

ODESA NATIONAL MEDICAL UNIVERSITY

FOREIGN LANGUAGES DEPARTMENT

ENGLISH

FOR PHARMACEUTICAL STUDENTS

of the 1st year of study

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CONTENT

1. Higher medical education in Ukraine
2. Healthcare and medical institutions in Ukraine
3. Pharmacy
4. Human body
5. Microorganisms
6. Cell
7. Tissues
8. Metabolism
9. Vitamins and minerals
10. Plants. Their structure and functions
11. Medical plants
12. Chemistry and its branches
13. Organic and inorganic chemistry
14. Periodic table of chemical elements
15. Chemical reactions

HIGHER MEDICAL EDUCATION IN UKRAINE

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
admission experience obstetrics psychiatry school-leaver surgery syllabus term	allow carry out diagnose treat	entrance external separate

Exercise 2. Read the following word-combinations, guess their meanings.

Procedure: experimental procedure; medical procedure; surgical procedure; Procedure Room. It is a painful procedure.

Admission: admission rules; the procedure of admission; admission board; admission department. The procedure of admission to medical universities has changed greatly recently.

Disease: to treat different diseases; to fight against diseases; disease of the lungs; the symptoms of the disease; the reaction of the body to the disease; a heart disease; a dangerous disease, a prolonged disease. The disease is the natural process.

Institution: medical institution; educational institution; state institutions.

Exercise 3. Form the names of specialists from the names of professional fields

a) with the help of suffix **-ist**

For example: pharmacology – pharmacologist

Dermatology, physiology, neurology, immunology, gynecology, anesthesiology, pathology, traumatology, neurology, ophthalmology, oncology, urology, endocrinology, venereology, psychiatry.

b) with the help of suffix **-ian**

For example: paediatrics – paediatrician

Obstetrics, technics, electricians, mathematics.

How will you call these specialists in another way?

Eye doctor –

Ear, nose and throat doctor -

Therapist –

Exercise 4. Read the text.

Medical Universities in Ukraine

Becoming a doctor is a dream for millions of students around the world. Students can get higher medical education in Ukraine at post-secondary higher educational institutions called medical universities, which are separate from traditional universities. The procedure of admission to medical universities has changed greatly recently. Nowadays, Ukrainian school-leavers do not take any entrance exams. Medical universities admit their students on the basis of the results of the External

Independent Testing in Biology, Chemistry or Maths and Ukrainian language and literature, which they take after the final school year.

Medical Universities train future doctors, dentists and pharmacists. Doctors' training takes six years but dentists' or pharmacists' training lasts five years. The curriculum and syllabuses for these Institutes are approved by the Ministry of Public Health. The main administrative unit of medical University is the faculty. As a rule, the Medical University may have some faculties (medical, dental and others), headed by the dean. He/She is responsible for administrative affairs of the faculty.

The training course consists of lectures, practical classes, practical work in laboratories and medical practice at different medical institutions. During the first two years the students of the Medical Institutes have so-called pre-clinical training, which includes general subjects, as Physics, Chemistry, Anatomy, Biology and others. In the senior years they study clinical subjects, as Therapy, Surgery, Obstetrics, Gynecology and others. At the clinical subjects, students learn to diagnose different diseases, to carry out laboratory analyses and treat people for different diseases.

Senior students acquire practical skills, working at many hospitals, polyclinics, sanitary epidemiological stations, and pharmacies. They acquire such practical skills as examining patients, making a diagnosis, prescription proper treatment, filling in case histories. A lot of students participate in scientific societies; their dream is to become research workers in future.

Having passed the state examinations, young doctors begin to work as interns during a certain period. After the internship training, they work as different specialists at the medical institutions. The most advanced specialists are engaged in research. They defend theses and obtain degrees of candidates of science (medicine).

All the medical universities in Ukraine teach their courses in English, Ukrainian or Russian. At the end of each course of study or training medical students take final tests, graded tests or exams in different subjects. The students are not allowed to skip classes as they will have to make up the missed ones overtime.

Ukrainian medical universities enroll students from almost every country especially India, Morocco, Tunis, Algeria, Bulgaria, Romania, USA, Syria etc. Most of students come to join their General Medicine program in Ukraine due to high level of training. All applicants who want to study medicine in Ukraine at the national medical universities are supposed to be assessed in Chemistry and Biology at secondary school.

The list of medical universities in Ukraine includes state education institutions of Ukraine of the 3rd and 4th accreditation levels such as universities, academies, and institutes.

Odesa National Medical University is considered to be one of the top medical universities in Ukraine. There are seven faculties (three medical ones, the faculty of dentistry, the faculty of pharmacy, an international faculty and the faculty of post-graduate studies), and 55 departments at Odesa National Medical University now. Post-diploma specialization is carried out in internship.

In January 2014 the first medical simulation center in Ukraine was founded at Odesa National Medical University. This center is equipped with modern facilities, that haven't got analogues in Ukraine. New methods and techniques are used for the educational process. The Centre has collaborations with leading medical simulation centers worldwide. Educational process at the Centre has an interdisciplinary approach and is aimed to provide healthcare specialists for Ukraine and other countries in accordance with, modern healthcare requirements.

Exercise 5. Answer the following questions:

1. What educational institutions train future doctors and pharmacists?
2. Who is a medical university headed by?
3. How long does the training course at the medical university last?
4. What does the training course include?
5. What languages is the training course provided in?
6. What do students take at the end of each term?
7. What kind of training do the students have during the first two years?
8. What subjects do they study during pre-clinical training?
9. What subjects do students of medical universities study during the senior years?
10. Where do young medical specialists work after graduation?
11. What specialists are engaged in the research work?
12. How many faculties are there at ONMedU now?
13. What modern facilities is ONMedU equipped with?

Exercise 6. Match the medical specialties to their definitions:

1. psychiatry	a) the medical science that deals with the nervous system and disorders affecting it;
2. pharmacology	b) the branch of medicine that deals with the care of women during pregnancy and childbirth;
3. pediatrics	c) the branch of medicine dealing with health care for women, especially the diagnosis and treatment of disorders affecting the female reproductive organs;
4. neurology	d) the branch of medicine concerned with the study, diagnosis, and treatment of mental disorders;
5. obstetrics	e) the branch of medicine that deals with the study and application of anesthetics;
6. gynecology	f) the branch of medicine concerned with treating disease, injuries, etc, by means of manual or operative procedures;
7. anesthesiology	g) the branch of medical science concerned with children and their diseases;
8. surgery	h) the science of drugs, including their characteristics and uses.

Exercise 7. Fill in the gaps with the following words or word combinations:

<p>neurology; engage; surgery, obstetrics and pediatrics; academic year; tenure; terms; attend lectures; higher educational institution; gynecology; to gain deep knowledge</p>

1. Each ... is usually divided into two ...
2. A medical university is a post –secondary ...
3. During their course of studies medical students ... and have practical classes in different subjects.
4. Medical students typically ... in both basic science and practical clinical coursework during their ...in medical school.
5. Students perform different laboratory works and attend dissecting room... of Anatomy.
6. The clinical part of the course includes learning
7. ... is the field of medicine dealing with the diseases of the nervous system.
8. Gynecologists work in the field of

Exercise 8. Match two parts of the sentences below to make an explanation of what a medical student is:

1. A medical student	a) medical students become doctors;			
2. Medical students study	b) is a student who studies medicine;			
3. They study a lot of subjects,	c) such as Anatomy, Physiology, Biochemistry, Histology and others;			
4. Medical students typically engage	d) at medical universities;			
5. After graduation from the university,	e) in both basic science and practical clinical coursework during their tenure at a medical school.			
1.	2.	3.	4.	5.

Exercise 9. Fill in the gaps with the words from the table below to get an explanation of what is a medical university:

such faculties; teach; post-secondary; future doctors; the course structure

1. A medical university is a ... higher educational institution.
2. It teaches
3. A medical university has ... as medical, dental and pharmaceutical.
4. Medical universities ... subjects such as human anatomy, biochemistry, pharmacology, immunology, neurology, obstetrics and gynecology, anesthesiology, internal medicine, family medicine, surgery, psychiatry, genetics, and pathology.
5. Traditionally, ... at a medical university is divided into a pre-clinical and a clinical part.

Exercise 10. Put the sentences into the correct order to explain the term “ONMedU”:

- ___ In 2010 the university was given the status of National University.
- ___ Odessa National Medical University was founded on September 1st, 1900, as the Medical Faculty of Novorossiysky University thanks to the efforts of the great surgeon N.I. Pirogov.
- ___ Post-diploma specialization is carried out in internship and in Master’s degree programme.
- ___ In 1920 the Medical Academy was organized in Odesa on the basis of the Medical Faculty of Novorossiysky University and became an independent higher educational institution.
- ___ There are seven faculties and 55 departments at the university.

Exercise 11. Complete the following answers:

1. Where do you study? I study at ...
2. What tests do medical students have to pass successfully to enter a medical university?
3. How long does your training take? My training ...
4. What subjects do you learn during the first two years? I learn ...
5. What subjects do the senior medical students learn? They learn ...
6. What practical skills will you acquire being the senior student? I'll acquire ...
7. What do medical students take at the end of each course of study? They take...
8. When do future doctors start working as interns?

Exercise 12. Natalia is a 4th year medical student of ONMedU. She is studying to become a physician. Her father, Viktor Andriyovych is a surgeon at a regional hospital. Natalia's brother Oleksandr is 15, he is still at school, but he wants to become a surgeon like his father.

a) Put the verbs in brackets into the correct forms of Present, Past or Future Simple.

1. Oleksandr ...(study) medicine after he graduates from school.
2. Viktor Andriyovych ...(treat) his patients with great care.
3. Natalia ... (like) Chemistry and Biology when she was at school.
4. Oleksandr ...(not want) to become a physician.
5. Natalia ...(not study) in 5 years' time.
6. Viktor Andriyovych ...(not live) at home with his parents when he was a student.

b) Complete the questions with suitable auxiliary verbs and answer them:

1. ... Viktor Andriyovych study medicine next year? -
2. ... Natalia want to become a surgeon like her father? -
3. ... Oleksandr go to school last year? -
4. Where ... Oleksandr's sister study? -
5. What ... Natalia do after she graduates from the university? -
6. What ... Natalia's father study at university? -

Exercise 13. Put the words in the correct order:

To make a statement:

1. lasts, choice, usually, the, 8 hours, about, multiple.
2. test, medical, is, most, Admission, schools, in, required.

To make a question:

1. Academic, factor, achievement, Is, important, an?
2. sciences, are, When, medical, presented?
3. What, curriculum, clinical, are, subjects, included, into?
4. final, What, during, the, consist, of, the, two, does, curriculum, years?

To make negative sentences:

1. headache, The, complains, of, a, patient. severe.
2. The, give, non-disposable, patients, with, nurses, syringes, injections.

Exercise 14. Put special questions to the words in italics:

1. *We* are taking notes of Anatomy.
2. A member of the staff is interviewing *the students of the second year*.
3. The students are working *at the laboratory* now.
4. He is taking his examination *in History* now.
5. *Students'* total expenses throughout the year are about several thousand dollars.
6. The department provides *instruction* in cell physiology and systems physiology.
7. The laboratory work of the trimester is summarized *in small group conferences*.
8. The students are preparing for a medical school *for 4-5 years*.

Self-control

I. Answer the questions:

1. What educational institutions train future doctors and pharmacists?

2. How long does the training course at the medical university last?
3. What does the training course consist of?
4. What kind of training do the students have during the first two years?
5. What subjects do the students study during the senior years?
6. Where do young medical specialists work after graduation?
7. How many faculties are there at ONMedU now?

II. Define the term: Medical student; medical university; ONMedU; psychiatry; pharmacology; pediatrics; neurology; obstetrics; gynecology; anesthesia; surgery

HEALTHCARE AND MEDICAL INSTITUTIONS IN UKRAINE

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
authority	administer	initial
fulfillment	deliver	inpatient
illness	ensure	outpatient
intervention	improve	
management	protect	
poisoning	provide	
rehabilitation		

Exercise 2. Form different parts of speech. Explain the meaning of affixes:

1. form **nouns and verbs** with the help of the prefix *over-*: production, heat, dosage, weight, to eat, to sleep, to react, to estimate;
2. form **adjectives** with the help of the prefix *un-*: favourable, clear, likely, conditioned, controllable, duly, safe, comfortable;
3. form **adjectives** with the help of the prefix *intra-*: muscular, venous, abdominal, hepatic, intestinal, nasal, oral;
4. form **the names of specialists (nouns)** with the help of the suffix *-ist*: neurology, gynaecology, physiology, anatomy, dermatology, endocrinology, traumatology, therapy, urology, oncology, ophthalmology.

Exercise 3. Read the following word-combinations.

to consult: to consult a neurologist, to consult an ENT-doctor, to consult the patients, a consulting doctor, consulting hours;

to make: to make a correct diagnosis, to make a procedure, to make a blood test, to make an experiment, to make an exception;

to complain: to complain of poor health, to complain of a headache, to complain of problems, to complain of heart discomfort, to complain of bad care;

to administer: to administer treatment, to administer certain drugs, to administer pain-killers, to administer intramuscular injections, to administer some procedures;

to provide: to provide population with medicines, to provide body with oxygen, to provide the injured people with first aid, to provide hospitals with things for medical care, to provide the patient with pills;

to relieve: to relieve pain, to relieve toothache, to relieve anxiety, to relieve fear, to relieve seizures;

analysis: blood analysis, urinalysis, feces analysis, laboratory analyses, biochemical analyses.

Exercise 4. Complete the table with necessary plural forms of nouns.

<i>Singular endings</i>	<i>Plural endings</i>	<i>Examples</i>	
		<i>singular</i>	<i>plural</i>
a	ae	vertebra	vertebrae
en	ina	lumen	lumina
um	a	septum	septa
us	i	fungus	fungi
ex, ix	ices	index	indices

1. diagnosis	
2. bacterium	
3. analysis	
4. nucleus	
5. streptococcus	
6. alveolus	
7. vertebra	
8. focus	

Exercise 5. Read the text:

Medical institutions in Ukraine

Healthcare is an independent dynamic system consisting of structural (healthcare authorities) and functional elements that are closely related. Healthcare authorities carry out direct management of healthcare institutions, direct and coordinate their work, ensure the interaction of individual health sectors, the unity of methods and basic principles of its organization. The functional elements of the healthcare system are represented by various services.

A healthcare service is any form of service that contributes to the fulfillment of tasks to improve health or to make the diagnosis, deliver treatment and rehabilitation of patients, and not only providing purely medical care. The healthcare system also embraces the total number of existing institutions and organizations whose multi-purpose function is to satisfy the diverse needs and demands of population for medical care.

Medical care in its broad sense is a generalized name for all types of medical aid, including treatment and preventive purposes. The level of difficulty in medical assistance ranges from simple self-help techniques to the use of the most highly specialized treatment methods.

Depending on the degree of responsibility and the complexity of medical interventions, medical care is divided into three levels –primary, secondary and tertiary.

Primary medical care is the central function and the main link of the healthcare system of any country, the main health care service, built on the principle “from the periphery to the center”, which exists as an integral part of social and economic development any country. The government of Ukraine announced the start of medical reform in 2017. Since April 2018, the campaign to select a doctor to provide primary health care has rapidly begun. Primary care will include pediatricians, therapists and family doctors. Citizens will have to sign a declaration of service with them. By signing this document, the patient is assigned to the doctor. The patient can change his/her choice if he/she is disappointed in the care provided by doctor or if he/she moves to another place of residence. To do this, one only needs to conclude a new declaration and a breach of relations with the former doctor will automatically occur. Each pediatrician can only recruit up to 900 patients, each family doctor –up to 1800 patients, and each therapist –up to 2000 patients. A citizen has the right to sign a declaration at any clinic at his/her request, regardless of his/her place of residence, as well as at a private clinic. The reform involves a fundamental change in the financing scheme for clinics and hospitals. Hence, prior to the adoption of innovations, state and municipal medical institutions were kept at the state budget, and now the funds will be used to purchase the services of doctors. The more declarations the doctors from the clinic will sign, the higher will be the income of this medical institution and the salary of the doctor.

Secondary care (health care) is provided by doctors who have the appropriate specialization and can provide more specialized treatment, consultation, diagnosis and prevention services than a general practitioner. This type of assistance is provided by city and district hospitals. Tertiary (highly specialized) care is provided by a doctor or a group of doctors with appropriate training in the field of diseases which are difficult to diagnose and treat, in the treatment of diseases that require special methods of diagnosis and treatment, as well as with the aim of diagnosing and treatment of rare diseases. Highly specialized care is provided mainly at regional medical institutions and centers.

There is a wide network of medical institutions in Ukraine which protect the health of our people: polyclinics, hospitals, health care centers, first aid stations, dental clinics, pharmacies and medical laboratories.

A polyclinic is health care facility that provides examinations and treatment for different diseases and injuries to outpatients and is usually independent of a hospital. Family doctors, therapists and pediatricians monitor your or your child's health, diagnose and treat the most common illnesses, injuries, and poisonings. If necessary, your doctor refer you to a secondary or tertiary care specialist or consult with this specialist about your treatment.

A hospital is a special medical institution that is aimed at treatment of the sick, injured or dying people with specialized medical and nursing staff and medical equipment. Hospitals typically have emergency departments to treat urgent health problems, such as fire and accident victims.

Emergency medical service (EMS) also known as *ambulance services* or *paramedic services* is a medical service that provides out-of-hospital medical care and transportation of patients with diseases and injuries to hospitals. It is carried out by the specialized facility called the First Aid Station.

A pharmacy (drugstore in US, chemist's shop in GB) is an institution of health service where people can buy different drugs and things for medical care.

Exercise 6. Answer the questions:

1. What is healthcare service?
2. What is medical care divided into?
3. What is primary medical care?
4. Whom is secondary care provided by?
5. What are the medical institutions?
6. What is a polyclinic?
7. What is a hospital?
8. What is an EMS?

Exercise 7. Explain word-combinations.

Bed-patient

Sitting – patient

Up-patient

In-patient

Out-patient

Exercise 8. a) Join adjectives and nouns to make up word-combinations:

1. initial	a) examination
2. intramuscular	b) drugs
3. unfavourable	c) trouble
4. instrumental	d) injection
5. poisonous	e) cavity
6. daily	f) diagnosis
7. abdominal	g) rounds
8. stomach	h) results

b) Join verbs and nouns to make up word-combinations:

1. to carry out	a) overdosage
2. to cause	b) injections
3. to administer	c) medicines
4. to require	d) dropper
5. to take	e) procedures
6. to set	f) treatment
7. to give	g) stomachache
8. to relieve	h) surgery

Exercise 9. What do the doctors do? Fill in the blanks with the words below:

1. patients; 2. treatment; 3. examines; 4. heart and lungs; 5. depressed; 6. blood pressure;
7. prescribes; 8. surgery; 9. disease; 10. chemist's; 11. nurse; 12. prescription.

