

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

**НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ
ХАРЧОВИХ ТЕХНОЛОГІЙ**

АНГЛІЙСЬКА МОВА

МЕТОДИЧНІ ВКАЗІВКИ

до вивчення дисципліни та виконання
контрольних робіт
для студентів напрямку 6.051.401
”Біотехнологія”
заочної форми навчання

СХВАЛЕНО
на засіданні кафедри
іноземних мов
загальної підготовки
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Пояснювальна записка до методичних вказівок

Загальні відомості

В світлі Болонського процесу розвиток та поліпшення заочної освіти має важливе значення для забезпечення економіки України висококваліфікованими спеціалістами. Поширення міжнародного співробітництва в різних галузях народного господарства вимагає від сучасного випускника вищої школи практичного володіння іноземною мовою, що дозволяє своєчасно ознайомитися з новими технологіями та відкриттями в науці і техніці, сприяє встановленню контактів з зарубіжними фірмами та підприємствами.

Методичні вказівки мають призначенням навчання та контроль знань студентів заочної форми навчання для формування вміння самостійно читати літературу англійською мовою із спеціальності з метою отримання інформації з іноземних джерел та комунікації.

Методичні вказівки складаються з чотирьох контрольних робіт і розраховані на 4 семестри. Кожна контрольна робота включає 10 варіантів контрольних завдань, які розподіляються викладачем.

Студенти заочного відділення виконують контрольну роботу в окремому зошиті. Контрольна робота повинна бути написана власноруч кульковою ручкою, охайно і чітко. Не дозволяється виконувати контрольну роботу на комп'ютері, друкарській машинці або з використанням копіювального паперу. При виконанні роботи слід залишати широкі поля для зауважень, пояснень та методичних вказівок викладача.

Усі завдання виконуються письмово, у тій послідовності, в якій вони розташовані у методичних вказівках. На титульному листі зошита слід вказати назву дисципліни, курс, номер академічної групи, прізвище, ім'я, по-батькові, адресу студента. У верхньому лівому кутку пишеться прізвище викладача.

На установчих заняттях викладач пояснює порядок виконання контрольної роботи і граматичний матеріал, пов'язаний з цією контрольною роботою. Вдома студент повинен проробити цей граматичний матеріал самостійно, використовуючи довідники, підручники, словники, вказані наприкінці Пояснювальної записки. На залікових заняттях студент також готує три – чотири розмовні теми, конспект граматичного матеріалу, словник тематичної лексики, яку він вчить напам'ять.

Мета і завдання дисципліни

Основною метою вивчення студентами іноземної мови в немовному вузі є досягнення ними практичного володіння цією мовою, що передбачає при заочній формі навчання формування вміння самостійно читати літературу за спеціальностями вузу з метою отримання інформації з іншомовних джерел.

Студент повинен знати лексичний та граматичний матеріал, необхідний для:

- 1) читання літератури зі спеціальності для отримання інформації,
- 2) набуття професійних комунікативних навичок.

Студент повинен вміти:

- 1) читати тексти зі спеціальності; розуміти їх зміст і відбирати все

необхідне для своєї роботи;

2) перекладати тексти рідною мовою, використовуючи словник, брати участь в усному спілкуванні іноземною мовою в обсязі матеріалу, передбаченого програмою.

Особливість вивчення іноземної мови при заочній формі навчання полягає в тому, що більша частина мовного матеріалу проробляється самостійно.

Кожному аудиторному заняттю у 2 години повинні відповідати 6 годин самостійної роботи.

Робоча програма з англійської мови

Фонетика

Особливості вимови, відкритий і закритий склади, наголос, розходження між написом і вимовою, особливості інтонації.

Лексичний мінімум

За повний курс навчання студент повинен здобути лексичний запас:

1) 1000 лексичних одиниць (слів і словосполучень), найбільш вживаних в англійській мові і пов'язаних в майбутньої спеціальності, які є основою для розширення потенційного словникового запасу студента

2) 500 лексичних одиниць на основі наступної тематики:

I семестр

1. Про себе
2. Мій робочий день
3. Місто, в якому я живу
4. Мій університет

II семестр

5. Україна (видатні люди України)
6. Київ — столиця України
7. Велика Британія
8. США

III семестр

9. Видатні люди Великобританії і США
10. Я вивчаю англійську мову

IV семестр

11. Вища освіта
12. Моя майбутня спеціальність

Граматичний мінімум.

