Enumerate:*

- elements used by ancients;
- elements discovered by chance;
- toxic elements and their possible effects.

b) *Indicate:*

- elements contained in a man;
- functions of minerals in the body.

- c) *Briefly indicate:* contribution to the development of chemistry made by Antoine Lavoisier, Marie Scladovska Curie, D. I. Mendeleyev and other scientists.

Exercise 4. *Look through the list of elements in the Appendix part and choose any of the elements to think of its description. Present it to your groupmates so that they guess the name of the element described.*

Exercise 5. *Give some facts proving that:*

1. Heavy metals are very toxic and should be used with caution.
2. Oxygen is one of the elements present in the human body in the greatest amounts.
3. Certain organisms may accumulate considerable amounts of elements that do not occur in the human body.
4. Not only chemical elements are considered as toxic.
5. Chemical substances affect the human body in different ways.
6. Elements may serve man in his everyday life.

Exercise 6. *Extend the idea. Express your point of view. Use the following phrases: **I think/feel that ...; As far as I know ...; My point of view is ...** .*

1. Chemists sometimes speak about chemical changes and physical changes.
2. Nearly all elements on or in the earth are found combined with other elements.
3. Artificially combined elements are not plentiful; all of them are radioactive.

Exercise 7. *Prepare a talk on chemical elements using the following points as an outline.*

1. Periodic table of elements as the first natural classification of chemical elements and its significance to further development of chemistry.
2. Properties of matter.
3. Chemical elements of living matter and their amount.
4. Classification of toxic substances and their effects.

APPENDIX (приложение)

CHEMICAL ELEMENTS AND SUBSTANCES

acid	кислота; кислый; кислотный	alcohol	алкоголь, спирт
alkaline	щелочный	ammonium	аммоний
antimony	сурьма	argentum	серебро
arsenic	мышьяк	bile	жёлчь
boron	бор	bromide	бромид
bromine	бром	cadmium	кадмий
caffeine	кофеин	calcium	кальций
calomel	хлористая ртуть	carbohydrate	углевод
carbon	углерод	chloride	хлорид
chlorine	хлор	cholesterol	холестерин
copper	медь	curium	кюрий
dioxide	диоксид	disulfide	дисульфид
enzyme	фермент, энзим	ester	сложный эфир, эфир
ether	простой эфир, этиловый эфир, эфир	fat	жир
ferum	железо	fluoride	фтористый
fluorine	фтор	glucose	глюкоза
glycerol=glycerine	глицерин	glycogen	гликоген
gold	золото	halogen	галоген
helium	гелий	hormone	инкрет (гормон)
hydrocarbon	углеводород	hydrogen	водород
iodine	йод	iron	железо
lead	свинец	lithium	литий
magnesium	магний	manganese	марганец
mercury	ртуть	molybdenum	молибден
neon	неон	niacin	никотиновая кислота
nitrate	нитрат	oxygen	кислород
petroleum	нефть	phenol	фенол
phosphorus	фосфор	potassium	калий
radium	радий	renium	рений
salt	соль	selenium	селен
silicon	кремний	silver	серебро
sugar	сахар	sulphurous	сернистый
sulfur	сера	tungsten	вольфрам
yttrium	иттрий		

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