When people have some problems like being _ or having lost appetite, they go to see the doctor in his/her _ . Every doctor has a _ to help the patient. When the doctor sees _ in the surgery, first he/she listens to their problems, then he/she _ them. The doctor takes the patient's temperature, listens to his/her _ , looks in his/her ears, eyes, takes his _ . Then, if the _ isn't so serious, the doctor _ some medicine. Later the patient will take the _ to the _ . If something is seriously wrong with the patient, the doctor sends him/her to the hospital for _ .

Exercise 10. Guess what word is meant.

1. A person who is treated by the doctor is a _____.
2. A medical document where the patient's information is written down is a _____.
3. A patient who comes to hospital to receive treatment and then returns home is called _____.
4. When a patient shouldn't eat before a procedure is known as _____.
5. To relieve stomachache it's necessary to follow a strict _____.
6. A patient who receives treatment at hospital and stays overnight is called _____.
7. The period when the patient's condition is improving is called a _____.
8. When a nurse slowly (in drops) introduces medicine into the patient's vein, it is called _____.

Exercise 10. Where can you find these patients? Match the patients with the correct wards.

a. Mary who has just delivered a baby	1. Intensive Care Unit
b. John who has broken his leg	2. Orthopaedic department
c. My grandmother who is suffering from pneumonia complications	3. Paediatric Ward
d. Peter who will have his appendix removed	4. Burn unit
e. Betty's mother who is suffering from women's disease	5. Casualty and Emergency Department
f. My mother who will be operated on for an eye cataract	6. Surgical Ward
g. Samuel who is unconscious	7. Geriatric Ward
h. Paul who has just been in a car crash	8. Ophthalmic Ward
i. Your son who has measles	9. Gynaecological Ward
l. James who has skin burns on his left arm	10. Maternity unit

Exercise 11. Put questions to the underlined words.

1. There are different departments in hospitals specialized in the treatment of particular diseases.
2. In case of emergency you may dial 103 for the ambulance to come, which operates day and night.
3. Maternity homes, Mother-and-Child Health Care Centers concentrate their efforts on the problems of Pediatrics, Obstetrics and Gynecology.
4. Nowadays a doctor should develop the basic skills to diagnose early, to treat efficiently and to exclude serious complications.
5. The service of epidemic warnings is carried out by WHO.
6. WHO gathers information and broadcasts it daily by radio to health authorities, ports, airports and ships at sea.

7. WHO also informs national health services about outbreaks of viral diseases such as coronavirus and hepatitis C.
8. WHO achieved impressive success in the campaign against small pox and malaria.

Exercise 12. Open the brackets using the verbs in the appropriate form.

The working day of any specialist at the polyclinic (to begin) at 9 o'clock in the morning. But, as a rule, they all (to come) to work at 8:45 a.m. so as to get ready for the reception of their patients. The work of a district doctor at the polyclinic (to last) for 3 hours during which he (to examine) about 10 and sometimes even 15 patients. In the afternoon he (to make) his daily round of visits to the district: if a patient (to be) seriously ill, his district doctor (to examine) him at home. As for other specialists working at the polyclinic their working day (to differ) from the one of a district doctor. They (to work) for 5 hours a day, i.e. from 9 a.m. to 2 p.m. As a rule, it (to take) them 15 to 20 minutes to examine one patient. Thus, a specialist (to receive) about 20 patients a day. So, the working day of any specialist at the polyclinic (to be) quite intense.

Exercise 13. Arrange the following sentences in order to describe the profession of a *family doctor*:

1. A family doctor is a specialist working at the polyclinic with a definite number of patients.
2. Then he leaves for the seriously ill patients who cannot come to the polyclinic and gives them sick-leaves.
3. The work of family doctors is very intensive, especially during seasonal epidemics such as flu.
4. The work of a family doctor at the polyclinic lasts for 6 hours.
5. His work consists of two parts: examinations at the polyclinic and visits to patients at home.

Self-control

I. Answer the questions:

1. What is healthcare service?
2. What is medical care divided into?
3. What is primary medical care?
4. Whom is secondary care provided by?
5. What are the medical institutions?
6. What is a polyclinic?
7. What is a hospital?
8. What is an EMS?

II. Define the term: Polyclinic, hospital

AT THE PHARMACY

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
ambiguity	dispense	dangerous
chemist's	promote	drastic
consequence	supply with	poisonous
contraindication		
expiry date		
prescription		
side effect		
storage		
warnings		

Exercise 2. Read correctly.

ps [s]: psychotropic, psychiatry, psychology, psychosis, psychiatrist, psychologist, psychic;

ph [f]: pharmacy, philosophy, pharmacology, physician, pharmacist, physics, photo;

y [ai]: supply, apply, rely, July, good-bye, type, rye;

au [ɔ:]: cause, trauma, autopsy, auscultation, autonomy, nausea, August.

Exercise 3. a) Form different parts of speech. Explain the meaning of affixes.

1. form adverbs with the help of the suffix *-ly*: entire, dangerous, immediate, potent, correct, different, safe;
2. form nouns with the help of the suffix *-ist*: oncology, dermatology, pharmacy, neurology, dentistry, urology, endocrinology;
3. form adjectives with the help of the suffix *-ous*: fame, danger, poison, nerve, fibre, glory, joy;
4. form adjectives with the help of the suffix *-al*: clinic, medic, practice, nation, critic, logic.

Exercise 4. Read the text.

At the Chemist's

Chemist's shop (a *pharmacy* in Great Britain, a *drug store* in the USA) is an institution of health service. It supplies the population with medicines and medical things. It is a place where a wide variety of articles is sold and prescription can be made; drugs are dispensed, stored and sold. There are different types of chemist's: municipal, public, private. Each chemist's shop has a chemist's department and a prescription one. All medicines are kept in drug cabinets, open shelves and refrigerators at a chemist's.

At the chemist's department a person buys drugs ready to use, different things for medical care and medical herbs.

Poisonous, drastic, narcotic and psychotropic drugs are sold by prescription only at the prescription department. These drugs are potent and can be dangerous if taken in an overdose. Therefore, their use is strictly controlled.

Every small bottle, a tube or a box of medicine has a label on it. White labels indicate drugs for internal use, yellow ones indicate drugs for external use and blue ones indicate drugs used for

injections. The dose to be taken and the directions for the administration are also indicated on a label. Besides, all containers of dispensed medicines have the following particulars: name of the patient, name of the medicine, correct dosage instructions, date of dispensing, expiry date, warnings or contraindications, name and address of the pharmacy. It prevents confusing different remedies, some of which are poisonous. Their overdosage may cause unfavourable reactions and sometimes even death.

The structure of a complete prescription includes six essential parts: the patient's name, the superscription (i.e. the traditional symbol **Rx** at the beginning of the prescription), the inscription (i.e. the body of the prescription containing the ingredients and their quantities), the subscription (i.e. prescriber's instructions to the pharmacist), the signature (i.e. directions to the patient) and the prescriber's name.

In continental Europe, prescriptions are written out in Latin abbreviations. The only exception is the signature. That is why European medical schools require two years of Latin as part of the curriculum for medical doctors and pharmacists. In Great Britain, all prescriptions are written out in English to avoid ambiguity and misunderstanding that might lead to serious consequences.

Exercise 5. Answer the questions.

1. What is a chemist's shop?
2. What departments are there at every chemist's?
3. What can a person buy at the chemist's department?
4. What can a person buy at the prescription department?
5. Where are all the drugs kept at the chemist's?
6. Why are some drugs sold by prescription only?
7. What are the necessary particulars on the label?
8. What does the complete prescription consist of?

Exercise 6. Match the type of medicine and its application or content:

1. A vial	a) solid medicines are inserted into the rectum to melt and affect the body
2. A tube	b) to stop bleeding
3. A box	c) to clean and close wounds
4. An adhesive plaster	d) a device used to protect and immobilize a body part (such as a broken arm)
5. A suppository	e) of suppositories
6. A splint	f) the injection of liquid into the rectum and colon by way of the anus
7. A syrup	g) of cough mixture
8. A tourniquet	h) to explore a wound or body cavity
9. A probe	i) with eye drops
10. An enema	j) of liniment

Exercise 7. Match the terms with their explanations.

1. a chemist's	a) a case of taking drugs in excessive amount
2. a pharmacist	b) a special time when a medicine can no longer be used
3. a medicine	c) a small piece of paper which contains the information about the drug
4. a prescription	d) pills or tablets used for treatment of diseases
5. an overdosage	e) a person who is qualified to compose and dispense drugs
6. a label	f) a storage place for drugs and remedies inside a chemist's
7. a drug cabinet	g) a medical facility where one can buy drugs and things for medical care
8. an expiry date	h) a doctor's written instruction for the composition and use of a drug

Exercise 8. Replace the words in bold type with the equivalents from the texts.

1. Any **medicine** should be taken according to the prescription.
2. A chemist's **provides** people with medicines.
3. **The body of the prescription** includes the ingredients of a drug.
4. The drugs are **kept** in drug cabinets.
5. **An excessive intake of drugs** leads to **bad results**.
6. **Toxic** drugs are sold by prescription only.
7. Some **additional effects** appear when taking these pills.
8. **To escape double meaning** the British don't use Latin abbreviations.

Exercise 9. Insert instead of parentheses the words given in a box:

stretcher, splint, reception ward, drug, suppositories, laxatives, antipyretics,
side effects, wound, enema and hot water bottle

1. The patient with an open _____ should be injected anti-tetanus vaccine.
2. The man injured in a car accident was carried into the _____ on _____.
3. To arrest severe bleeding from the wound in the femur the nurse applied a _____.
4. The patient suffering from constipation was administered _____ to evacuate the bowels.
5. _____ are applied in treatment of gastrointestinal disorders.
6. As infants can't swallow the tablets, they are administered drugs to subside the fever - _____ by rectal route - in the form of _____.
7. A _____ is a chemical substance used to treat, cure, prevent, or diagnose a disease.
8. _____ of drugs may cause nausea, vomiting, heart and lung problems, etc.

Exercise 10. a) Open the brackets using the verbs in the appropriate form.

The structure of a complete prescription (to include) six essential parts: the patient's name, the superscription the inscription, the subscription, the signature and the prescriber's name.

The superscription (to be) the traditional symbol "Rx". It always (to appear) at the beginning of the prescription. "Rx" (to represent) the contraction of the Latin verb "recipe" which (to mean) "to take". In Continental Europe they (to use) the symbol "Rp". It (to be) the analogous of the English "Rx".

Then (to come) the inscription. It (to be) the body of the prescription. This section (to contain)

the ingredients and their quantities, necessary to make a medicine.

The subscription always (to follow) the inscription and (to contain) the writer's instructions to the pharmacist.

The signature (to consist) of the directions for the patient. The pharmacist (to place) this information the label of the container in which the medication is dispensed.

The prescriber's name (to be) the part of the prescription that (to guarantee) its authenticity.

b) Place the parts of the prescription in the correct order and read it. Name each part:

1. For pain, one pill four times a day by mouth
2. Dr Thomas Hood
3. Rx
4. Sevredol, sixty x twenty-milligramme tablets
5. two packages
6. Patient Robert Smith

11. Write the words in the correct group:

Disease	Medicines and treatment
a sore throat	laxatives
cough	antihistamine
pain	anti-emetics
allergy	plaster cast
vomiting	antiseptic
constipation	lozenges
wound	analgesics
fracture	a cough syrup

Exercise 12. Insert the preposition where necessary.

to (x 2) on (x 2) in (x 2) with out at

1. You can find this drug ... the chemist's over there.
2. The prescription is written ... in Latin.
3. Overdosage causes ... serious consequences.
4. I was ... a sick-leave twice last year.
5. I keep all the medicines ... a small drug cabinet.
6. This procedure consists ... listening ... the patient's heart and lungs.
7. Depending ... the weather, we'll either go ... the polyclinic or call ... a doctor.
8. World Health Organisation supplies ... people ... the information about epidemics.

Exercise 13. Change sentences from Active into Passive.

Model: *The doctor will examine you in a minute. – You will be examined by the doctor in a minute.*

1. A. Fleming discovered penicillin by chance.
2. The surgeon operated on the patient successfully.
3. Students study basic theoretical subjects in the first term.
4. Scientists introduced new methods of treatment of cancer.

5. The district doctor will prescribe you the proper treatment.
6. The doctor made a correct diagnosis after the physical examination.
7. The doctor will discharge the patient from the hospital in two days.
8. The nurse on duty usually takes the patients to different procedures.

Exercise 14. Re-write sentences opening brackets.

1. These drugs (to sell) yesterday.
2. A complete prescription (to consist) of six essential parts.
3. The daily dosage (to indicate) always on the label of the medicine.
4. In the future, sale of potent drugs (to control) much more strictly.
5. The prescriber's name (to guarantee) the authenticity of the drug.
6. Yesterday, before taking the pills she (to read) the package insert.
7. Drastic medicines (to cause) such side effects as nausea and dizziness.
8. If expiry date of a remedy is over, a pharmacist immediately (to write) it off.

Exercise 15. Put questions to the underlined words.

1. Latin is the language of prescriptions.
2. There are two departments at any chemist's.
3. The use of potent drugs is strictly controlled.
4. The physician prescribed him mild laxatives.
5. A chemist's supplies population with medicines.
6. In Britain prescriptions are written out in English only.
7. They will take into consideration all the doctor's administration.
8. The pharmacist instructed the patient about the medication's side effects.

Exercise 16. Describe the notion "chemist's" using the following table.

1. The type of establishment.	
2. What it supplies people with.	
3. Structural units.	
4. Peculiarities of prescription in different European countries.	

Self-check

I. Answer the questions:

1. What kinds of chemist's shops are there?
2. What can a person buy at the chemist's department?
3. What drugs are sold by prescription only?
4. Where are all the drugs kept at the chemist's?
5. What does the complete prescription consist of?

II. Define the terms: Pharmacy, Prescription

HUMAN BODY

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
buttocks	breathe	internal
chest	comprise	principal
conjunctiva	connect	
cornea	consist	
eyebrow	cover	
eyelash	grow	
esophagus	protect	
forehead	support	
gallbladder		
heart		
injury		
intestine		
iris		
kidney		
limb		
lens		
palate		
skull		
stomach		
thumb		
tongue		
trunk		
pupil		
wrist		

Exercise 2. Read the following word combinations. Make your own sentences.

Injury: occupational injury, sports injury, intentional injury, soft tissue injury, brain injury, the cause of injury. He escaped from the accident without injury.

To breathe: to breathe in, to breathe out, to breathe easily/freely, to breathe one's last, a natural fabric that breathes. Give me a moment to breathe. Don't breathe a word of this.

Surface: outer surface, interior surface, facial surface, buccal surface, masticatory surface, lingual surface, superficial.

Extremity: upper extremity, lower extremity, complex extremity trauma. it is important to keep the extremities warm. Extremity angiography is a test used to see the arteries in the hands, arms, feet or legs.

Exercise 3. Read the text:

Human body

The human body refers to the entire structure of a human being.

The principal parts of the human body are the head, the trunk, and limbs (extremities).

The head consists of 2 parts: the skull contains the brain and the face includes the forehead, the eyes, nose, the mouth, the cheeks, the ears and the chin.

Each eye has the eyelids and the eyelashes that grow along the edge of the eyelids. There are the eyebrows over our eyes. The eyes serve as the organ of sight. The outer layer of the eye consists of 8 eye parts: lens, pupil, iris, cornea, conjunctiva and sclera.

The nose is the organ of smell through which we breathe.

The ear includes 3 principal parts: the external ear, the middle ear and the internal ear. The ear is responsible for hearing and balance.

The mouth has 2 lips: the upper and the lower lip. The tongue which is the organ of taste, teeth and hard and soft palates are located in the mouth.

The head is connected with the trunk by the neck.

The upper part of the trunk is the chest. The principal organs in the chest are the lungs, the heart and the esophagus (gullet).

The lower part of the trunk called abdomen consists of the stomach, the liver, the spleen, the intestines, the kidneys, the gallbladder and the bladder.

The surface of the body from the neck to the buttocks is called the back.

The waist is the narrow middle part of the body above the hips.

When we speak of the upper extremity, we mean the arm. The upper extremity connected with the chest by the shoulder consists of the upper arm, the forearm, the elbow, the wrist and the hand. We have 5 fingers on each hand which allow grasp the objects. A short finger set apart from the other is called the thumb. Fingers contain some of the densest areas of nerve endings on the body, are the richest source of tactile feedback, thus the sense of touch is intimately associated with hands.

The lower extremity called the leg consists of the thigh, the knee, the calf, the ankle and the foot. The foot is composed of the toes, the heel, the sole and the arch. The nail is a hard part at the end of a toe and finger.

The framework of bones called the skeleton supports the soft parts and protects the organs from injury. The bones are covered with muscles.

The body is covered with the skin.

Exercise 4. Answer the questions:

1. What are the principal parts of the human body?
2. What does the face include?
3. What is the organ of taste?
4. Where do eyelashes grow?
5. What does the eye consist of?
6. What do we breathe through?
7. What organ is responsible for hearing and balance?
8. What are the principal organs in the chest?
9. What organs does the abdomen consist of?

10. What does the upper/lower extremity consist of?
11. Why are fingers important?
12. What part of the body is responsible for sense of touch?
13. What supports the soft parts and protects the organs from injury?

Exercise 5. Fill in the gaps with the proper words:

1. The bones are covered with... .
2. When we speak of the upper extremity we mean
3. The ... is the narrow middle part of the body above the hips.
4. The upper part of the trunk is the
5. The head is connected with the ... by the neck.
6. The ... is the organ of taste.
7. The mouth has 2 ... : the upper ... and the lower
8. The nose is the organ of ... through which we breathe.

Exercise 6. Complete the sentences:

1. There are five fingers on my
2. There are five toes on my
3. I can smell with my
4. I can hear with my
5. I can taste with my
6. Put your hand in front of your ... when you yawn.
7. I hope I will pass my exam, I cross my
8. When you agree with someone you generally nod your

Exercise 7. Match the following parts of the body to their definitions:

Kidney	a) a long pipe leading from the stomach which takes waste matter from the body;
Lung	b) a sac-like organ in which food is broken down;
Liver	c) an organ in the head which controls thought and feeling;
Heart	d) one of the paired organs which separate waste liquid from the blood;
Brain	e) a large organ which cleans the blood;
Stomach	f) a passage from the back of the mouth down inside the neck;
Intestine	g) one of a pair of breathing organs in the chest;
Throat	h) an organ in the chest controlling the flow of blood by pushing it round the body.