У процесі навчання студент повинен засвоїти основні граматичні форми і структури англійської мови, характерні для наукових текстів.

Морфологія

I курс I семестр

2) прикметник, прислівник — ступені порівняння;

- 3) числівник – кількісні, порядкові, читання дат;
- 4) займенник – особові, присвійні, зворотні, питальні, неозначені;
- 5) дієслово – активні і пасивні форми.
- 6) безособові речення. Порядок слів у простому реченні.

I курс II семестр

Дієслово, модальні дієслова. Спосіб дієслова. Неособові форми дієслова.

II курс III семестр

Неособові форми дієслова. Інфінітивні, дієприкметникові та герундіальні звороти.

II курс IV семестр

Умовні речення. Головні та другорядні члени речення.

Іспит. До іспиту допускається студент, який виконав усі письмові завдання і склав заліки за попередні семестри.

Екзаменаційний білет складається з наступних питань:

а) прочитати і перекласти зі словником текст 1.600 друк. знаків зі спеціальності за 1 академічну годину.

б) прочитати без словника текст 600-800 друк. знаків, який містить вивчений граматичний матеріал і 5-8 незнайомих слів. Форма перевірки — передача змісту українською мовою.

в) вміти вести бесіду за тематикою, передбаченою програмою.

Рекомендована література

I, II курс

1. Авраменко О.П., Скибицька Н.А. Підручник з англійської мови, 1987.

2. Авраменко О.П., Бузницька Р.О., ін. Методичні вказівки до розмовних тем з англійської мови для студентів I-II курсів усіх спеціальностей денної та заочної форми навчання. – К.: УДУХТ. – 2001.

3. Методичні вказівки до вивчення дисципліни та виконання контрольних робіт для студентів спеціальності 7.091607 “Біотехнологія” та всіх технологічних спеціальностей заочної форми навчання та скороченого терміну навчання / О.П.Авраменко, Л.Г.Стрельникова, А.Л.Верба та ін. – К.: УДУХТ, 1999.

4. Буданов С.І., Борисова А.О. .Англійська мова . - К.: Вища школа, 1995.

5. Верба Г.Г., Верба Л.Г. Довідник з граматики англійської мови, 2000.

6. Англо-українські та українсько-англійські словники.

TEST № 1

Variant 1

I. Read, copy and translate the following text.

Animal Cell Structure

Cells are the basic structural units of all living organisms. Cells may have the form of primitive animals (protozoa) or plants (bacteria and some algae). There are two types of cells found in all currently existing organisms: prokaryotic and eukaryotic. Prokaryotes are simpler in structure than eukaryotes. Unlike the prokaryotes, the eukaryotes carry out their various metabolic functions in membrane-bound compartments called organelles.

A typical animal cell consists of a nucleus; the cytoplasm, which contains a wide variety of structures called organelles; and an outer plasma membrane (or cell wall in plants). Organelles and inclusions are suspended in the fluid medium called the cytoplasm. The roundish structure in the center of the cell is the nucleus, which is bounded by the nuclear envelope. The ergastoplasm, also called the rough endoplasmic reticulum, is a network of sacs and tubules that act as channels for materials passing through the cell.

The nucleus of eukaryotes performs two vital functions for the cell. First, it contains the cell's blueprints, that is, it stores the cell's information. Second, the nucleus influences all cellular metabolic activities. A typical nucleus contains two small, spherical nucleoli. The nucleolus, rich in RNA (ribonucleic acid) and surrounded by a rim of specialized DNA (desoxyribonucleic acid), is involved in the synthesis of materials (mainly ribosomal RNA) used in the production of ribosomes. Much of the nucleolus consists of a threadlike meshwork called the nucleolonema. The genetic information is encoded in thousands of genes, which are serially arranged along the length of the DNA. The DNA-gene-protein complex forming the major portion of the nuclear material and of the chromosomes is called chromatin.

The endoplasmic rough reticulum (ER), with numerous ribosomes on its surface is primarily involved in protein synthesis. The smooth ER takes part in lipid synthesis and biotransformation. The most important function of the plasma membrane is selective permeability.