Exercise 8. What parts of the body are described?

1. The movable part of the body at the end of the leg on which a person stands.
2. The upper front part of the body between the neck and the abdomen, enclosing the heart and lungs.
3. The part of the face above the mouth which is the organ of smell and through which air is breathed.
4. The opening on the face through which a person can take food into the body and speak.
5. The front part of the head from the chin to the forehead and hair.

6. The lower part of the arm between the hand and the elbow.
7. The upper part of the face above the eyes and below the hair.
8. The front part of the face below the mouth.
9. The front part of the body below the chest.
10. The part of the leg just above the foot.

Exercise 9. Divide the words into two columns – nouns and adjectives.

Example: heart (n) – cardiac (adj), neck (n) – cervical (adj).

Facial, spinal, pelvis, lung, basic, neck, anatomical, buccal, palate, extremity, skull, nasal, surface, cranial, cheek, cervical, renal, tongue, pulmonary, liver, trunk, lingual, mouth, cardiac, oral, kidney, palatine, hepatic, tongue, pelvic.

Exercise 10. Read and pay attention to prepositions:

In the chest, in the patient, in the child; at the table, at the academy, at the hospital; on the shoulder, on the wrist; behind the stomach; between the lungs, between the upper arm and the forearm; in front of the hospital, in front of the kidney; near the heart; to the right of the stomach, under the diaphragm, above the diaphragm, above the elbow; below the liver; to the hospital, to the heart; from the heart; into the room, into the muscle; through the heart; out of the lungs.

Exercise 11. Fill the blanks with prepositions:

1. There are eyebrows ... our eyes.
2. The nose is the organ ... smell ... which we breathe.
3. The head is connected ... the trunk ... the neck.
4. The teeth are located ... the mouth.
5. We have 5 fingers ... each hand.
6. The skeleton protects the organs ... injury.
7. The body is covered ... the skin.
8. A short finger set apart ... the other is called the thumb.

Exercise 12. Put the questions to the underlined parts of the sentences:

1. Some strange spots have covered both his palms and feet.
2. His tongue was dry and white.
3. The upper extremity is connected with the chest by the shoulder.
4. Eyelashes protect the eye from entering of foreign bodies.
5. All human beings have five fingers on each hand.
6. Each toe consists of three phalanx bones.
7. The skin covered by your nail is called a nail bed.
8. During the last winter, doctors have noted a great number of broken ankles.

Exercise 13. Arrange the sentences in the correct order to get some additional information about a human body:

1. Out of these 78 organs of a male or female body, skin is the largest organ.
2. Other major organs of the body have their names, location and functions.
3. The major organ in the body of human beings is the brain.

4. There are almost 78 organs in a human body which have various sizes, functions or actions.
5. The cells in the body organs are highly specialized.
6. An organ is a collection of millions of cells which group together to perform single functions in our body.

Exercise 14. Name the organs and parts of the body localized in:

Thoracic cavity
 Abdominal cavity
 Upper extremity
 Lower extremity

Exercise 15. Speak about a human body according to such points:

- basic parts of the human body;
- vital organs of the human body
- sensory organs

Self-control

I. Answer the questions:

1. What are the principal parts of the human body?
2. What are the principal organs in the chest?
3. What organs does the abdomen include?
4. What does the upper extremity consist of?
5. What does the lower extremity consist of?
6. What supports soft parts and protects organs from injury?

II. Define the term: Human body, Head, Trunk, Upper extremity, Lower extremity

**MICROORGANISMS
Part 1**

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
algae	encompass	capable
archaea	prevalent	irregular
bacteria	replicate	lobed
fungi	responsible for	rectangular
habitat		rod
protozoa		salty
viruses		spherical
yeast		spiral
		visible

Exercise 2. Remember:

Singular	Plural
alga	algae
archaeon	archaea
bacterium	bacteria
coccus	cocci
eukaryote	eukarya
flagellum	flagella
fungus	fungi
hypha	hyphae
medium	media
mitochondrion	mitochondria
nucleus	nuclei
protozoan	protozoa

Exercise 3. Read the following paying attention to the rules of reading:

[əʃ] – filamentous, infectious, dangerous, numerous, previous, fibrous, nervous, various

[ə] – medium, fungus, nucleus, bacterium, asexual, archaeon, flagellum, spirillum, alga

[ə] – contain, consists, comprise, concern, control, correct, complete,

[s] – cocci, actinomycete, multicellular, absence, bacillus, mycelium, resistance, acid

[k] – coccus, cycling, nuclei, mitochondria, archaea, bacteria, actinomycete, microbe

Exercise 4. Study the elements of medical terminology. Read the following words and give more examples of your own:

a – asexual, acellular, abacterial, abiotic, avascular, avirulent, atoxic

multi – multicellular, multicapsular, multichamber, multivitamins, multipurpose

uni – unicellular, unicameral, unilateral, uninuclear, unioocular, unigravida

Exercise 5. Group the following words according to the parts of speech using the table:

Noun	Verb	Adjective	Adverb
------	------	-----------	--------

Harmless, helpful, asexual, umbrella, generally, microbe, through, colony, replication, fungi, host, algae, major, unicellular, differ, nucleus, variety, encompass, individual, domain, width, habitat, reproduce, appear, external, rod-shaped, exist, gram-negative, membrane-bound, propel, urogenital, archaeal, absence, typically, filamentous, within, superficially, hyphal, form, namely, contain, resistance, human, compose, unusually, instead, endure, solvent, survive, known, harsh, particularly, exploit, extremely, characteristic.

Exercise 6. Read the text:

Microorganisms

Part 1

A microorganism or microbe is any microscopic organism too small to be visible to the naked eye which may exist in its single-celled form or in a colony of cells (multicellular form). Microorganisms is an umbrella term used to encompass bacteria, yeast, fungi, and in some definition. The classification is broad and includes both microorganisms that are capable of replication outside of any host and those that require a host to survive.

Microorganisms differ from each other not only in size, but also in structure, habitat, metabolism, and many other characteristics. The major groups of microorganisms – namely bacteria, archaea, fungi (yeasts and molds), algae and protozoa are usually found in each of the three domains of life: Archaea, Bacteria, and Eukarya. Microbes within the domains Bacteria and Archaea are all *prokaryotes* whereas microbes in the domain Eukarya are *eukaryotes*. Some microorganisms, such as viruses, do not fall within any of the three domains of life.

A **prokaryote** is a unicellular organism that lacks a membrane bound nucleus, mitochondria, or any other membrane-bound organelle. Prokaryotes are asexual, reproducing without fusion of gametes.

Eukaryotes are organisms whose cells have a nucleus enclosed within membranes. Eukaryotic cells typically contain other membrane-bound organelles such as mitochondria and the Golgi apparatus, and in addition, some cells of plants and algae contain chloroplasts.

Eukaryotes can reproduce both asexually through mitosis and sexually through meiosis and gamete fusion.

Bacteria are microorganisms that do not have a true nucleus; their genetic material is free floating within the cell. Bacteria are very small one-celled organisms and do not contain very complex cell structures. Generally, bacteria come in three varieties: *bacilli* (rod-shaped), *cocci* (sphere-shaped), and *spirilla* (spiral-shaped). Bacteria are prevalent in all environments and are important members of an ecosystem. They are responsible for the breakdown of dead organic matter into its constituent molecules. For this reason, we call bacteria decomposers. They also can be eaten by other organisms and are thus valuable in food-chain relationships. Since bacteria are small, can divide asexually very rapidly, can live practically anywhere, and have great metabolic versatility, they are the most numerous organisms on Earth. Many bacteria, when placed in good conditions, can reproduce every 20 or 30 minutes, each doubling its population after each reproduction.

Archaea are a group of microorganisms that are similar to, but evolutionarily distinct from bacteria. They are eukaryotes and contain the green pigment chlorophyll, carry out photosynthesis, and have rigid cell walls. Archaea can be spherical, rod, spiral, lobed, rectangular or irregular in shape. An unusual flat, square-shaped species that lives in salty pools has also been discovered. Some exist as single cells, others form filaments or clusters.

Many archaea have been found living in extreme environments, for example at high pressures, salt concentrations or temperatures. These types of organisms are called extremophiles. Their cell wall differs in structure from that of bacteria and is thought to be more stable in extreme conditions, helping to explain why some archaea can live in many of the most hostile environments on Earth.

Exercise 7. Answer the questions:

1. What is a microorganism?
2. What are the forms of microorganisms?
3. What is the classification of microorganisms and what microorganisms does it include?
4. What do microorganisms differ from each other?
5. What are the major groups of microorganisms?
6. What are the three domains of life of microbes?
7. What domains do prokaryotes and eukaryotes belong to?
8. What microorganisms do not fall within any of the three domains of life?
9. What unicellular organism do we call a prokaryote?
10. How can eukaryotes reproduce?
11. What shapes may all bacteria have?

12. What is the major characteristic of bacteria?
13. Where may bacteria be usually found?
14. What are Archaea?
15. What shape can Archaea be?
16. Where do Archaea live?

Exercise 8. Complete the sentences:

Microscopy

The previously mentioned will often rely on microscopic examination for identification of the microbe. Instruments such as ... can be used to view the specimen under ordinary illumination to assess critical aspects of the organism. This can be performed immediately after the ... is taken from the patient and is used in conjunction with biochemical ... techniques, allowing for resolution of cellular features. are also used for observing ... in greater detail.

electron microscopes and fluorescence microscopes; sample; staining; microbes; culture techniques; compound light microscopes

***Using your knowledge of Physics, argue your answer to the following question:** What microscope is more precise: electron or light?

Exercise 9. Fill in the gaps with prepositions from the box below:

in, by, of, for; on

Microbiological culture is the primary method used ____ isolating infectious disease ____ study _____ the laboratory. Tissue or fluid samples are tested ____ the presence ____ a specific pathogen, which is determined _____ growth in a selective or differential medium.

The 3 main types ____ media used ____ testing are:

1. A solid surface is created using a mixture of nutrients, salts and agar. A single microbe on an agar plate can then grow into colonies (clones where cells are identical to each other) containing thousands _____ cells. These are primarily used bacteria and fungi.
2. Cells are grown inside a liquid media. Microbial growth is determined by the time taken for the liquid to form a colloidal suspension. This technique is used _____ diagnosing parasites and detecting mycobacteria.
3. Human or animal cell cultures are infected with the microbe of interest. These cultures are then observed to determine the effect this new microbe has _____ the cell. This technique is used for identifying viruses.

***Find the answers to the following questions:**

1. In what cases is the microbiological culture used?
2. What materials are usually tested?
3. What types of media are used for testing?

Exercise 10. Make the sentences interrogative and negative paying attention to Modal Verbs. Translate them:

1. A microorganism, or microbe is a microscopic organism, which **may** exist in its single-celled form or in a colony of cells.
2. Microorganisms **could** live in almost every habitat from the poles to the equator, deserts, geysers, rocks and the deep sea.
3. The scientists **must** identify many disease-causing microorganisms.

4. Microbes are important in human culture and health in many ways, they **may** serve to ferment foods, treat sewage, produce fuel, enzymes and other bioactive compounds.
5. Medical microbiologists **must** serve as consultants for physicians, suggesting treatment options.
6. A microbiologist **may** also assist in preventing or controlling epidemics and outbreaks of disease.
7. There are four kinds of microorganisms that **can** cause infectious disease; bacteria, fungi, parasites and viruses.
8. Fleming **might** interest biologists and mould experts in production of penicillin.

Exercise 11. Read the sentences. Put the predicates into the Past:

1. A single microbe on an agar plate can grow into colonies.
2. Fluid samples may be tested for the presence of a specific pathogen.
3. Microbial growth must be determined by the time taken for the liquid to form a colloidal suspension.
4. Certain technique may be used for diagnosing parasites and detecting mycobacteria.
5. Instruments such as compound light microscopes can be used to assess critical aspects of the organism.
6. Diagnosis of infectious disease may be nearly always initiated by consulting the patient's medical history and conducting a physical examination.
7. More detailed identification techniques can involve microbial culture, microscopy, biochemical test and genotyping.
8. Other less common techniques must be used to produce images of internal abnormalities resulting from the growth of an infectious agent.

Exercise 12. Open the brackets using the verbs in the appropriate form. Translate the sentences into Ukrainian:

History of Medical Microbiology

Anton van Leeuwenhoek is considered to be the one of the first to observe microorganisms using a microscope. In 1676, he (**to observe**) bacteria and other microorganisms, using a single-lens microscope of his own design.

In 1796, using an ancient Chinese technique for smallpox vaccination, Edward Jenner (**to develop**) a method using cowpox a to successfully immunize a child against smallpox. The same principles (**to use**) for developing vaccines today.

Following on from this, in 1857 Louis Pasteur also (**to design**) vaccines against several diseases as well as pasteurization for food preservation.

Joseph Lister is considered to be the father of antiseptic surgery. By sterilizing the instruments with diluted carbolic acid and using it to clean wounds, post-operative infections (**to reduce**) making surgery safer for patients.

In the years between 1876-1884 Robert Koch provided much insight into infectious disease. He (**to be**) one of the first scientists to focus on the isolation of bacteria in pure culture. This (**to give**) rise to germ theory, a certain microorganism being responsible for a certain disease. He (**to develop**) a series of criteria around this that have become known as the Koch's postulates.

In 1884 Hans Christian Gram developed the method of staining bacteria, to make them more visible and differentiable under a microscope. This technique (**to use**) widely today.

In 1929 Alexander Fleming developed the most commonly used antibiotic substance both at the time and now: penicillin.

Exercise 13. Put questions to the underlined words:

CASE

Joaquim, a 45-year-old journalist, has just returned to the U.S. from travels in China and Africa. He is not feeling well, so he goes to his general practitioner complaining of weakness in his arms and legs, fever, headache, noticeable agitation, and minor discomfort. He thinks it may be related to a dog bite he suffered while interviewing a Chinese farmer. He is experiencing some prickling and itching sensations at the site of the bite wound, but he tells the doctor that the dog seemed healthy and that he had not been concerned until now. The doctor ordered a culture and sensitivity test to rule out bacterial infection of the wound, and the results came back negative for any possible pathogenic bacteria.

Self-control

I. Answer the questions:

1. What is a microorganism?
2. What are the major groups of microorganisms?
3. What are the three domains of life of microbes?
4. What shapes may all bacteria have?
5. What is the major characteristic of bacteria?
6. What are Archaea?

II. Define the term: Microorganisms, Bacteria, Archaea

MICROORGANISMS

Part II

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
algae	accumulate	rigid
cilia	cause	spindle-shaped
helminth	exhibit	
invertebrate	reside	
larvae		
mold		
protozoa		
tapeworm		
yeast		

Exercise 2. Read the following paying attention to the rules of reading:

- [ə] – apparatus, addition, cilia, aquatic, ability, pharmaceuticals, filament
- [ʒn] – fusion, division, decision, vision, inclusion, exclusion
- [dʒ] – vaginal, Golgi, algae, rigid, oxygen, allergies, fungi, flagella, energy
- [k] – chloroplasts, character, chemistry, chlorophyll, mitochondria
- [j] – yeast, yolk, yes, yet, yellowness, yield, yesterday

Exercise 3. a) Make Adjectives for the Nouns with the help of suffixes:

Noun	Adjective	Noun	Adjective
------	-----------	------	-----------

eukaryote		sphere	
protozoan		filament	
type		cylinder	
cell		larva	
microscope		virus	
aqua		parasite	
photosynthesis		vision	
hypha		sex	

b) Make a word combination with each Adjective:

For example: eukaryotic - eukaryotic cell

Exercise 4. Give the Plural of the following Nouns:

Alga, bacterium, flagellum, species, nucleus, hypha, streptococcus, analysis, virus, datum, formula, mycobacterium, fungus, medium, mitosis, mitochondrion, phenomenon, archaeon, coccus, vibrio, vertebra, ganglion, protozoan

Exercise 5. Read the word combinations:

Cell – cell growth; a host cell; uninuclear cell; unicellular archaea and bacteria; cell division.

The virus will infect a cell and then it will begin to replicate.

Bacterium - spiral bacterium; chemosynthetic bacterium; gas-producing bacteria; bacterial.

Under optimal conditions bacteria can grow extremely rapidly and their numbers can double as quickly as every 20 minutes.

Nucleus – nuclei; nuclear envelope; constitution of the nucleus; the eukaryotic cell's nucleus

A sperm is a nucleus surrounded by little other cellular material.

Microorganism - microorganism activity; motile microorganism; microorganism-free animals.

This microorganism is a producer of disease. In the human body microorganisms make up the human microbiota including the essential gut flora.

Enclose - enclosed; enclosed within a membrane; enclosed area; enclosed in brackets; enclosure.

If a place or object is enclosed by something, the place or object is inside that thing or completely surrounded by it.

Exercise 6. Read the text:

Microorganisms

Part II

Algae are eukaryotic organisms that have no roots, stems, or leaves but do have chlorophyll and other pigments for carrying out photosynthesis. Algae can be multicellular or unicellular.

Unicellular algae occur most frequently in water, especially in plankton. Phytoplankton is the population of free-floating microorganisms composed primarily of unicellular algae. In addition, algae may occur in moist soil or on the surface of moist rocks and wood. Algae live with fungi in lichens.

Fungi are eukaryotic organisms that have rigid cell walls and may be either unicellular or multicellular. Unlike algae, fungi do not contain chlorophyll and thus cannot carry out photosynthesis. Fungi do not ingest food but must absorb dissolved nutrients from the environment.

Of the fungi classified as microorganisms, those that are multicellular and produce filamentous, microscopic structures are frequently called molds, whereas yeasts are unicellular fungi.

Unicellular fungi – **yeasts** – are included within the study of microbiology. The unicellular yeasts have many forms from spherical to egg-shaped to filamentous. Yeasts are found in many different environments, from the deep sea to the human navel. Some yeasts have beneficial uses, they are noted for their ability to ferment carbohydrates, producing alcohol and carbon dioxide in products such as wine and bread. Some even cause diseases, such as vaginal yeast infections and oral thrush.

Other fungi of interest to microbiologists are multicellular organisms called **molds**. In molds cells are cylindrical in shape and are attached end to end to form threadlike filaments (hyphae) that may bear spores. Individually, hyphae are microscopic in size. However, when large numbers of hyphae accumulate—for example, on a slice of bread or fruit jelly—they form a fuzzy mass called a mycelium that is visible to the naked eye.

Protozoa, or protozoans, are single-celled, eukaryotic microorganisms. Some protozoa are oval or spherical, others elongated. Cells can be as small as 1 μm in diameter and as large as 2 mm (visible without magnification). Some protozoa move with help from hair-like structures called cilia or whip-like structures called flagella. Some phytoflagellate protozoa are photosynthetic which obtain their energy via photosynthesis; others feed on organic material. Some are free-living, whereas others are parasitic, which feed on organic matter such as other microorganisms or organic tissues and debris. Most protozoa are harmless, but some are pathogens that can cause disease in animals or humans.

Viruses are acellular microorganisms which are not composed of cells. Essentially, a virus consists of proteins and genetic material—either DNA or RNA, but never both—that are inert outside of a host organism. However, by incorporating themselves into a host cell, viruses are able to co-opt the host's cellular mechanisms to multiply and infect other hosts.

A virus is a sub-microscopic infectious agent that replicates only inside the living cells of an organism. They can infect all types of cells, from human cells to the cells of other microorganisms, including bacteria and archaea.

Multicellular parasitic worms called **helminthes** are not technically microorganisms, as most are large enough to see without a microscope. However, these worms fall within the field of microbiology because diseases caused by helminthes involve microscopic eggs and **larvae**. The helminthes are invertebrates characterized by elongated, flat or round bodies. In medically oriented schemes the flatworms or Platyhelminthes (platy from the Greek root meaning “flat”) include flukes and tapeworms. Roundworms are nematodes (nemato from the Greek root meaning “thread”). These groups are subdivided for convenience according to the host organ in which they reside, e.g., lung flukes, extraintestinal tapeworms, and intestinal roundworms.

Exercise 7. Answer the questions:

1. What microorganism contain chlorophyll and thus can carry out photosynthesis?
2. Where may algae normally occur?
3. What is the difference between algae and fungi?
4. What are fungi?
5. What environments are yeasts usually found in?
6. What beneficial uses do some yeasts have?

7. What eukaryotes have been used to make pharmaceuticals?
8. What eukaryotic microorganisms move with help from hair-like structures called cilia or whip-like structures called flagella?
9. How do some phytoflagellate protozoa obtain their energy?
10. What does a virus consist of?
11. What are the multicellular parasitic worms called?
12. What groups may helminthes be subdivided into?

Exercise 8. Look through the definitions and match them with the terms filling the table given below with the corresponding letters:

1. fungus	a) a bacterium of an order of typically non-motile filamentous forms. They include streptomycetes, and were formerly regarded as fungi;
2. virus	b) a simple, non-flowering, and typically aquatic plant of a large assemblage that includes the seaweeds and many single-celled forms. They contain chlorophyll but lack true stems, roots, leaves, and vascular tissue;
3. protozoan	c) a member of a large group of unicellular microorganisms which have cell walls but lack organelles and an organized nucleus, including some which can cause disease;
4. actinomycete	d) any of a group of unicellular, multicellular, or syncytial spore-producing organisms feeding on organic matter, including moulds, yeast, mushrooms, and toadstools;
5. bacterium	e) a single-celled microscopic animal of a group of phyla of the kingdom Protista, such as an amoeba, flagellate, ciliate, or sporozoan;
6. yeast	f) a microscopic single-celled organism which has neither a distinct nucleus with a membrane nor other specialized organelles, including the bacteria and cyanobacteria;
7. prokaryote	g) a microscopic fungus consisting of single oval cells that reproduce by budding, and capable of converting sugar into alcohol and carbon dioxide;
8. alga	h) an infective agent that typically consists of a nucleic acid molecule in a protein coat, is too small to be seen by light microscopy, and is able to multiply only within the living cells of a host.

Exercise 9. Put questions to the underlined words:

CASE

A patient in the hospital has an intravenous catheter inserted to allow for the delivery of medications, fluids and electrolytes. Four days after the catheter is inserted, the patient develops a fever and an infection in the skin around the catheter. Blood cultures reveal that the patient has a blood-borne infection. Tests in the clinical laboratory identify the blood-borne pathogen as *Staphylococcus epidermis*, and antibiotic susceptibility tests are performed to provide doctors with essential information for selecting the best drug for treatment of the infection. Antibacterial chemotherapy is initiated and delivered through the intravenous catheter that was originally inserted into the patient. Within 7 days, the skin infection is gone; blood cultures are negative for *Staphylococcus epidermis* and the antibacterial chemotherapy is discontinued. However, 2 days after discontinuing the

antibacterial chemotherapy, the patient develops another fever and skin infection and the blood cultures are positive for the same strain of *Staphylococcus epidermis* that had been isolated the previous week. This time the doctors remove the intravenous catheter and administer oral antibiotics, which successfully treat both the skin and blood-borne infection caused by *S. epidermis*. Furthermore, the infection does not return after discontinuing the oral antibacterial chemotherapy.

Exercise 10. Choose a proper variant of Modal verbs. Read the text into your native language:
 In 1876, Robert Koch established that microbes **can/could** cause disease. He found that the blood of cattle that were infected with anthrax always had large numbers of *Bacillus anthracis*. Koch found that he **can/could** transmit anthrax from one animal to another by taking a small sample of blood from the infected animal and injecting it into a healthy one, and this caused the healthy animal to become sick. He also found that he **can/could** grow the bacteria in a nutrient broth (бульон), then inject it into a healthy animal, and cause illness. Based on these experiments, he devised criteria for establishing a causal link between a microbe and a disease and these are now known as Koch's postulates. Although these postulates **cannot/could not** be applied in all cases, they do retain historical importance to the development of scientific thought and are still being used today.

Self-control

I. Answer the questions:

1. What microorganism contain chlorophyll and thus can carry out photosynthesis?
2. What are fungi?
3. What beneficial uses do some yeasts have?
4. What eukaryotes have been used to make pharmaceuticals?
5. What does a virus consist of?
6. What groups may helminthes be subdivided into?

II. Define the term: Algae, fungi, virus, helminth

TISSUES

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
cavity	aggregation	columnar
epithelium	allow	cuboidal
fiber	embed	fibrous
glia	exchange	loose
lamina	line	moisture
layer	lose	neural
loss	support	rigid
passageway		squamous
refinement		striated
stratum		urogenital

tissue		visceral
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Exercise 2. Read correctly:

- **ous** [əs] – fibrous, nervous, numerous, venous, dangerous, infectious, continuous
- **ure** [tʃə] – moisture, moisturize, future, fracture, fractured, suture, lecture
- **o** [ʌ] – other, come, become, some, among, another, accompany, accomplish
- **tion** [ʃn] – aggregation, protection, secretion, absorption, connection, addition
- **um** [əm] – stratum, caecum, rectum, peritoneum, atrium, curriculum, palladium

Exercise 3. Read the following words and word-combinations:

Tissue: epithelial tissues, connective tissue, loose connective tissue, smooth tissue.

Cell: cells, cellular, unicellular, multicellular organisms, intercellular substances.

Protect: protection, health protection, protected, to protect from injury.

Lining: covering and lining epithelium, to line, lined, to line the internal organs.

Histology, histologist, histologic, histologic anatomy, to study histopathology.

Support: the support to the body, supportive personnel, supporting treatment.

Voluntary muscle, involuntary muscle, voluntary and involuntary movements

Exercise 4. Read the text:

Tissues

The term **tissue** is used to describe an aggregation of cells that are similar in structure and perform a specific function. **Histology** is the field of study that involves the microscopic examination of tissue appearance, organization, and function.

All tissues of the body develop from the three primary **germ** cell layers that form the embryo:

Mesoderm – develops into epithelial tissue, connective tissue and muscle tissue.

Ectoderm - develops into nervous tissue and epithelial tissue.

Endoderm – develops into epithelial tissue. Different kinds of tissue have different physical properties.

Tissues may be hard (bone), soft (muscle), or even liquid (blood).

Tissues are organized into four broad categories based on structural and functional similarities. These categories are epithelial, connective, muscle, and nervous. The primary tissue types work together to contribute to the overall health and maintenance of the human body.

Epithelial tissue provides a covering for deeper body layers and protects our body from moisture loss, bacteria, and internal injury. There are two kinds of epithelial tissues:

- **Covering and lining epithelium** covers or lines almost all of our internal and external organismal surfaces such as the skin, the airways, the lymph vessels and the digestive tract. It serves functions of protection, secretion, and absorption, and is separated from other tissues below by a *basal lamina*.
- **Glandular epithelium** secretes hormones or other products such as stomach acid, sweat, saliva, and milk.

Connective tissue generally provides structure and support to the body. There are two types of connective tissue:

- **Loose connective tissue** holds structures together. For example, loose connective tissue holds the outer layer of skin to the underlying muscle tissue. This tissue is also found in your fat layers, lymph nodes, and red bone marrow.
- **Fibrous connective tissue** also holds body parts together, but its structure is a bit more rigid than loose connective tissue. Fibrous connective tissue is found in ligaments, tendons, cartilages, and bones.

Nervous tissue forms the nervous system, which is responsible for coordinating the activities and movements of your body through its network of nerves. Parts of the nervous system include the brain, spinal cord, and nerves. **Nervous tissue** consists of two kinds of nerve cells **neurons** and **neuroglia, or glial** cells.

Muscle tissue contracts forcefully when excited, providing movement. There are three kinds of muscle tissues:

- **Skeletal (striated) muscle** tissue is attached to bones and move the skeleton (also called voluntary muscle)
- **Cardiac muscle** tissue makes up most of the heart wall allowing the heart to contract and pump blood throughout an organism (also involuntary muscle).
- **Smooth (visceral) muscle** tissue lines the walls of blood vessels and certain organs such as the digestive and urogenital tracts.

A **tissue membrane** is a thin layer of cells that covers the outside of the body (for example, skin), the organs (for example, pericardium), internal passageways that lead to the exterior of the body (for example, abdominal mesenteries), and the lining of the moveable joint cavities. There are two basic types of tissue membranes: connective tissue and epithelial membranes.

The **connective tissue membrane** is formed solely from connective tissue. These membranes encapsulate organs, such as the kidneys, and line our movable joints. A **synovial membrane** is a type of connective tissue membrane that lines the cavity of a freely movable joint. For example, synovial membranes surround the joints of the shoulder, elbow, and knee.

The **epithelial membrane** is composed of epithelium attached to a layer of connective tissue, for example, your skin. The **mucous membrane** is also a composite of connective and epithelial tissues. It lines the body cavities and hollow passageways that open to the external environment, and include the digestive, respiratory, excretory, and reproductive tracts.

A **serous membrane** is an epithelial membrane that lines those cavities that do not open to the outside, and they cover the organs located within those cavities. They are essentially membranous bags, with mesothelium lining the inside and connective tissue on the outside.

The skin is an epithelial membrane also called the **cutaneous membrane**. It is a stratified squamous epithelial membrane resting on top of connective tissue. The apical surface of this membrane is exposed to the external environment and is covered with dead, keratinized cells that help protect the body from desiccation and pathogens.

Fibroblasts in the inner layer of the synovial membrane release hyaluronan into the joint cavity. The hyaluronan effectively traps available water to form the synovial fluid, a natural lubricant that enables the bones of a joint to move freely against one another without much friction. This synovial fluid readily exchanges water and nutrients with blood, as do all body fluids.

Mucous, produced by the epithelial exocrine glands, covers the epithelial layer. The underlying connective tissue, called the **lamina propria** (literally “own layer”), help support the fragile epithelial layer.

Exercise 5. Answer the questions:

1. What is a tissue?
2. What are the main tissues in the human body?
3. What kind of tissues protects our body from moisture loss, bacteria, and internal injury?
4. What are the main functions of covering and lining epithelium?
5. Where can a loose connective tissue be found in our body?
6. What differs a muscle tissue from other tissue types?
7. What are the main three kinds of muscle tissues?
8. What is a tissue membrane?
9. What does connective tissue membrane encapsulate?
10. What does mucous membrane line?
11. What is a serous membrane?
12. How is cutaneous membrane also called?
13. What is the function of the hyaluronan?
14. What is histology?

Exercise 6. Match the terms with their definitions:

1. gland	a) the delicate web (network) of connective tissue that surrounds and supports nerve cells;
2. glia	b) an animal tissue consisting of one or more layers of closely packed cells covering the external and internal surfaces of the body;
3. layer	c) any thread-shaped structure, such as a nerve fibre;
4. hyaluronan	d) a cell or organ in man and other animals that synthesizes chemical substances and secretes them for the body to use or eliminate, either through a duct or directly into the bloodstream;
5. fiber	e) a thickness of some homogeneous substance, such as a stratum (слой, пласт) or a coating on a surface;
6. muscle	f) a cell specialized to conduct nerve impulses: consists of a cell body, axon, and dendrites;
7. fibroblast	g) a part of an organism consisting of a large number of cells having a similar structure and function;
8. neuron(e)	h) a tissue composed of bundles of elongated (продолговатый) cells capable of contraction and relaxation to produce movement in an organ or part;
9. epithelium	i) a cell in connective tissue which produces collagen and other fibers;
10. tissue	j) is a clear, gooey substance that is naturally produced by your body.

Exercise 7. Crossword:

1.				t							
2.				i							
		3.		s							
			4.	s							
	5.			u							
		6.		e							

1. One of the types of tissue, which can be simple, stratified, pseudostratified, and transitional.
2. Noncellular substance surrounding the cells of connective tissue.
3. Bone-forming cell.
4. One of the types of muscular tissue.
5. Cells in the nervous system other than neurons.
6. The fundamental unit of every living organism.

Exercise 8. Memorize the following terms:

Classification of Epithelium

Types of epithelium	Shape of cells
Simple (single layer of cells)	Squamous Cuboidal Columnar
Stratified (more than one layer of cells)	Squamous Cuboidal Columnar
Pseudostratified (modification of simple epithelium)	Columnar
Transitional (modification of stratified epithelium)	Roughly cuboidal or many surfaced

Exercise 9. Read additional information about tissue:

1. The major types of epithelia are simple and stratified squamous epithelia, simple and stratified cuboidal epithelia, simple, pseudostratified and stratified columnar epithelia, and transitional epithelium.
2. Simple epithelium generally is involved in diffusion, filtration, secretion, or absorption.
3. Squamous cells function in diffusion and filtration.
4. Cuboidal or columnar cells secrete or absorb.
5. Connective tissue cells are blast cells (form the matrix), cyte cells (maintain it), and clast cells (break it down for remodeling).
6. The cells' names end with suffixes according to the cells' functions as blasts, cytes, or clasts.
7. Fibroblasts are cells that form fibrous connective tissue, and chondrocytes are cells that maintain cartilage (chondromean cartilage).
8. Osteoblasts form bone (oste- means bone), osteocytes maintain it, and osteoclasts break it down.

Exercise 10. Read the text and insert words from the brackets into the gaps.

*Tissue, skin, connective, muscle, walls, cells, impulses,
organ, epithelial, protection, smooth, internal.*

Many different tissues grouped together create an 1. _____, which has a specific job. An example of an organ would be the stomach. Epithelial 2. _____ covers the body surface and forms the lining for most internal cavities. The major function of 3. _____ tissue

includes protection, secretion, absorption, and filtration. The 4. _____ is an organ made up of epithelial tissue which protects the body from dirt, dust, bacteria and other microbes that may be harmful. Connective tissues perform a variety of functions including support and 5. _____. Fat tissue, dense fibrous tissue, cartilage, bone, blood, and lymph are all considered 6. _____ tissue. There are three types of muscle tissue: skeletal, 7. _____ and cardiac. Skeletal 8. _____ is a voluntary type of muscle tissue that is used in the contraction of skeletal parts. Smooth muscle is found in the walls of 9. _____ organs and blood vessels. It is an involuntary type. The cardiac muscle is found only in the 10. _____ of the heart and is involuntary in nature. Nerve tissue is composed of specialized 11. _____ and conducts 12. _____ to and from all parts of the body. Nerve cells or neurons are long and string-like.

Exercise 11. Open the brackets using the verbs in an appropriate tense and voice and translate:

1. Histology (**to study**) the microscopic anatomy of cells and tissues of plants and animals.
2. The microscopic anatomy of cells and tissues of plants and animals (**to perform**) by examining a thin slice of tissue under a light microscope or electron microscope.
3. Recently the use of histological stains (**to enhance**) the ability to visualize and differentially identify the microscopic structures.
4. Histology is known (**to be**) an essential tool of biology and medicine.
5. In the 19th century, histology (**to be**) as an academic discipline in its own right.
6. The 1906 Nobel Prize in Physiology or Medicine (**to award**) to histologists Camillo Golgi and Santiago Ramon y Cajal.
7. Camillo Golgi and Santiago Ramon y Cajal (**to have**) dueling interpretations of the neural structure of the brain.
8. Cajal (**to win**) the prize for his correct theory and Golgi for the staining technique he invented to make it possible.

Exercise 12. Put questions to underlined words:

1. Histopathology refers to the microscopic examination of tissue in order to study the manifestations of disease.
2. Specifically, in clinical medicine, histopathology refers to the examination of a biopsy or surgical specimen by a pathologist.
3. In contrast, cytopathology examines free cells or tissue fragments.
4. Histopathology deals with the microscopic study of diseased tissue.
5. Accurate diagnosis of cancer and other diseases usually requires histopathological examination of samples.
6. Trained medical doctors perform histopathological examination and provide diagnostic information based on their observations.
7. The trained personnel who prepare histological specimens for examination are histotechnicians, histology technicians (HT), histology technologists (HTL), medical scientists, medical laboratory technicians, or biomedical scientists.
8. The field of study of technologists, medical laboratory technicians, or biomedical scientists is called histotechnology.

Exercise 13. Translate the sentences paying attention to Emphatic Constructions *It is (was, will be)... that (who, which)* and *It was not until ... (any date) that*:

*In 1906 the Nobel Prize in Physiology was awarded to a great histologist Camillo Golgi.
It was **the Nobel Prize in Physiology** that was awarded to a great histologist Camillo Golgi.*

1. It is histopathological examination of tissues that starts with surgery, biopsy, or autopsy.

2. It was the tissue that was removed from the body or plant, and then placed in a fixative which stabilized the tissues to prevent decay.
3. It will be formalin (10% formaldehyde in water) that will be the most common fixative.
4. It is under a microscope that the tissue is then prepared for viewing using either chemical fixation or frozen section.
5. It is a pathologist who examines the histological slides under a microscope by, a medically qualified specialist who has completed a recognised training program (5 - 5.5 years in the United Kingdom).
6. It is as a pathology report that describes the histological findings and the opinion of the pathologist, the medical diagnosis was formulated.
7. It is in the removal of cancer that the pathologist will indicate whether the surgical margin is cleared, or is involved.
8. It was not until 1839 that the German biologist T. Schwann substantiated (обґрунтував) the cell theory that became the methodological basis of histology.