Vocabulary

| | |
|-----------|------------------------|
| cell wall | стінка клітини |
| protozoa | мн. простіші організми |
| algae | морські водорості |
| nucleus | ядро |
| store | накопичувати |
| tubule | трубочка |
| vesicle | бульбочка |
| sac | мішечок |

| | |
|--------------------|------------------|
| arrange | розташовувати |
| suspended | підвішений |
| fluid medium | рідке середовище |
| involve, take part | брати участь |
| smooth | гладкий |
| permeability | проникненість |

II. Answer the following questions.

1. What is a cell? 2. What types of cells are there? 3. Is there difference between procariotes and eucariotes? 4. How is an animal cell arranged? 5. What are the functions of the nucleus of the cell?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

живі організми, нині існуючі організми, примітивні рослини, виконує різні функції, обмежений мембраною, складатися з, містить структури, зовнішня стінка клітини, відділ клітини, підвішену у, рідке середовище, оточений оболонкою, міцна сітка, яка називається (2), здійснює вплив на, яка знаходиться, зберігає інформацію, сітка (2) мішечків, які утворюють, вибіркова проникненість.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. Cells are the basic structural units of all living organisms. 2. A laboratory assistant prepares the samples. 3. The professor's lecture deals with the structure of the cell. 4. The students write their thesis for the conference. 5. The student's questions show his interest in the subject. 6. The nucleus of eukaryotes performs two vital functions for the cell. 6. First, it contains the cell's blueprints, that is, it stores the cell's information. 7. A typical animal cell consists of a nucleus, and an outer plasma membrane 8. The eukaryotes carry out their various metabolic functions in organelles.

V. Fill in the gaps with the verb to be.

1. There ____ two types of cells found in all currently existing organisms: prokaryotic and eukaryotic. 2. The ergastoplasm ____ a network of sacs and tubules 3. The nucleolus ____ rich in RNA. 4. The nucleolus ____ synthesizing ribosomal RNA. 5. I ____ a first-year student of the extramural department of the National University of Food Technology. 6. I ____ born in Ukraine in the town of Glukhiv. 7. I have ____ in Kyiv before. 8. We will ____ specialists in biotechnology.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. My name is Alexandr Zhuravlev. 2. Our family is not large. 3. My father works as an engineer and mother as a dentist. 4. I have only an elder brother. 5. He has graduated from the university. 6. Now he is working in Kyiv

technical school as a teacher of mathematics. 7. As for me I got interested in biology and chemistry being at school. 8. So having finished it I entered the National University of Food Technology.

VII. Transform the verbs into the past tense.

1. High school gives much knowledge. 2. They have passed their examinations. 3. We study properties of microorganisms. 4. She tells the truth. 5. We are solving the problems. 6. He combines work and studies. 7. He does everything carefully. 8. The students are making experiments in the laboratory.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. Your translation is the (good) one. 2. Prokaryotes are (simple) in structure than eukaryotes 3. There are (many) high mountains in the Caucasus than in the Carpathians. 4. The (much) important function of the plasma membrane is selective permeability. 5. There is (little) truth in this statement than in that one. 6. Multi-cellular organisms live (long). 7. Our speciality is one of (much) wonderful. 8. The (bad) the life the (much) resistant we should be.

IX. Copy the sentences using personal, possessive, objective and reflexive pronouns.

1. I will answer the question (I). 2. He doesn't like to speak about (he). 3. (I) mother told me about the war. 4. Send (we) an invitation and we will come. 5. (We) group studies biotechnology. 6. They often talked about (they) achievements. 7. She is very busy. It's hard to find (she) in (she) office. 8. They make the preparations (they).

X. Translate the sentences into English using the grammar of the test.

1. Щодо мене, мене завжди цікавила харчова біотехнологія. 2. Тому, закінчивши школу, я вступив до Національного університету харчових технологій. 3. Зараз я вивчаю дуже цікаві дисципліни. 4. Я вірю, що буду хорошим інженером — технологом після університету. 5. Всі організми складаються з клітин. 6. Існують два типи клітин — еукаріотні та прокаріотні. 7. Еукаріоти простіші за структурою, ніж прокаріоти. 8. Клітини складаються з ядра, цитоплазми та плазменної мембрани.

Variant 2

I. Read, copy and translate the following text.

Plant Cells

Plants belong to eukaryotes. Many scientists now believe that the cells of higher plants and animals are descended from relatively simple cells. These simple cells, of which bacteria are examples, are called prokaryotes. Eukaryotes, possessing

a discrete nucleus and requiring oxygen for its metabolism, evolved from prokaryotic cells. According to the hypothesis mitochondria and plastids in eukaryotic cells are prokaryotically derived in the process of symbiosis of two kinds of cells.