Self-control

I. Answer the question:

1. What is a tissue?
2. What are the main tissues in the human body?
3. What are the main functions of covering and lining epithelium?
4. What differs a muscle tissue from other tissue types?
5. What are the main three kinds of muscle tissues?
6. What is a tissue membrane?
7. What is a serous membrane?
8. What is the function of the hyaluronan?

II. Define the term: Tissues

METABOLISM

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
carbohydrate	break down	chemical
compound	determine	constructive
fat	enable	destructive
protein	maintain	metabolic
source	release	

Exercise 2. Read the following word combinations:

Activity: increased activity of the brain , mental activity, electrical activity, illegal activity, to stimulate activity, cortical activity, milk-ejecting activity;

Compound: essential compound, protein compound, chemical compound, compound microscope, complicated compounds;

Protein: vegetable protein, whey protein, regenerated protein, defensive protein, crude protein;

Release: release energy, release the waste products, release hormones, to be released by glands;

Substance: harmful substance, poisonous substance, natural substance, pure substance, soluble substance, medicinal substance, to contain substance.

Exercise 3. Read the text:

Metabolism

Metabolism is the chemical reactions in the body's cells that change food into energy. Our bodies need this energy to do everything from moving to thinking to growing.

Specific proteins in the body control the chemical reactions of metabolism. Thousands of metabolic reactions happen at the same time — all regulated by the body — to keep our cells healthy and working.

After we eat food, the digestive system uses enzymes to:

- break proteins down into amino acids
- turn fats into fatty acids
- turn carbohydrates into simple sugars (for example, glucose)

The body can use sugar, amino acids, and fatty acids as energy sources when needed. These compounds are absorbed into the blood, which carries them to the cells.

After they enter the cells, other enzymes act to speed up or regulate the chemical reactions involved with "metabolizing" these compounds. During these processes, the energy from these compounds can be released for use by the body or stored in body tissues, especially the liver, muscles, and body fat.

Metabolism is a balancing act involving two kinds of activities that go on at the same time:

- building up body tissues and energy stores
- breaking down body tissues and energy stores to get more fuel for body functions

Anabolism (the buildup of substances), or constructive metabolism, is all about building and storing. It supports the growth of new cells, the maintenance of body tissues, and the storage of energy for future use. In anabolism, small molecules change into larger, more complex molecules of carbohydrates, protein, and fat.

Catabolism (the breakdown of substances), or destructive metabolism, is the process that produces the energy needed for all activity in the cells. Cells break down large molecules (mostly carbs and fats) to release energy. This provides fuel for anabolism, heats the body, and enables the muscles to contract and the body to move.

As complex chemical units break down into more simple substances, the body releases the waste products through the skin, kidneys, lungs, and intestines.

Several hormones of the endocrine system help control the rate and direction of metabolism. Thyroxine, a hormone made and released by the thyroid gland, plays a key role in determining how fast or slow the chemical reactions of metabolism go in a person's body.

Another gland, the pancreas, secretes hormones that help determine whether the body's main metabolic activity at any one time are anabolic or catabolic. For example, more anabolic activity usually happens after you eat a meal. That's because eating increases the blood's level of glucose — the body's most important fuel. The pancreas senses this increased glucose level and releases the hormone insulin, which signals cells to increase their anabolic activities.

Metabolism is a complicated chemical process. So, it's not surprising that many people think of it in its simplest sense: as something that influences how easily our bodies gain or lose weight. That's where calories come in. A calorie is a unit that measures how much energy a particular food provides to the body. A chocolate bar has more calories than an apple, so it provides the body with more energy — and sometimes that can be too much of a good thing. Just as a car stores gas in the gas tank until it is needed to fuel the engine, the body stores calories — primarily as fat. If you overfill a car's gas tank, it spills over onto the pavement. Likewise, if a person eats too many calories, they "spill over" in the form of excess body fat.

The number of calories someone burns in a day is affected by how much that person exercises, the amount of fat and muscle in his or her body, and the person's **basal metabolic rate (BMR)**. BMR is a measure of the rate at which a person's body "burns" energy, in the form of calories, while at rest.

The BMR can play a role in a person's tendency to gain weight. For example, someone with a low BMR (who therefore burns fewer calories while at rest or sleeping) will tend to gain more pounds of body fat over time than a similar-sized person with an average BMR who eats the same amount of food and gets the same amount of exercise.

BMR can be affected by a person's genes and by some health problems. It's also influenced by body composition — people with more muscle and less fat generally have higher BMRs. But people can change their BMR in certain ways. For example, a person who exercises more not only burns more calories, but becomes more physically fit, which increases his or her BMR.

Exercise 4. Answer the questions:

1. What is metabolism?
2. Why are enzymes necessary for the digestive system?
3. What are the body's energy sources?
4. How does metabolism act?
5. What is anabolism?
6. What is catabolism?
7. What does catabolism provide?
8. What controls metabolism?
9. What is a calorie?
10. What is BMR?

Exercise 5. Match the terms to their explanation:

1. protein	a) is a molecule that have carbon, hydrogen and oxygen atoms and is an energy source;
2. carbohydrate	b) is a large biomolecule made up of amino acids that join together to form long chains;
3. starch	c) is an essential part of our diet along with carbohydrates and proteins;
4. glucose	d) a simple sugar containing six carbon atoms, it is an important source of energy;
5. fat	e) is a hormone that your pancreas makes to allow cells to use glucose;
6. insulin	f) a white odorless tasteless granular or powdery complex carbohydrate.

Exercise 6. Look at the table and learn nutrients needed by the body and what they are used for:

Type of nutrient	Where it is found	How it is used
Carbohydrate (starches and sugars)	<ul style="list-style-type: none"> • Breads • Grains • Fruits • Vegetables • Milk and yogurt • Foods with sugar 	Broken down into glucose, used to supply energy to cells. Extra is stored in the liver.
Protein	<ul style="list-style-type: none"> • Meat • Seafood • Legumes • Nuts and seeds • Eggs • Milk products • Vegetables 	Broken down into amino acids, used to build muscle and to make other proteins that are essential for the body to function.
Fat	<ul style="list-style-type: none"> • Oils • Butter • Egg yolks • Animal products 	Broken down into fatty acids to make cell linings and hormones. Extra is stored in fat cells.

Exercise 7. Read the sentences having different forms of Participles:

1. Excess carbohydrate, not immediately required by the body, is stored in the liver and muscles in the form of glycogen
2. The circulating volume of the blood depends on the changes in the air temperature.
3. Excess protein, not required by the body, can be converted into glucose and used as an energy source.
4. The inorganic salts, absorbed from the soil or water, are built up by living things into organic salts.
5. The protein molecule is a complex structure made up of one or more chains of amino acids.
6. Proteins, carbohydrates and fats are complicated compounds found in plant and animal matter.
7. Metabolism is the term applied to all changes that occur in the body in connection with the use of food.
8. The glucose required for immediate use is carried straight through the liver and enters the circulation.

Exercise 8. Change the sentences using the Passive voice:

Model: Amino acids synthesize proteins in the body. → Proteins are synthesized in the body by amino acids.

1. A high concentration of salt or sugar will check the growth of many bacteria.
2. Milk may transmit infection from animals to man.
3. Special enzymes convert proteins into simple amino acids so that the body can use them.
4. The kidneys excrete the waste products of protein metabolism in the urine.
5. A lot of people use herbs as food.
6. Plants form the base of the natural food chain.

7. The most active tissues of the body require glucose.
8. The production of heat and energy needs the use of fats as fuel.

Exercise 9. Fill in prepositions where necessary:

1. Glucose occurs ... many fruits and is present ... the blood ... animals.
2. Hydrogen, oxygen and nitrogen are ... the most common.
3. Some vegetable foods are very rich ... proteins.
4. The condensation ... amino acids leads ... building ... proteins.
5. Proteins are separated ... groups based chiefly ... physical properties.
6. The granules of starch can be recognized ... a microscope, ... the iodine test.
7. Fructose is produced directly ... photosynthesis.
8. The urea being useless for fuel is carried away ... the blood stream and excreted ... the blood ... the kidneys.

Exercise 10. Put questions to the underlined words:

1. The vitamins and certain salts act as regulators of tissue activity.
2. Fuel is required to produce the energy for the body activity.
3. The infants and children require extra building material for the process of growth.
4. We should eat less fat.
5. Glucose contains six carbon atoms.
6. Metabolic changes take place in every living thing.
7. The waste products of the combustion of the carbohydrates are carbon dioxide and water.
8. The fatty acids combine with alkalines in the intestine to form soap.

Exercise 11. Open the brackets using correct voice. Translate the sentences:

1. The diet (to be) the daily ration of foods required by the individual.
2. The caloric value required by the individual (to affect) by age, exercise, sex, weight and build, climate and weather, temperament.
3. The amount of carbohydrate required (to depend) on the energy output.
4. A man doing heavy work (to require) more carbohydrates than a sedentary worker.
5. It (to be) also essential that the food (should, to contain) cellulose. It is indigestible and therefore (to remain) in the bowels and (to stimulate) it to empty.
6. The value of foods (to calculate) by the amount of heat which they (to give) on combustion.
7. The heat (to measure) in calories.
8. The caloric value of a normal diet (should, to be) 3,000 to 3,300 calories per day.

Self-control

I. Answer the questions:

1. What is metabolism?
2. How does metabolism act?
3. What is anabolism?
4. What is catabolism?
5. What is BMR?

II. Define the term: Metabolism, proteins, fats, carbohydrates

VITAMINS AND MINERALS

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
copper	expose (to)	diverse
exception	ingest	fat-soluble
iodine	store	sufficient
iron	strengthen	naturally
nutrient		water-soluble
potassium		
sodium		
sulfur		
tin		

Exercise 2. Read the word combinations with the new words:

Compound: acid compound; iodine compound; oxygenated compound; low molecular weight compound.

Exception: without exception; an exception to the rule; as an exception; make an exception; be no exception.

Nutrient: nutrient medium; nutrient absorption; nutrient excess; intravenous nutrient; nutrient-enriched food.

Sufficient: sufficient quantity; sufficient skills; sufficient energy; self-sufficient; sufficient reason.

Exercise 3. Form nouns with the help of the following suffixes, translate them into Ukrainian:

-ance(-ence): perform, assist, differ, maintain, appear, occur, disturb, resist

-ion: except, reflect, direct, ingest, suggest, collect, infect, solute, combine

Exercise 4. Read the text:

Vitamins and Minerals

A vitamin is an organic compound required as a nutrient in tiny amounts by an organism. In other words, an organic chemical compound is called a vitamin when it cannot be synthesized in sufficient quantities by an organism, and must be obtained from the diet. If a molecule can be synthesized in the body, it is not a vitamin. The single exception to this rule is vitamin D which can be synthesized in the skin, but only when exposed to sunlight and Niacin (B3) which itself can be synthesized in the liver in small amounts.

Vitamins are classified as either water-soluble or fat-soluble. There are 13 universally recognized vitamins: 4 fat-soluble (A, D, E, and K) and 9 water-soluble (8 B vitamins and vitamin

C). Fat-soluble vitamins are stored in the body's fatty tissue, so they do not need to be ingested every day. Water soluble vitamins cannot be stored and must be ingested frequently for optimal health. They are easily excreted through the urine.

Vitamins have diverse biochemical functions. For example, vitamin A helps to develop and maintain body tissues such as bone and skin; it also helps the body's vision. Vitamin C helps form tissues, cells, bones and teeth and improves the immune system's performance.

Along with vitamins human body needs a certain amount of minerals. There are 20 minerals including copper, iodine, chromium, iron, tin, zinc, magnesium, sodium, potassium, chlorine, phosphorus, calcium, sulfur and others. The body uses minerals to perform many different functions — from building strong bones to transmitting nerve impulses. Some minerals are even used to make hormones or maintain a normal heartbeat. For example, copper is needed by enzymes for metabolizing; iodine assists the thyroid gland in working properly; calcium and phosphorus build bones and teeth; iron delivers oxygen to the body's cells, and so on.

Vitamins and minerals not only help the body function, but they work to strengthen each other. The body absorbs iron through the help of vitamin C. Vitamin D helps the body absorb phosphorus and calcium.

A diet naturally high in vitamins and minerals can be the best defense against many diseases. You can develop health problems if you do not get enough of a particular vitamin. It is good to know that fat-soluble vitamins should be taken before meals, and water-soluble ones should be taken after meals.

Exercise 5. Answer the questions:

1. What vitamins can be synthesized in the body?
2. How are vitamins classified?
3. How many vitamins are universally recognized?
4. Why is it unnecessary to ingest fat-soluble vitamins daily?
5. How are water-soluble vitamins excreted out of the body?
6. What minerals are there?
7. What does iron do in the body?
8. How do vitamins and minerals strengthen and help each other?

Exercise 6. Match the words to their definitions:

1. vitamin	a) any vitamin that is soluble in water
2. fat-soluble vitamin	b) an inorganic element, such as calcium, iron, potassium, sodium, or zinc, that is essential for the nutrition of humans, animals, and plants;
3. water-soluble vitamin	c) any substance that nourishes an organism
4. nutrient	d) any of various organic compounds that are needed in small amounts for normal growth and activity of the body
5. mineral	e) any vitamin that is soluble in fats

Exercise 7. Put the words in the correct order to make questions:

1. can / be / How / vitamins / classified?

2. Where / produced / vitamins / are / synthetic?
3. helps / change / into energy / What / the body cells / carbohydrates?
4. folate / does / form / help / What?
5. for / What / essential / is / biotin?
6. the body / leave / vitamins / do / How / water-soluble?
7. What / the body's fatty tissue / vitamins / stored / are / in?
8. the first / isolated / Who / vitamin complex?

Exercise 8. Put questions to the underlined words:

1. Vitamin supplements are usually available as isolated vitamins or in combination with other nutrients.
2. The skin creates vitamin D when it is exposed to sunlight.
3. Vitamin K is produced by intestinal bacteria.
4. Along with vitamins human body needs a certain amount of minerals.
5. Iodine assists the thyroid gland in working properly.
6. The body absorbs iron through the help of vitamin C.
7. Calcium and phosphorus build bones and teeth.
8. The body absorbs iron through the help of vitamin C.

Exercise 9. Ask questions beginning with the question word given in brackets:

1. Cashmir Funk was the first scientist who used the term “vitamine”. (Who?)
2. In the 1930s a scientific discovery demonstrated the biochemical functions of the vitamins. (When?)
3. Vitamins have been commercially produced since 1930. (Since what time?)
4. Niacin can lower blood cholesterol levels. (What?)
5. Vitamins were given letters to go with their chemical names to simplify discussion about them. (Why?)
6. Fat-soluble vitamins are absorbed through the intestinal tract. (How?)
7. Water-soluble vitamins dissolve easily in water. (Where?)
8. Vitamin C promotes wound healing. (What?)

Exercise 10. Open the brackets, using the verbs in either active or passive tenses:

1. Vitamins (to contribute) to good health by regulating the metabolism and assisting the biochemical processes of the body.
2. Water-soluble vitamins (to excrete) out of the body within one day.
3. Vitamin D (to help) the body absorb calcium.
4. Vitamin E (to know) as tocopherol.
5. Scientific research (to prove) that excesses of isolated vitamins or minerals can produce vitamin poisoning.
6. Vitamin supplements (to divide) into two groups: synthetic and natural.
7. The term “vitamin” (to derive) from “vitamine” by Polish scientist Casimir Funk.
8. In 1812 Polish biochemist Casimir Funk (to isolate) a complex of micronutrients and named them “vitamines”.

Exercise 11. Change the sentences as in the model (using Passive Voice instead of Active Voice):

Model: *Enzymes need copper for metabolizing. – Copper is needed by enzymes for metabolizing.*

1. Iron delivers oxygen to the body's cells.
2. Vitamins and minerals strengthen each other.
3. The skin creates vitamin D when it is exposed to sunlight.
4. The body absorbs iron through the help of vitamin C.
5. Polish scientist Casimir Funk made up a combination word "vitamine" from *vital* and *amine*.
6. Medical men used lipid from fish oil to cure rickets during the late 18th and early 19th centuries.
7. In 1881, Russian surgeon Nikolai Lunin studied the effects of scurvy.
8. Japanese scientist Umetaro Suzuki isolated the first vitamin complex in 1910.

Exercise 12. Put the sentences into the correct order to explain the term “vitamin”:

___ Water soluble vitamins cannot be stored, with the exceptions of B₁₂ and Folic Acid and must be ingested frequently for optimal health.

___ Vitamins are classified as either water-soluble or fat-soluble.

___ There are 13 universally recognized vitamins: 4 fat-soluble (A, D, E, and K) and 9 water-soluble (8 B vitamins and vitamin C).

___ A vitamin is an organic compound that is needed in a small amount for normal growth and activity of the body.

___ Fat-soluble vitamins are stored in the body's fatty tissue, so they do not need to be ingested every day.

Exercise 13. Put the sentences into the correct order to explain the term “mineral”:

___ For example, the body absorbs iron through the help of vitamin C and vitamin D helps the body absorb phosphorus and calcium.

___ Minerals are essential for the nutrition of humans, animals, and plants.

___ A mineral is an inorganic element, such as calcium, iron, potassium, sodium, or zinc.

___ Vitamins and minerals not only help the body function, but they work to strengthen each other.

___ There are 20 minerals, which play significant roles in the body.

Self-control

I. Answer the questions:

1. What vitamins can be synthesized in the body?
2. How are vitamins classified?
3. How many vitamins are universally recognized?
4. How many minerals are there?

II. Define the term: Vitamin, mineral

PLANTS. THEIR STRUCTURE AND FUNCTIONS

Exercise 1. Key words:

nouns	verbs	adjectives	adverbs
axis	arrange	autotrophic	sexually
chlorophyll	bear	dependent	spirally
embryo	develop	dorsiventral	vegetatively
fertilization	divide	largely aquatic	
fragmentation	enclose	leaf-like	
gamete	fuse	root-like	
kingdom	possess	slender	
liverwort	transfer	well-differentiated	
moss		vascular	
nomenclature		naked-seeded	
phenomenon		stem-like	
rhizoid		thalloid	
syngamy		upright	

Exercise 2. In the following sentences choose the most appropriate words:

- Gymnosperms are plants of a group that comprises those that have seeds **unprotected/ protective/protection** by an ovary or fruit, including the conifers, cycads, and ginkgo.
- Stamen is the male **fertilizing/fertilized/ fertilization** organ of a flower, typically consisting of a pollen-containing anther and a filament.
- Pteridophyte a flowerless green plant of the division *Pteridophyte*, which comprises the ferns and their **relatives/relatively/relativity**.
- Bryophytes are a division of small **floweriness/flowerless/flowering** green plants which comprises the mosses and liverworts.
- Rhizoids - root hair on the underside of the thallus in some lower plants **serve/ served/service** to anchor the plant and to conduct water.
- Filament is the slender part of a stamen that **supporting/supports/supportive** the anther.
- Ovule is the part of the ovary of seed plants that **container/contains/containing** the female germ cell and after fertilization becomes the seed.
- Pistil is the female **reproduction/reproductive/reproducible** part of a flower, consisting of one carpel or a group of carpels joined together.
- An **anther/ether/anthem** is the part of a flower that contains pollen.

Exercise 3. Memorize the pronunciation of the words:

Syngamy /'sɪŋgəmi/, thalloid /' θ æ.lɔɪd/, thallus ' θ æ.ləs/, substratum /sʌb'strɑ:təm,sʌb'streɪtəm/, Chlorophyceae /.klɒ.rə'faɪsɪ/, gamete /'gæm.i:t/, isogamy /ɪ'sɒgəmi/, anisogamy /,ənɪ'sɒgəmi/ or archegonia /,ɑ:kɪ'gəʊni/, gymnosperm /'dʒɪmnə(ʊ)spə:m/

Exercise 4 . Match the parts to form word combinations.

classified	on water
pigment	a filament and an anther
dependent	plant body
differentiated	into three classes

differentiated into	by fragmentation
consists of	true root, stem and leaves
reproduce	possessed

Exercise 5 . Read the text:

Plants. Their Structure and Functions

Plant kingdom includes algae, bryophytes, pteridophytes, gymnosperms and angiosperms. Algae are chlorophyll-bearing simple, thalloid, autotrophic and largely aquatic organisms. Depending on the type of pigment possessed and the type of stored food, algae are classified into three classes, namely Chlorophyceae, Phaeophyceae and Rhodophyceae. Algae usually reproduce vegetatively by fragmentation, asexually by formation of different types of spores and sexually by formation of gametes which may show isogamy, anisogamy or oogamy.

Bryophytes are plants which can live in soil but are dependent on water for sexual reproduction. Their plant body is more differentiated than that of algae. It is thallus-like and prostrate or erect and attached to the substratum by rhizoids. They possess root-like, leaf-like and stem-like structures. The bryophytes are divided into liverworts and mosses. The plant body of liverworts is thalloid and dorsiventral whereas mosses have upright, slender axes bearing spirally arranged leaves. The main plant body of a bryophyte is gamete-producing and is called a gametophyte.

In pteridophytes the main plant is a sporophyte which is differentiated into true root, stem and leaves. These organs possess well-differentiated vascular tissues. The sporophytes bear sporangia which produce spores. The spores germinate to form gametophytes which require cool, damp places to grow. The gametophytes bear male and female sex organs called antheridia and archegonia, respectively. Water is required for transfer of male gametes to archegonium where zygote is formed after fertilisation. The zygote produces a sporophyte.

The gymnosperms are the plants in which ovules are not enclosed by any ovary wall. After fertilisation the seeds remain exposed and therefore these plants are called naked-seeded plants. The gymnosperms produce microspores and megaspores which are produced in microsporangia and megasporangia borne on the sporophylls. The pollen grain germinates and pollen tube releases the male gamete into the ovule, where it fuses with the egg cell in archegonia. Following fertilization, the zygote develops into embryo and the ovules into seeds.

In angiosperms, the male sex organs (stamen) and female sex organs (pistil) are borne in a flower. Each stamen consists of a filament and an anther. The anther produces pollen grains (male gametophyte) after meiosis. The pistil consists of an ovary enclosing one to many ovules. Within the ovule is the female gametophyte or embryo sac which contains the egg cell. The pollen tube enters the embryo-sac where two male gametes are discharged. One male gamete fuses with egg cell (syngamy) and other fuses with diploid secondary nucleus (triple fusion). This phenomenon of two fusions is called double fertilisation and is unique to angiosperms. The angiosperms are divided into two classes – the dicotyledons and the monocotyledons.

Green plants provide a substantial proportion of the world's molecular oxygen, and are the basis of most of Earth's ecosystems. Plants that produce grain, fruit, and vegetables also form basic human foods and have been domesticated for millennia. Plants have many uses, they have been the source of medicines and psychoactive drugs.

The naming of plants is governed by the International Code of Nomenclature for algae, fungi, and plants and International Code of Nomenclature for Cultivated Plants.

Exercise 6. Answer the questions:

1. What does plant kingdom include?
2. What is the classification of algae based on?
3. How do Algae usually reproduce?
4. What are Bryophytes?

5. What is the main plant body of a bryophyte?
6. What is a sporophyte in pteridophytes differentiated into?
7. What are the plants in which ovules are not enclosed by any ovary wall?
8. What are the male and female sex organs in angiosperms?
9. What does a stamen consist of in angiosperms?
10. What does an anther produce after meiosis?
11. What does a pistil consist of?
12. Which plants provide a substantial proportion of the world's molecular oxygen?
13. What organization is the naming of plants governed by?

Exercise 7. Fill in the gaps with the following words or word combinations: *asexually, angiosperms true root, sporangia, antheridia, oxygen, megaspores, filament, dicotyledons.*

1. Plant kingdom includes algae, bryophytes, pteridophytes, gymnosperms and
2. Algae usually reproduce ... by formation of different types of spores and sexually by formation of gametes.
3. In pteridophytes the main plant is a sporophyte which is differentiated into ..., stem and leaves.
4. The sporophytes bear ... which produce spores.
5. The gametophytes bear male and female sex organs called ... and archegonia, respectively.
6. The gymnosperms produce microspores and... which are produced in microsporangia and megasporangia borne on the sporophylls.
7. Each stamen consists of a ... and an anther.
8. The angiosperms are divided into two classes – the ... and the monocotyledons.
9. Green plants provide a substantial proportion of the world's molecular ..., and are the basis of most of Earth's ecosystems.

Exercise 8. Match two parts of the sentences below to make an explanation of the terms “Algae”, “Bryophytes”, and “Angiosperms”:

1. Algae are chlorophyll-bearing simple, thalloid,	a. as angiospermae.
2. They are classified into three classes depending	b. and stem-like structures.
3. Algae usually reproduce	c. on the type of pigment possessed and the type of stored food
4. Bryophytes are plants which can live in soil but are	d. autotrophic and largely aquatic organisms.
5. They possess root-like, leaf-like	e. are borne in a flower.
6. Bryophytes do not	f. and an anther.
7. The bryophytes are divided	g. pollen grains after meiosis
8. Flowering plants are also known	h. into liverworts and mosses.
9. In angiosperms, the stamen pistil	i. produce flowers or seeds reproducing via spores
10. The pistil consists of an ovary	j. dependent on water for sexual reproduction.
11. Each stamen consists of a filament	k. vegetatively by fragmentation.
12. The anther produces	l. enclosing one to many ovules.

Exercise 9. Decide if the sentences are true false of not given:

1. All living things were traditionally placed into one of two groups, plants and animals.
2. Algae mostly live in water.
3. There are four classes of algae.
4. Asexual reproduction is characteristic for algae.
5. Pteridophytes are dependent on soil for sexual reproduction.
6. The evolution of plants has resulted in increasing levels of complexity.
7. Algae plant body is more differentiated than that of Bryophytes.
8. The angiosperms are the plants in which ovules are not enclosed by any ovary wall.
9. Each country has a specialized body responsible for the naming of plants.

Exercise 10. Match the words to their explanations:

1. Sporangium	a. a reproductive organ of a flower which produces pollen.
2. Zygote	b. spores are formed in this enclosure
3. Sporophyte	c. female reproductive cells are produced and contained in this the structure.
4. Stamen	d. is considered to be composed of one or more carpels.
5. Pistil	e. is also known as generative fertilization and impregnation
6. Ovule	f. a fertilization event between two gametes leads to the formation of this eukaryotic cell
7. Syngamy	g. is the diploid multicellular stage in the life cycle of a plant or alga.

Exercise 11. Match the parts the the sentences, pay attention to the prepositions:

1. Our understanding of the plant kingdom has changed over	a. on natural affinities among the organisms and consider internal features, like ultrastructure, anatomy, embryology and phytochemistry. e. time.
2. The earliest systems of classification used only gross superficial morphological characters such	b. as habit, colour, number and shape of leaves, etc.
3. Such systems were artificial; they separated the closely related species	c. by George Bentham and Joseph Dalton Hooker.
4. As against this, natural classification systems were based	d. since they were based on a few characteristics.
5. Such a classification for flowering plants was given	e. time.
6. At present phylogenetic classification systems based	f. on evolutionary relationships between the various organisms are acceptable.
7. This assumes that organisms belonging	g. to the same taxa have a common ancestor.
8. We now use information from many other sources too to help resolve difficulties	h. in classification

Exercise 12. Find synonyms to the verbs in the text, insert them in the sentences below:

Comprise, fasten, have, carry, develop, make or become different, need, combine, convey, bare.

1. Animal kingdom ... all mammals, reptiles, birds, insects, and more.
2. Algae ... a specific type of pigment.
3. Gametophyte ... the male sex organs.
4. The male and female gametes ... to form zygote.
5. Pteridophytes ... water for fertilization .
6. Water ... male gametes to archegonium.
7. The plants need an adequate amount of water to germinate.
8. A number of branched cell-threads(rhizoids) are ... to the base of the stem.
9. A curled leaf has less of its surface area ... *to the sunlight*.
10. It's important to ... between fact and opinion.

Self-control

I. Answer the questions:

1. What does plant kingdom include?
2. What is the classification of algae based on?
3. What are Bryophytes?
4. What is the main plant body of a bryophyte?
5. What are the plants in which ovules are not enclosed by any ovary wall?
6. What are the male and female sex organs in angiosperms?
7. What does a pistil consist of?

II. Define the term: Algae, Bryophytes, Angiosperms

MEDICINAL PLANTS

Exercise 1. Key words:

nouns	verbs	adjectives	adverbs
ancestor	collect	complex	carelessly
bark	derive	proper	intricately
botanist	discover	salicylic	especially
cleanliness	enable	separate	easily
humidity	ensure	therapeutic	fully
maintenance	equip	unripe	historically
pollination	exist		
powder	monitor		
precursor	prescribe		
rodent	promote		
storage	require		
synthesis	search		
tincture			
trial			

Exercise 2. Read the following word-combinations and make sentences.

Salicylic: salicylic acid, to apply salicylic acid topically, salicylic acid in the treatment of acne, the side effects of Salicylic Acid Topical;

Ensure: ensure survival, ensure prompt healing, wash regularly to *ensure* personal hygiene;

Humidity: absolute *humidity*, *relative humidity*, room temperature and air *humidity* were recorded every day;

Pollination: orchid pollination, bird pollination, Insects facilitate pollination, this type of bee is very important for flower pollination;

Cleanliness: cleanliness and hygiene, to maintain cleanliness, *cleanliness* campaign run by the government of India;

Tincture: this tincture contains chloroform, tincture for internal administration, tincture diluted with water;

Trial: clinical trial, drug trial, randomized clinical trial, learning through trial and error;

Precursor: specific precursor, precursor molecule, bad breath can be a precursor to bad gums.

Exercise 3. Complete the sentences with the words from ex. 2:

1. When applied to the skin, ... may work by helping the skin to shed dead cells from the top layer and by decreasing redness and swelling
2. Public health is connected with the ... of the streets.
3. Levodopa, the metabolic ... of dopamine, relieves the symptoms of Parkinson's disease presumably by being converted to dopamine in the brain.
4. ... can often fail and the seed not set, due to the fact that the specific pollinator has not visited the plant
5. This medicine will ... you a good night's sleep.
6. Well diluted ... in very small amounts has been used to treat anemia.
7. A full clinical ... was conducted.
8. The electronics include ... sensors for recording environmental conditions.

Exercise 4 . Match the parts to form word combinations.

used for	humidity
discovered by	insects
active	ingredient
fully	trial and error
stored in	separate areas
well	developed
entry of	ventilated
conditions of	therapeutic purposes

Exercise 5. Read the text choosing the most appropriate words:

Medicinal Plants

A medicinal plant is any plant which, in one or more of its parts, contains substance that can be used for therapeutic purposes or which is a precursor for synthesis of useful drugs.

Historically, plants have played an important role in medicine. For early people, they came **at ease/easily/easy** to hand, and were intricately connected to diet and healing. Through observation and experimentation, they learned which plants **promotive/ promoted/ promotion** health and well-being.

Without plants, most medicines you take would not exist. Over 40 % of medicines now prescribed in the U.S. contain **chemicals/chemical/chemistry** derived from plants.

Historically, plant medicines were discovered by trial and error. Our ancestors noticed that **ache/aches/aching** and pains went away when they drank tea made from the bark of a willow tree. Later, scientists found that willow bark contains salicylic acid, the active ingredient in aspirin. Over time, the practice of herbal medicine has grown more complex. Science has **enabled/disabled/able** us to process natural substances into pills, tinctures and powders. Throughout the world, botanists and chemists search the plant kingdom for new medicines.

Today many drug plants are cultivated and many drug plants are collected from fields and woods. Drugs are made from fruits, leaves, flowers, roots, seeds of the plants.

It is very important to collect plants in **proper/properly/prop** time. Leaves are collected when they are fully developed. The time of the day is also important in the collection of medicinal plants. Flowers are collected before the time of **pollination/pollinating/pollinated**. Fruits are collected when they are fully grown but unripe. To dry plants correctly is also very important. If it is made carelessly the drug may be spoiled.

The plant parts most **preferred/preferable/preferring** in medicinal plants are roots. Of the medicinal plants found in the shops, 61 % were in the form of roots, 22 % in the form of whole plant, 15 % in the form of barks, 1 % in the form of fruits and the other 1 % in the form of leaves.

Medicinal plant materials should be stored in separate areas. The storage area should be well ventilated and equipped in such a way as to protect against the entry of insects or other animals, especially rodents. Effective measures should be taken to limit the spread of animals and microorganisms introduced with the plant material and to prevent crosscontamination/**cross-contamination/ cross contamination**. Containers should be located in such a way as to allow free air circulation.

Special attention should be paid to the cleanliness and good maintenance of the storage areas, particularly when dust is generated. The storing/**storage/ store** of plants, extracts, tinctures and other preparations may require special conditions of humidity and temperature or protection from light; steps should be taken to ensure that these conditions are provided and monitored.

Exercise 6. Answer the following questions:

1. What plants are considered to be medicinal?
2. What ingredient does willow bark contain?
3. What parts of a plant are drugs made from ?
4. When are leaves collected for producing drugs?
5. When are flowers collected for producing drugs?
6. When are fruits collected for producing drugs?
7. Which parts of plants are most preferred for producing drugs?
8. Why should effective measures be taken to protect a medicinal plants storage area?
9. What are the special conditions for the storage of plants?

Exercise 7. Decide if the sentences are true false of not given:

1. All plant medicines were discovered by thorough search and study.
2. A medicinal plant is a plant whose entire body contains substance that can be used for synthesis of drugs.
3. The story of the discovery of aspirin stretches back more than 3500 years to when bark from the willow tree was used as a pain reliever and antipyretic.
4. Any part of a plant can be used to produce drugs.
5. Leaves and flowers are collected when they are fully dry.
6. Roots are more commonly used than other parts of medicinal plants.

- Containers with the plant material should be located in such a way as to prevent free air circulation.
- For plants sensitive to solar heat, air-drying is recommended; herbs should be dried out of the sun in well-ventilated places on winnowing baskets or trays placed on shelves. NG

Exercise 8. Complete the sentences with suitable words:

- Historically, plants have played an important role in
- Over 40 % of medicines now prescribed contain chemicals derived from ...
- Throughout the world, botanists and chemists search the plant kingdom for new
- Today many medicinal plants are
- It is very important to collect plants in
- Medicinal plant materials should be stored in separate
- Medicinal plants constitute an important natural wealth of a

Exercise 9. Arrange the words to build sentences:

- medicinal/ A/ plant/ is/ containing/ can/ drugs/ substance/ that/ preparing/ plant/ any/ be/ used/ in.
- made/ plants/ leaves,/ from/ Drugs/ roots,/ are/ fruits,/ seeds/ of/ the/ flowers,
- It/ manner./very/ proper/ to/ is/ collect/ time/ important/ plants/ in/ and /
- fibrous,/ to/ administer./Medicinal/ preparation/ convenient/ are/ some/ plants/ and/ often/ requiring/ form/ of/ to/ make/ tough/ them
- Most/ the/ polyphenols,/ compounds/ terpenes./found/ major/ plants /four/ biochemical/ classes:/ alkaloids,/ glycosides, / of/ and/ in/ in/ are/

Exercise 10. Complete the table with the words *polyphenols, glycosides, terpenes and terpenoids, alkaloids:*

bitter-tasting chemicals very widespread in nature often toxic	include Anthraquinone glycosides and cardiac glycosides Plant-based laxatives made from such plants	they are strongly aromatic and serve to repel herbivores	their scent makes them useful in essential oils
opium poppy deadly nightshade	senna aloe lily of the valley foxglove	kudzu, angelica, fennel, and anise.	rose lavender

Exercise 11. Complete the text with the words in Italics: *ranging lower treat benefit medicinal herb adverse dermatitis clinical trials compound sickle cell anaemia increasing alter heartburn*

Garlic

Garlic has been used as a culinary spice and ... for thousands of years. One active ... in garlic is allicin, and this is produced along with many additional sulphur compounds by the action of the enzyme allinase when fresh garlic is crushed or chewed. Initial ... suggested the potential of garlic to ... serum cholesterol and triglyceride, but a recent trial has shown limited to no Garlic has been advocated to ... many conditions, ... from many cardiovascular diseases, e.g. atherosclerosis including peripheral vascular disease, hypertension, lipid disorders and Garlic can ... blood coagulability by decreasing platelet aggregation and fibrinolysis.