There is a remarkable similarity between plant and animal cells at the cellular and subcellular levels. Two main features – a rigid cell wall and the presence of plastids – distinguish the cells of higher plants. The cell wall is an extracellular structure, lying just outside the plasma membrane. It consists of cellulose fibers embedded in a matrix containing interlinked polysaccharides, such as pectins and hemicelluloses. The main function of the cell wall is to provide varying degrees of rigidity to different areas of the plant. This is accomplished by osmotic pressure. When a cell without a cell wall takes up water, it swells and ultimately bursts. However, when surrounded by a cell wall, the same cell will produce a very rigid structure when it takes up water, in much the same way that filling the inner bladder of a football with air causes pressure and imparts rigidity to the leather outer cover.

Plant cells contain various types of organelles called plastids, which are involved in photosynthetic processes. Mitochondrial-like, including the possession of their own DNA, plastids are derived from the egg, or female cell, and multiply independently in the cytoplasm. Small proplastids are precursors, which can develop into the green, chlorophyll-containing chloroplasts, yellowish etioplasts (modified chloroplasts found in plants grown in the dark), yellow-red chromoplasts containing carotenoid pigments, or leucoplasts, some of which store starch and may be involved in gravitational responses.

Vocabulary

| | |
|-----------------|-------------------------|
| subcellular | підклітинний |
| fiber | волокно |
| embedded | вбудований |
| interlinked | взаємозв'язаний |
| provide | забезпечувати |
| rigid | міцний |
| accomplish | завершувати |
| swell | набрякати |
| burst | тут луснути |
| fill | наповнювати |
| be derived from | походити від |
| store | зберігати, накопичувати |
| multiply | розмножуватися |
| precursor | попередник |
| response | реакція |

II. Answer the following questions.

1. In what process did a eucaryotic cell develop? 2. What is the distinguishing feature of higher plants cell wall? 3. What does the plant cell wall consist of?

4. What are the functions of the cell wall? 5. What are plastids and what function do they play in the cell?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

належати до, помітна схожість між, підклітний рівень, дві головні риси, відрізняється від, складається з, вбудована в матрицю, містить щось, походить з, забезпечує структуру, спричиняє тиск, які знаходяться у рослинах, розмножується незалежно, накопичує крохмаль, оточена оболонкою, набирає води, бере участь у гравітаційній реакції, набрякає і лускається, стає міцною, має власну ДНК.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. Plants belong to eukaryotes. 2. Plants' cells include bacteria and some algae. 3. The cell wall lies just outside the plasma membrane. 4. It consists of cellulose fibers embedded in a matrix. 5. Man's energy depends on food. 6. The plant's chromoplasts contain carotenoid pigments, or leucoplasts. 7. Carbohydrates, fats and proteins give energy. 8. Organelles called plastids are involved in photosynthetic processes.

V. Fill in the gaps with the verb to be.

1. The cell wall ____ an extracellular structure. 2. There ____ three types of bacterial shapes. 3. There have always ____ several solutions to this problem. 4. Everyone ____ happy to receive good marks at the lesson. 5. There ____ a laboratory work next night. 6. ____ a good scientist you must ____ materialist and democrat. 7. ____ you observing the cells through the microscope last time? 8. They had ____ discussing the culture medium for two days.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. The cell will produce a very rigid structure when it takes up water. 2. After the university the students will put their knowledge to practice. 3. She will graduate from the university by July next year. 4. He has become a prominent scientist. 5. Retorts, flasks and test tubes were on the table. 6. He had defended his term paper long ago. 7. All last week he was preparing for the examinations. 8. That professor has been delivering lectures in chemistry since 2005.

VII. Transform the verbs into the past tense.

1. I go in for sports to keep fit. 2. I get up at seven o'clock. 3. My day starts with morning exercises. 4. Doing my exercises I switch on the tape-recorder. 5. It puts me in good spirit. 6. I combine work and studies. 7. I have got a new car. 8. I am giving much time to studies.

VIII. Copy and translate the following sentences, using different degrees of

comparison of adjectives and adverbs.

1. Starch is (much) important carbohydrate. 2. This chain is (shorter) than that one. 3. The (much) you read, the (much) you know. 4. He is the (good) student of our group. 5. Have some fresh air even in the (bad) weather. 6. The mixture grew much (hot). 7. White sugar is (little) useful than yellow. 8. Pharmagenomics is one of the (young) branches of biotechnology.