The ... effects of garlic use involve gastro-intestinal symptoms including halitosis, dyspepsia, flatulence and Other reported adverse effects include headache, haematoma and contact

Exercise 12. Read the text and find the synonyms to the words in bold from the words below(there are some extra words you do not need):

medicine collected prevent researched study pharyngitis pneumonia relieves spasms rise changing correct decrease searching for resembling diagnosis

Licorice is cultivated for its sweetness and medicinal properties. The roots are **harvested** at the end of the fourth year, when the sweet taste is the strongest. Glycyrrhiza uralensis and G. glabra most frequently used medicinally. Licorice root has a variety of medicinal uses, and has been traditionally classed as anti-inflammatory, adrenal tonic, antiallergy, antimicrobial, cough-reducer, expectorant, and mild laxative. It has been extensively **investigated**, and many of its traditional uses have been verified through clinical **trials**. Licorice is widely used for upper respiratory problems: **sore throats**, bronchitis, coughs, and excess catarrh. It **soothes** and reduces coughing, while its antiviral action is excellent for mouth ulcers and cold sores. The sweet taste makes licorice a popular addition to cough syrups and lozenges.

The healing effects of licorice make this herb a **remedy** for gastritis, peptic ulcer, and abdominal **cramping**. Some studies suggest that licorice can **increase** gastric juices by as much as 25 percent without **altering** the natural pH of the stomach, making licorice important for **proper** digestion.

Chemicals in licorice are metabolized by the body into molecules having a **similar** structure to some adrenal hormones. One of these hormones, Cortisol, may be the basis of the antiinflammatory effect of licorice. The herb is often added to formulas for chronic inflammatory conditions such as arthritic and rheumatic complaints. Like all strong herbs, licorice must be treated with respect, and **seeking** the advice of a qualified natural health practitioner is recommended.

Exercise 13. Match the parts of the sentences:

1. There are several types of ginseng (Siberian, Asian, American and Japanese),	a. potential modulation of the immune system and increase of glycogen storage.
2. In humans, ginseng has been suggested to be a sedative-hypnotic, an aphrodisiac, an antidepressant	b. could be disadvantageous in women with oestrogen-sensitive cancers
3. Its pharmacologic properties include actions as a phytoestrogen, suggesting that its use, as with soy supplementation,	c. is not established beyond reasonable doubt.
4. The active component of ginseng, ginsenoside, inhibits	d. agitation, irritability, insomnia and headache.
5. These properties may partly explain purported central nervous system stimulant actions of ginseng,	e. and a diuretic, and therapeutic benefits have been claimed for many indications
6. However, possible efficacy of ginseng in improving physical or psychomotor performance	f. the most common type used in herbal preparations being the Asian variety (Panax ginseng).
7. The adverse effects of ginseng are primarily CNS effects –	g. cAMP phosphodiesterase and monamine oxidase.

Self-control

I. Answer the questions:

1. What plants are considered to be medicinal?
2. What parts of a plant are drugs made from ?
3. When are leaves collected for producing drugs?
4. When are flowers collected for producing drugs?

5. When are fruits collected for producing drugs?
6. Which parts of plants are most preferred for producing drugs?
7. What are the special conditions for the storage of plants?

II. Define the term: Medicinal Plants

CHEMISTRY AND ITS PARTS

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
chain composition dissociation matter measurement observation origin property quality	gain occur provide	familiar purely

Exercise 2. Form adjective from the following nouns:

1. chemistry –
2. importance –
3. universe –
4. possibility –
5. system –
6. physics –
7. physiology –
8. pharmacology –

Exercise 3. Match the following PREFIXES with their meanings.

bi-, mono-, multi-, poly-, dis-, in-, mal-, un-, de-, over-, ultra-, super-, re-, mis-

number:

degree or size:

negativeness:

reverse:

repetition:

Now match the following words with appropriate prefixes. Some words can be combined with several prefixes.

___ lingual	___ expected	___ atomic	___ compose
___ advantage	___ function	___ hydrate	___ understand
___ accuracy	___ cellular	___ frost	___ live

Exercise 4. Do you know other outstanding scientists who played an important part in the development of chemistry? Match the names of scientists and their contribution to the development of chemistry. Make sentences according to the model. Model: Mari Curie is famous for (is given the credit for) the discovery of radium and polonium.

Names of the scientists	Their contribution to the development of chemical science
1. Mari Curie 2. N. Borh 3. F. A. Kekulle 4. Joseph Priestly 5. S. Arrhenius 6. A. M. Butlerov 7. H. M. Semenov 8. Irene Curie and Frederie Joliot	1. introduction of structural theory of organic chemistry 2. the theory of chain reactions 3. discovery of the artificial radioactivity 4. the theory of dissociation in water solutions 5. the discovery of radium and polonium 6. the structural formula for benzene 7. the discovery of oxygen 8. the orbit al model of an atom

Exercise 5. Read the text:

Chemistry and its parts

Pharmacy is the health profession that links the health sciences with the chemical sciences. So, chemistry is of the basic subjects for pharmacy students. It studies the composition, properties and behavior of matter. Chemistry is concerned with atoms and their interactions with other atoms, and particularly with the properties of chemical bonds. Chemistry is also concerned with the interactions between atoms (or groups of atoms) and various forms of energy (e.g. photochemical reactions, changes in phases of matter, separation of mixtures, properties of polymers, etc.).

Chemistry is sometimes called "the central science" because it bridges other natural sciences like physics, geology and biology with each other. Chemistry is a branch of physical science but distinct from physics. It is not easy to precisely define the boundary of chemical sciences (or simply chemistry), because the discipline lies along the spectrum between physics on the one hand and biology on the other.

The word chemistry comes from the word alchemy, an earlier set of practices that encompassed elements of chemistry, philosophy, astrology, astronomy, mysticism and medicine.

In retrospect, the definition of chemistry has changed over time, as new discoveries and theories add to the functionality of the science. The term "chemistry" meant the subject of the material principles of mixed bodies.

Chemistry is typically divided into several major sub-disciplines. There are also several main cross-disciplinary and more specialized fields of chemistry.

Analytical chemistry is the analysis of material samples to gain an understanding of their chemical composition and structure. Analytical chemistry incorporates standardized experimental methods in chemistry. These methods may be used in all sub-disciplines of chemistry, excluding purely theoretical chemistry.

Biochemistry is the study of the chemicals, chemical reactions and chemical interactions that take place in living organisms. Biochemistry and organic chemistry are closely related, as in medicinal chemistry or neurochemistry. Biochemistry is also associated with molecular biology and genetics.

Inorganic chemistry is the study of the properties and reactions of inorganic compounds. Neurochemistry is the study of neurochemicals; including transmitters, peptides, proteins, lipids, sugars, and nucleic acids; their interactions, and the roles they play in forming, maintaining, and modifying the nervous system.

Nuclear chemistry is the study of how subatomic particles come together and make nuclei. Modern Transmutation is a large component of nuclear chemistry, and the table of nuclides is an important result and tool for this field.

Organic chemistry is the study of the structure, properties, composition, mechanisms, and reactions of organic compounds. An organic compound is defined as any compound based on a carbon skeleton.

Pharmaceutical chemistry is one of the important in the range of special subjects; it plays a leading role in testing of drug quality. It is the basis of such sciences as toxicological chemistry, technology of drugs, organization and economy of pharmacy.

Chemistry will have a different impact on the career of each individual, but even if your career is far removed from the sciences, chemistry plays an important role in everyday life. We depend on the science of chemistry to provide us with a better standard of living.

Exercise 6. Answer the following questions:

1. What is a major part of pharmacy education?
2. What is pharmacy?
3. What does chemistry study?
4. Why is chemistry sometimes called "the central science"?
5. What is alchemy?
6. What does analytical chemistry study?
7. What does biochemistry study?
8. What does inorganic chemistry study?
9. What does organic chemistry study?
10. What does nuclear chemistry study?

Exercise 7. Match the words with their corresponding definitions:

proton	neutron	electron	molecule	atom
---------------	----------------	-----------------	-----------------	-------------

- a. the smallest particle of a chemical element that can exist
- b. a stable subatomic particle occurring in all atomic nuclei, with a positive electric charge equal in magnitude to that of an electron
- c. a stable subatomic particle with a charge of negative electricity, found in all atoms and acting as the primary carrier of electricity in solids
- d. a group of atoms bonded together, representing the smallest fundamental unit of a chemical compound that can take part in a chemical reaction

e. a subatomic particle of about the same mass as a proton but without an electric charge, present in all atomic nuclei except those of ordinary hydrogen

Exercise 8. Determine whether these statements are true or false, correct the false ones:

1. We need chemistry in our everyday lives.
2. Chemistry doesn't require any observations.
3. Chemistry deals with the changes in our personal life.
4. Organic chemistry deals with testing of drug quality.
5. The study of organic chemistry is not so important for pharmacists.
6. Measurement in chemistry are usually made using the metric system.
7. Pharmaceutical chemistry is one of the basic sciences for pharmacy students.
8. Chemistry has traditionally been divided into only two categories for study.

Exercise 9. Match the synonyms in columns A and B.

A	B
1) explain	a) characteristics
2) open	b) importance
3) put forward	c) limits
4) frontiers	d) account for
5) deal with	e) basic
6) significance	f) be concerned with
7) property	g) reveal
8) fundamental	h) alter
9) change	i) include
10) field	j) be made of
11) postulate	k) take place
12) be composed of	l) branch
13) occur	m) advance, suggest
14) research	n) state
15) contain	o) investigation

Exercise 10. Choose a suitable word given in the brackets to fill in each gap.

Chemistry (are\is) a branch of science that (deals, is dealing) with how substances (are\is) made up, how they combine, how they act under different conditions. The chemistry laboratory stereotypically (use\uses) various forms of laboratory glassware, but glassware (are\is) not central to chemistry, and a great deal of experimental chemistry (is\are) done without (it\its). Chemical engineering is (an\a) branch of chemistry and engineering that (apply\applies) the physical sciences e.g. chemistry and physics, and/or life sciences, e.g. biology, microbiology and biochemistry, together (up\with) mathematics and economics to production, transformation, transportation and (proper\properly) usage of molecules, chemicals, materials and energy.

Exercise 11. Open the brackets, using *there is* or *there are*:

1. To a chemist, there (to be) a fundamental distinction between a pure substance and a mixture.

2. In between the disciplines of Biology and Chemistry there (to be) an area known as Biochemistry.
3. If there (to be) no chemical reaction there (to be) no air, no air means no oxygen.
4. Since there (to be) chemistry seen in biological forms as well as physical states of nature, there (to be) subjects called biochemistry and physical chemistry which help study these changes.
5. There (to be) a lot of reasons why chemistry is a big part of daily life.
6. There (to be) innumerable chemical changes that occur around us all the time.
7. There (to be) some chemical change examples that are often observed in our surroundings.
8. There (to be) a meeting at our department next week.

Exercise 12. Choose the correct alternative to complete these statements.

1. If you can see very clearly through a material the material is
a translucent b translucent c transparent
2. If you cannot see through a material. It is
a opal b opalescent c opaque
3. A substance that dissolves in liquid is
a dissolute b dissolvable c soluble
4. A liquid that dissolves substances is a
a solvent b soluent c solutent
5. A material that is hard but breaks easily is
a battle b brittle c bristle
6. If a material bends easily. It is
a bendible b flexible c flectable
7. A material that does not bend easily is
a rancid b rigorous c rigid

Exercise 13. Put different questions to the sentences.

1. They have set up a number of experiments to verify the working hypothesis.
2. Science has become the most important part of the modern world.
3. Chemistry has always been of a great value to medicine.
4. They have predicted the result on the basis of their experiments.
5. He has achieved a significant correlation between practical results and theoretical assumptions.
6. Our findings have supported the hypothesis.
7. The scientists have expected a major breakthrough this field of technology.
8. He has carried out a promising research of a great theoretical and practical importance.

Self-control

I. Answer the questions:

1. What is pharmacy?
2. What does chemistry study?
3. What does analytical chemistry study?
4. What does biochemistry study?
5. What does inorganic chemistry study?
6. What does organic chemistry study?

7. What does nuclear chemistry study?

II. Define the term: Chemistry

ORGANIC AND INORGANIC CHEMISTRY

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
acid albumin amine carbon carbohydrate compound feature hydrocarbon hydrolysis lipid precipitation protein	convert	edible greasy reticular tetravalent

Exercise 2. Form adverbs from adjectives:

Model: *quick – quickly*

wonderful – wonderfully

happy – happily

true – truly

wide, natural, essential, primary, day, main, rapid, careful, normal, love, sleepy, usual, frequent, easy, part, different.

Exercise 3. a) Study the table:

Degrees of comparison of adverbs

Positive	Comparative	Superlative
long	longer	longest
early	earlier	earliest
patiently	more patiently	most patiently
PAY ATTENTION		
well	better	best
badly	worse	worst
many/much/a lot	more	most
little	less	least
far	farther/further	farthest/furthest

b) Fill in the table:

Positive	Comparative	Superlative
cold		
late		
usefully		
carelessly		
badly		
little		
many		
easy		

Exercise 4. Insert the appropriate form of the adverb.

1. He runs ... than me. (fast)
2. She came ... of all. (early)
3. You should eat ... spicy food. (little)
4. He wrote his exam ... than any of us. (well)
5. This reaction occurs ... than that one. (slowly)
6. It took me ... than usual to make a correct diagnosis. (long)
7. He worked ... and ... each time to achieve the best results. (hard)
8. Everyone treated him ... than other patients at hospital. (kindly)

Exercise 5. Find all the synonyms in each line.

1. matter a). science; b). subject; c). substance; d). structure
2. property a). quality; b). characteristic; c). quantity; d). feature
3. definition a). attribute; b). rule; c). determination; d). explanation
4. composition a). mixture; b). combination; c). compound; d). blend
6. essential a). utmost; b). ultimate; c). main; d). important
7. to convert a). to transform; b). to change; c). to turn into; d). to make
8. complicated a). complex; b). hard; c). uneasy; d). difficult

Exercise 6. Read the text:**Organic and Inorganic Chemistry**

The two main branches of chemistry are organic and inorganic chemistry. The difference between an organic and an inorganic compound is that organic compounds have a carbon in its chemical structure, while inorganic compounds usually do not have this element. Over a half million different organic compounds have been described in the chemical literature. The simplest organic compounds are the hydrocarbons. The carbon atom possesses the property of being able to form either chains or rings by joining up a number of similar carbon atoms together. The carbon atom is tetravalent whereby other atoms can be joined to it. A feature of organic chemistry is that the number of other elements involved is small: hydrogen, oxygen and nitrogen are so far the most common.

The three biggest classes of the organic compounds are proteins, carbohydrates, and lipids.

Proteins are made of amino acids which are linked together. Amino acids are compounds with the properties of amines and acids. There are many naturally occurring amino acids. The substances are found either free as components of plant or animal tissues, or as a product of protein hydrolysis. Several of them are essential in human nutrition.

Proteins are important substances in plants and animals. They occur as separate molecules or as reticular constituents of cells. Proteins are divided into groups according to physical properties: solubility, coagulation, precipitation. These groups include albumins, globulins, nucleo-proteins, etc.

The human body contains different proteins. The blood, hair, fingernails, skin, tendon and muscle fibers consist mostly of protein. Plant food and animal food such as meat, eggs, milk, cheese, contains proteins. Special enzymes covert proteins into simple amino acids so that the body can use them.

Carbohydrates occur most widely in nature. The most important carbohydrates are sugars, starches, and celluloses. The carbohydrates are classified according to the number of carbon atoms in the molecule.

Lipids are any of a diverse class of organic compounds, found in all living things that are greasy and insoluble in water. As one of the three large classes of substances in foods and living cells, lipids contain much more energy (calories) per unit of weight than proteins and carbohydrates. They include the fats and edible oils (e.g. butter, olive oil, corn oil), which are primarily triglycerides; phospholipids are important in cell structure and metabolism; waxes of plant and animal origin, etc.

Inorganic chemistry is the science of chemical elements and the simple and complex compounds formed by them, except the compounds of carbon, which are the subject of organic chemistry. It is the most important area of chemistry as it deals with the transformation of matter accompanied by changes in composition, properties, and structure.

Inorganic chemistry makes life easier and more comfortable. It satisfies industry, agriculture, medicine, and many other spheres of human activity. It is developing very rapidly and is one of the most important sources of scientific and technological progress.

Exercise 7. Answer the questions:

1. What does organic chemistry study?
2. What is the simplest organic compound?
3. What classes are organic compounds divided into?
4. What part of human body consists mostly of proteins?
5. What are proteins classified according to?
6. What are the examples of carbohydrates?
7. What is the advantage of lipids in comparison with proteins and carbohydrates?
8. What is the difference between organic and inorganic chemistry
9. What is inorganic chemistry?
10. What is inorganic chemistry used for?

Exercise 8. Match the words with their definitions:

1. protein	a) organic substance that is important for cell structure and metabolism
2. glucose	b) organic substance that provides body with sugars

3. lipid	c) simpler constituents of proteins
4. wax	d) main constituent of the cell walls of plants and of wood
5. carbohydrate	e) sticky substance of fats and oils secreted by plants or animals
6. cellulose	f) fatty substance that gives a lot of energy
7. phospholipid	g) building materials of living beings that consist of amino acids
8. amino acid	h) simple common sugar

Exercise 9. Find the correct endings of the sentences:

<p>1. Carbon is the basis for organic chemistry...</p> <p>2. Carbon is a nonmetal that can bond with itself and many other chemical elements, ...</p> <p>3. Elemental carbon can take the form of one of the hardest substances (diamond) ...</p> <p>4. Carbon is made in the interiors of stars, ...</p> <p>5. Carbon compounds have limitless uses. In its elemental form, diamond is a gemstone and used for drilling/cutting; graphite is used in pencils, as a lubricant, and to protect against rust; ...</p> <p>6. Carbon has the highest melting/sublimation point of the elements. The melting point of diamond is -3550°C. ...</p> <p>7. Pure carbon exists free in nature ...</p> <p>8. The origin of the name 'carbon' comes from the Latin word carbo, for charcoal ...</p> <p>9. Pure carbon is considered non-toxic, ...</p> <p>10. Carbon is the fourth most abundant element in the universe ...</p>	<p>a. as it occurs in all living organisms.</p> <p>b. or one of the softest (graphite).</p> <p>c. though it was not produced in the Big Bang.</p> <p>d. and has been known since prehistoric time.</p> <p>e. forming nearly ten million compounds.</p> <p>f. hydrogen, helium, and oxygen are found in higher amounts, by mass.</p> <p>g. although inhalation of fine particles, such as soot, can damage lung tissue.</p> <p>h. The German and French words for charcoal are similar.</p> <p>i. while charcoal is used to remove toxins, tastes, and odors.</p> <p>j. with the sublimation point of carbon around 3800°C,</p>
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Exercise 10. Say whether the following statements true or false:

1. A common simple sugar is lactose.
2. Coagulation is the property of proteins.
3. Only proteins belong to organic compounds.
4. Organic chemistry is the study of acids and salts.
5. Proteins are made of amino acids linked together.
6. Lipids contain less energy than proteins and carbohydrates.
7. The most important carbohydrates are sugars, starches, cellulose.
8. The blood, hair, fingernails, tendon and muscle fibers consist of fat.