IX. Copy the sentences using personal, possessive, objective and reflexive pronouns.

1. They always do everything (they). 2. We love (we) Motherland and want to be happy in it. 3. Ask (I) what (you) don't understand. 4. Write down (you) name (you), please. 5. They sent (she) to Cambridge University to study arts. 6. (She) taste is wonderful. 7. Tell (he) to come in time. 8. (They) experiment was a success.

X. Translate the sentences into English using the grammar of the test.

1. Рослини належать до еукаріотів. 2. У прокаріотів відсутнє ядро. 3. Схожість між рослинною та тваринною клітиною включає наявність міцної стінки та пластидів. 4. Хімічні формули на дошці. 5. Ми зацікавилися науками у школі. 6. Зараз я читаю підручник (textbook) хімії. 7. Селекція дала нам нові рослини та тварин. 8. Ми будемо вивчати генну технологію (genetic engineering).

Variant 3

I. Read, copy and translate the following text.

Carbohydrates

Carbohydrate kar-bo-hi'drat is any of a large class of carbon-hydrogen-oxygen compounds that includes the simple sugars and their polymers (chiefly starch, glycogen, and cellulose). Most carbohydrates are produced by photosynthesis in plants. They are the major food compounds for both plants and animals, and one group of carbohydrates (cellulose) is the chief structural material of plants. Most carbohydrates are represented by the formula $C_x(H_2O)_n$, where n is three or higher. On the basis of their chemical structure, carbohydrates are classified as polyhydroxyaldehydes, polyhydroxyketones, or their derivatives. Carbohydrates are divided into four groups, according to the number of simple sugars or their derivatives contained within the carbohydrate molecule. Nearly all are white solids that are soluble in water, and those of low molecular weight are sweet.

The monosaccharides are simple sugar molecules made up of three, four, five, or six carbons in chain or ring form. The three-carbon sugars, called trioses, include glycer-aldehyde, an aldo-sugar, and dihydroxyacetone, a keto-sugar. Tetroses, or four-carbon sugars, include D-erythrose and D-threose. The five-carbon sugars are called pentoses. Some, such as D-ribose and D-xylose, occur widely in nature and are of great biological significance. In deoxy compound a hydrogen atom replaces the hydroxyl group and it has one less oxygen atom. One deoxy compound, 2-deoxy D-

ribose, is a major component of biological coding systems.

Six-carbon sugars, the hexoses, are the most important intermediate source of energy to biological organisms. Common natural hexoses include D-glucose, D-mannose, D-galactose, and D-fructose. D-fructose, a common fruit sugar which also is found in honey, The disaccharides are molecules of two simple sugars linked together. Common disaccharides are maltose, lactose, and sucrose. The trisaccharides are raffinose (fructose, glucose, and galactose) and melezitose (glucose, glucose, and fructose).

Vocabulary

| | |
|------------------|---------------------|
| compound | сполука |
| starch | крохмаль |
| derivative | похідний |
| divide | ділити |
| contain | містити |
| solid | твердий |
| soluble | розчинний |
| molecular weight | молекулярна вага |
| sweet | солодкий |
| simple | простий |
| replace | замінити |
| significance | важливість |
| link | зв'язок, зв'язувати |

II. Answer the following questions.

1. What compounds does the class of carbohydrates include? 2. How are they formed? 3. How are the carbohydrates classified on the basis of their chemical structure? 4. On what principle are carbohydrates divided into four groups? 5. How are disaccharides and trisaccharides arranged and represented?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

сполука включає, прості сахари, головним чином, виробляються фотосинтезом, представлені формулою, згідно з кількістю, головна сполука, поділяються на, їхні похідні, розчинні в воді, молекулярна вага, проміжне джерело енергії, складаються з вуглеводів, названі тріозами, які зустрічаються, біологічно значущий, заміщує гідроксильну групу, знайдені в меді, зв'язані разом.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. The cell's functioning includes enzymes production, on which the efficiency of biochemical reactions depends. 2. All matter consists of atoms. 3. The monosaccharides are simple sugar molecules. 4. The three-carbon sugars, called trioses, include glyceraldehyde. 5. Most carbohydrates are produced by photosynthesis in

plants. 6. The cell's structure needs further investigation. 7. Scientists show that milk and its products have exceptional nutritional value. 8. Cow's liver contains much vitamin A.