Exercise 11. Insert the necessary preposition:

1. Carbohydrates occur most widely ... nature.
2. Lipids are any ... a diverse class of organic compounds.
3. Proteins are important substances ... plants and animals.

4. Proteins are divided ... groups according to physical properties.
5. Amino acids are compounds with the properties ... amines and acids.
6. Chemical literature describes ... a half million different organic compounds.
7. The blood, hair, fingernails, skin, tendon and muscle fibers consist mainly ... protein.
8. The carbon atom forms chains or rings ... joining ... a number of similar carbon atoms together.

Exercise 12. Arrange sentences in the correct order so as to describe “organic chemistry”:

1. The carbon atom form chains or rings by joining up a number of similar carbon atoms together.
2. Organic chemistry has made modern life simpler.
3. The three biggest classes of the organic compounds are proteins, carbohydrates, and lipids.
4. The simplest organic compounds are the hydrocarbons.
5. They all are found in plants and animals.
6. Organic chemistry studies the compounds of carbon.

Exercise 13. Put questions to the underlined words:

1. Amino acids are essential for human equilibrium.
2. Glycogen serves as a reservoir of carbohydrates.
3. This chemical factory produced anti-cancer drugs.
4. Plants produce oxygen by absorbing carbon dioxide.
5. Biochemistry derives its knowledge from observations.
6. Chromoproteins are responsible for the colour of hemoglobin.
7. The majority of reactions will be carried out in water solution.
8. The quality of human life has been greatly influenced by chemistry.

Exercise 14. Re-write sentences opening brackets.

1. Fructose also (to call) fruit sugar.
2. It was Friederick Kekule who (to find) organic chemistry.
3. Many exciting discoveries (to make) by scientists every day.
4. Important polysaccharides (to include) starch, glycogen, cellulose.
5. Many hydrocarbons (to know) in the early days of organic chemistry.
6. Organic chemistry (to mean) simply “chemistry of carbon compounds”.
7. Organic chemistry already (to enrich) modern life materially and intellectually.
8. Carbon atoms (to form) strong bond with each other, producing long chains or rings.

Self-control

I. Answer the questions:

1. What does organic chemistry study?
2. What is the difference between organic and inorganic chemistry?
3. What is the simplest organic compound?
4. What classes are organic compounds divided into?
5. What do proteins consist of?
6. What are the examples of carbohydrates?
7. What is inorganic chemistry?
8. What is inorganic chemistry used for?

II. Define the term: Organic chemistry, inorganic chemistry

THE PERIODIC TABLE OF CHEMICAL ELEMENTS

Exercise 1. Key words:

nouns	verbs	adjectives/adverbs
arrangement magnitude molecule ratio valence weight	display predict confide	analogous apparent tabular vacant

Exercise 2. Match the terms with their definitions:

1) atomic weight	a) relative size or extend
2) valence	b) the ratio of the average mass per atom of an element to one twelfth of the mass of an atom of carbon-12
3) element	c) a light silver-white metallic element
4) aluminum	d) the ability of atoms and chemical groups to form compounds
5) magnitude	e) any of the known substances that cannot be separated into simpler substances by chemical means

Exercise 3. Fill the table.

Verb	Noun	Adjective	Adverb
		predictable	
arrange			
	ability		
	discoverer		
		corrective	
			continuously
	collection		
confide			

Exercise 4. Read the text.

The Periodic table of chemical elements

The periodic table of the chemical elements is a tabular method of displaying the chemical elements. This invention is generally credited to Russian chemist Dmitry Mendeleev in 1869. Mendeleev intended the table to illustrate "periodic" trends in the properties of the elements.

In 1869, Mendeleev classified 56 elements on the basis of their physical and chemical properties in the increasing order of the atomic masses, in the form of a table. Mendeleev had observed that properties of the elements orderly recur in a cyclic fashion. He found that the elements with similar properties recur at regular intervals when the elements are arranged in the

order of their increasing atomic masses. He concluded that "the physical and chemical properties of the elements are periodic functions of their atomic masses". This came to be known as the law of chemical periodicity and stated: "The properties of the elements are a periodic function of the nuclear charges of their atoms".

Based on this law all the known elements were arranged in the form of a table called the "Periodic Table". D. I. Mendeleev arranged all the elements in a table consisting of vertical groups and horizontal periods. In this table all the uncoordinated data on the properties of elements and their compounds are collected and arranged into one well-constructed system. It enables scientists to predict the possibility of discovering new elements and their properties and to correct the errors made in previous definitions of the properties of known elements.

Periodic Table of the Elements

Legend:

- hydrogen
- alkali metals
- alkali earth metals
- transition metals
- poor metals
- nonmetals
- noble gases
- rare earth metals

1 H																	2 He																												
3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne																												
11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar																												
19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr																												
37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe																												
55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn																												
87 Fr	88 Ra	89 Ac	104 Unq	105 Unp	106 Unh	107 Uns	108 Uno	109 Une	110 Unn																																				
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <td style="background-color: #D3D3D3;">58 Ce</td> <td style="background-color: #D3D3D3;">59 Pr</td> <td style="background-color: #D3D3D3;">60 Nd</td> <td style="background-color: #D3D3D3;">61 Pm</td> <td style="background-color: #D3D3D3;">62 Sm</td> <td style="background-color: #D3D3D3;">63 Eu</td> <td style="background-color: #D3D3D3;">64 Gd</td> <td style="background-color: #D3D3D3;">65 Tb</td> <td style="background-color: #D3D3D3;">66 Dy</td> <td style="background-color: #D3D3D3;">67 Ho</td> <td style="background-color: #D3D3D3;">68 Er</td> <td style="background-color: #D3D3D3;">69 Tm</td> <td style="background-color: #D3D3D3;">70 Yb</td> <td style="background-color: #D3D3D3;">71 Lu</td> </tr> <tr> <td style="background-color: #D3D3D3;">90 Th</td> <td style="background-color: #D3D3D3;">91 Pa</td> <td style="background-color: #D3D3D3;">92 U</td> <td style="background-color: #D3D3D3;">93 Np</td> <td style="background-color: #D3D3D3;">94 Pu</td> <td style="background-color: #D3D3D3;">95 Am</td> <td style="background-color: #D3D3D3;">96 Cm</td> <td style="background-color: #D3D3D3;">97 Bk</td> <td style="background-color: #D3D3D3;">98 Cf</td> <td style="background-color: #D3D3D3;">99 Es</td> <td style="background-color: #D3D3D3;">100 Fm</td> <td style="background-color: #D3D3D3;">101 Md</td> <td style="background-color: #D3D3D3;">102 No</td> <td style="background-color: #D3D3D3;">103 Lr</td> </tr> </table>																		58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr
58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu																																
90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr																																

The layout of the table has been refined and extended over time, as new elements have been discovered, and new theoretical models have been developed to explain chemical behavior. The periodic table is now used within the academic discipline of chemistry, providing an extremely useful framework to classify, systematize and compare all of the many different forms of chemical behavior. The table has also found wide application in physics, biology, engineering, and industry. The table contains 117 elements as of 27 January 2008 (elements 1—116 and element 118).

Exercise 5. Answer the questions.

1. Who was D. Mendeleev?
2. What is the periodic table?
3. When was the periodic table credited?
4. Why are there vacant places in the periodic table?
5. How many elements does the periodic table consist of?

Exercise 6. Find words in the text that mean the following:

1. Substance which has not so far been split up into a simpler form by ordinary chemical methods.
2. List, orderly arrangement, of facts, information, etc.

3. Branch of science that deals with how substances are made up, how they (their elements) combine, how they act under different conditions.

Exercise 7. Are the following statements true or false? Correct the false ones.

1. The Periodic Table consists of vertical periods and horizontal groups.
2. The properties of the elements are a periodic function of the nuclear charges of their atoms.
3. There were known 1044 elements at the time of publishing Mendeleev's Periodic Table.
4. The table contains 117 elements as of 27 January 2008 (elements 1—116 and element 118).
5. Mendeleev's periodic system continues to form the basis for the most complex research.

Exercise 8. Fill in the blanks using the words under the line.

- a) One of the ... of modern chemistry is the Periodic Law.
- b) Mendeleev arranged the elements in order of increasing atomic
- c) There were several... positions in Mendeleev's periodic table.
- d) In this table all the data about chemical elements are arranged into ... system.
- e) His name will be ... in the discovery of new artificial elements.

1) perpetuated; 2) one well-constructed; 3) cornerstones; 4) weight; 5) vacant

Exercise 9. Learn the table below and answer the questions:

Name , group	Sym	#
Boron (non-metal)	B	5
Carbon (non-metal)	C	6
Copper (transition metal)	Cu	29
Gold (transition metal)	Au	79
Helium (noble gas)	He	2
Iodine (halogen)	I	53
Iron (transition metal)	Fe	26
Lead (metal)	Pb	82
Mercury (transition metal)	Hg	80
Neon (noble gas)	Ne	10
Nitrogen (non-metal)	N	7
Potassium (alkali metal)	K	19
Silver (transition metal)	Ag	47
Sodium (alkali metal)	Na	11
Sulfur (non-metal)	S	16
Tin (metal)	Sn	50

1. What group of elements does iron belong to?
2. What group of elements does nitrogen belong to?

3. What elements belong to non-metals?
4. What elements belong to noble gases?
5. What atomic weight does mercury have?
6. What atomic weight does lead have?
7. What element has atomic weight 11?
8. What element has atomic weight 19?

Exercise 10. Name the following elements and define them:

Model. C : Carbon is the chemical element with atomic weight 6 which belongs to non-metals .
K, Na, I, Au, Pb, Fe, Ag, He, Hg

Exercise 11. Read and determine what elements are described below:

1. this substance gives color to the Earth's atmosphere. Almost all substances burn in the presence ... it. Life on the Earth is impossible without it. In Latin it means "give birth to life".
2. this substance can be harder than glass and steel, but it can be softer than paper. Life is impossible without it. Neither a schoolboy nor a student can do without it at the lessons. In one of its modifications there is one of the most expensive minerals.
3. a colourless odourless relatively unreactive gaseous element that forms 78 per cent (by volume) of the air, occurs in many compounds, and is an essential constituent of proteins and nucleic acids: used in the manufacture of ammonia and other chemicals and as a refrigerant.;
4. a colourless odourless highly reactive gaseous element: the most abundant element in the earth's crust (49.2 per cent). It is essential for aerobic respiration and almost all combustion and is widely used in industry.;
5. a clear colourless tasteless odourless liquid that is essential for plant and animal life and constitutes, in impure form, rain, oceans, rivers, lakes, etc. It is a neutral substance, an effective solvent for many compounds, and is used as a standard for many physical properties

Exercise 12. Insert the forms of the Present or the Past Participle using the verbs given in brackets.

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.

Exercise 13. Fill in the missing prepositions (in, of, by, into:

The periodic table is an arrangement ... the chemical elements ordered ... atomic number so that periodic properties ... the elements (chemical periodicity) are made clear. The newest elements (113, 115, 117, and 118) are now accepted as discovered and officially part ... the periodic table. The discoverers will suggest names shortly ... these new elements.

The standard form ... the periodic table includes periods (shown horizontally) and groups (shown vertically). Elements ... groups have some similar properties ... each other. There is no one single or best structure ... the periodic table. The periodic table is a masterpiece ... organized chemical information. The evolution ... chemistry's periodic table ... the current form is an astonishing achievement ... major contributions ... many now famous chemists and other eminent scientists.

Exercise 14. Put up questions to the sentences beginning with the words in brackets:

1. Mendeleev predicted the properties of some elements before their discovery. (When?)
2. The properties of new compounds are discussed in this article. (Where?)
3. The arrangement of the elements in groups corresponds to their valences. (What?)
4. Nitrogen is slightly soluble in water. (Where?)
5. The same elements have been found both on the Earth and in the Sun. (Where?)
6. Mendeleev's daughter was the wife of Alexander Blok. (Whose?)

Exercise 15. Dwell upon:

- a) the major principles of the Periodic Table of elements;
- b) any element from the Periodic Table

Self-check**I. Answer the questions:**

1. Who was D. Mendeleev?
2. What is the periodic table?
3. When was the periodic table credited?
4. Why are there vacant places in the periodic table?
5. How many elements does the periodic table consist of?

II. Define the terms: the Periodic table of chemical elements**CHEMICAL REACTIONS****Exercise 1. Key words:**

nouns	verbs	adjectives/adverbs
-------	-------	--------------------

addition	convert	accurately
condition	estimate	available
elimination	involve	consistent
goal	undergo	precise
pathway		
rate		
shelf-life		
substitution		

Exercise 2. Read correctly:

ps [s]: psychotropic, psychiatry, psychology, psychosis, psychiatrist, psychologist;

ph [f]: pharmacy, philosophy, pharmacology, physician, pharmacist, physics;

y [ai]: supply, apply, rely, July, good-bye, type;

au [ɔ:]: cause, trauma, autopsy, auscultation, nausea, August.

Exercise 3. a) Form different parts of speech. Explain the meaning of affixes. Translate pairs of words into Ukrainian:

1. form adverbs with the help of the suffix *-ly*: entire, dangerous, immediate, potent, correct, different, safe;
2. form nouns with the help of the suffix *-ist*: oncology, dermatology, pharmacy, neurology, dentistry, urology, endocrinology;
3. form adjectives with the help of the suffix *-ous*: fame, danger, poison, nerve, fibre, glory, joy;
4. form adjectives with the help of the suffix *-al*: clinic, medic, continent, practice, nation, critic, logic.

Exercise 4. Read the text:

Chemical reactions

The study of the way, in which substances undergo a chemical change, is one of the main themes in chemistry. The experimental data for such a study are measurements of the rates, at which chemical changes take place. Such data are important when designing chemical plants or when estimating the shelf-life of a drug under various conditions. In pharmacy it is necessary to know not only how rapidly a drug decomposes or reacts with the constituents of the organism, but also the nature and mechanisms of the processes involved.

The mechanism of a reaction is a detailed, step-by-step description of the pathway, by which reactants are converted to products. One can never expect to prove a mechanism, because we cannot experimentally determine every precise detail of a reaction. We choose the “most reasonable” mechanism, which is consistent with the available experimental data. Now we have two bases while classifying reactions. The first involves designation as an addition, substitution, or elimination reaction. The second relates to the nucleophilicity or electrophilicity of the reagent. Thus nucleophilic additions and electrophilic substitutions are common reaction classifications.

Classification of a chemical transformation into one of the broad categories of reaction types is only the first step while developing a mechanism.

The study of reaction rates, which is called kinetics, is also important. It is kinetics that is a powerful tool for studying the reaction mechanism. Experiments are carried out at precisely controlled temperatures, reactant concentrations being accurately measured.

An important goal of the modern chemist is to make use of kinetics and structural information to develop a detailed mechanistic picture of a particular reaction.

Exercise 5. Answer the questions:

1. What is a chemical reaction?
2. What is the mechanism of a reaction?
3. Why is it necessary to know the mechanisms of a reaction?
4. What kind of reactions can you name?
5. What are the common reaction classifications?
6. What is kinetics?

Exercise 6. Match the words with their definitions:

1) precipitate	a) a large molecule consisting of chains or rings of linked monomer units, usually characterized by high melting and boiling points
2) reduction	b) a chemical reaction in which the solute and solvent react to form a new compound
3) elimination	c) an insoluble solid that emerges from a liquid solution
4) fermentation	d) any chemical reaction that involves the gaining of electrons
5) polymere	e) a polysaccharide that is composed of glucose monomers and is the main constituent of the cell wall of plants
6) cellulose	f) any of a group of chemical reactions induced by microorganisms or enzymes that split complex organic compounds into relatively simple substances
7) solvolysis	g) a type of organic reaction in which two substituents are removed from a molecule in either a one or two-step mechanism

Exercise 7. Fill in the gaps with the words from the box:

1.

decomposes; substitution; the constituents of the organism; undergo; shelf life; pathway; reaction rates

The mechanism of a reaction is a detailed, step-by-step description of the ... by which reactants are converted to products.

2. The types of chemical reactions are addition, ..., and elimination.
3. Pharmacists estimate ... of a drug under various conditions.
4. All substances ... changes in the process of the chemical reaction.
5. In pharmacy it is necessary to know how rapidly a drug ... or reacts with
6. The study of ... is called kinetics.

Exercise 8. Say whether the following statements are true or false:

1. The study of the way, in which substances undergo a chemical change, is one of the main themes in physics.
2. One can always expect to prove a reaction mechanism.
3. A reaction mechanism is a description of the pathway by which reactants are converted to products.
4. We should know nucleophilicity or electrophilicity of the reagents of the reaction mechanism studied.
5. Kinetics can help to study the reaction mechanism.
6. Chemical reactions are not important in the study of chemistry.

Exercise 9. Complete the sentences with *one/ones, that/those*:

1. The rate of this reaction differs from the rate of that
2. This chemical reaction failed to give the scientist accurate data and he performed another
3. Which substances are you going to use in your experiment? – Those
4. How does a double-replacement reaction occur? – It occurs when the ions of two compounds exchange places in an aqueous solution to form two new
5. The quality of reactants in your experiment is much better than ... of your classmate's.
6. On this web-site you will find our teacher's new experimental videos and ... of many other chemists.

Exercise 10. Open the brackets in the correct tense and form:

1. A chemical reaction is a process that (to lead) to the transformation of one set of chemical substances to another.
2. The substances involved in a chemical reaction (to call) reactants or reagents.
3. Chemical reactions (to happen) at a characteristic reaction rate at a given temperature and chemical concentration.
4. In the 17th century, Johann Rudolph Glauber (to produce) hydrochloric acid and sodium sulfate by reacting sulfuric acid and sodium chloride.
5. From the 16th century, such researchers as Robert Boyle and Isaac Newton (to try) to establish theories of chemical transformations.
6. In the 19th century, Christopher Ingold (to develop) the mechanisms of substitution reactions.

Exercise 11. Put questions to the underlined words:

1. Reaction rate is an important factor of a chemical reaction when the chemist develops the technology of a chemical process.
2. Chemist came to the conclusion that the rate of this reaction depended on the presence of catalysts.
3. Kinetics helps us to study the mechanism of chemical reactions.
4. Medical students study to perform synthesis of different compounds.
5. Inorganic chemistry is the most important area of chemistry as it deals with the transformation of matter accompanied by changes in composition, properties, and/or structure.

6. The arrangement of the elements in groups in the order of their atomic weights corresponds to their valences.