V. Fill in the gaps with the verb to be.

1. Carbohydrate ____ any of a large class of carbon-hydrogen-oxygen compounds. 2. Carbohydrates ____ the major food compounds for both plants and animals. 3. All people ____ using carbohydrates in their diet. 4. My native town ____ Kyiv. 5. It ____ built long ago. 6. I have ____ studying here. 7. There ____ many schools, cinemas, museums, parks and gardens. 8. I hope my town will ____ even more modern and beautiful in future.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. The course of study lasts five years. 2. Specialization will begin in the third course. 3. During junior years our students are studying basic subjects such as mathematics, physics, chemistry, etc. 4. We have seen much at the foodstuffs exhibition. 5. We entered the university this year. 6. When does the academic term start? 7. The number of vegetarians is rising today. 8. Why didn't you call me on Tuesday?

VII. Transform the verbs into the past tense.

1. She is taking her pills after meals. 2. The guests have seen the historical sights of Kyiv. 3. The film tells us about the achievements of medicine. 4. He first thinks then says. 5. Carbohydrates are divided into four groups. 6. History knows outstanding discoveries. 7. Our pharmacologists find new methods of drugs production. 8. Edible plants grow everywhere.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. (Many) carbohydrates are produced by photosynthesis in plants. 2. In the formula $C_x(H_2O)_n$ n is three or (high). 3. The hexoses are the (much) important intermediate source of energy to biological organisms. 4. To do nothing is (bad) than to do something. 5. We need food (little) than water. 6. Sugar and salt are recommended in the (little) quantities. 7. The (much) we know, the more we forget. 8. Computeromania is (good) than narcomania.

IX. Copy the sentences using personal, possessive, objective and reflexive pronouns.

1. The doctor recommended (he) to eat less. 2. (We) may improve (we) health drinking pure water. 3. The sick should care about (they) diet. 4. (You) good temper will save (you). 5. (I) students take much interest in food additives. 6. The technologist wants (we) to show our skills. 7. Let (I) ask (you) some questions. 8. (He) profession is pharmacologist.

X. Translate the sentences into English using the grammar of the test.

1. Які речовини включає клас вуглеводів? 2. Вуглеводи складаються з вуглецю, водню та кисню. 3. Вуглеводи — сполуки, які являють собою їжу для

тварин. 4. Вуглеводи утворюються в рослинах у процесі фотосинтезу. 5. Ви вже чули цю новину? 6. В той час всі працювали. 7. Ви полюбляли хімію в школі? 8. Після університету ми будемо працювати на фармацевтичному заводі.

Variant 4

I. Read, copy and translate the following text.

Proteins Structure And Synthesis

Protein takes many forms and is fundamental to life. Proteins make up the vital part of essential jelly material of the living cell – the protoplasm. The living tissues of plants and animals consist of protein material which is continually destroyed in the maintenance of life and must be restored. White of an egg is an example of pure protein.

Proteins are complex in nature and are composed of a number of amino acids. Most proteins contain from 51 to 55 per cent of carbon, about 7 per cent of hydrogen, from 20 to 23 per cent of oxygen, from 15 to 18 per cent nitrogen. Some of them also contain a little phosphorus or iron. Proteins are classified as complete, partially complete and incomplete. A complete protein is one that is adequate to support normal growth and to maintain life. A partially complete protein is one that maintains life but does not support normal growth. An incomplete protein will by itself neither support normal growth nor maintain life. Most animal proteins are complete. Plant proteins are more or less incomplete.

The first two steps in protein synthesis are: *transfer*, *replication* and *transcription*, which involve synthesis of nucleic acids using nucleic acid templates. The last step, *translation*, involves a nucleic acid template. Codon is recognized following specific base-pairing with a sequence of three bases on a tRNA called the anticodon. If this base-pairing was always the standard pairing of A with U and G with C, then one would expect at least one specific tRNA to exist for each codon. In some cases, this is true. For instance, in *E. coli*, although there are two lysine codons, there is only one lysyl tRNA, and its anticodon can base pair with either AAA or AAG. This is possible because in these cases tRNA molecules form standard base pairs at only *the first two* positions of the codon, while tolerating irregular base pairing at the third position. This apparent mismatch phenomenon, is called wobble.

Vocabulary

| | |
|----------------------|---------------------|
| essential | важливий |
| living tissue | жива тканина |
| destroy | руйнувати |
| incomplete protein | неповноцінний білок |
| ability | здатність, вміння |
| maintain life | підтримувати життя |
| support growth | підтримувати ріст |
| information transfer | перенос інформації |

| | |
|-----------------------|---------------------------|
| replication | повторення, копіювання |
| transcription | переписування, копіювання |
| nucleic acid template | матриця амінокислоти |
| codon recognized | опізнаний кодон |
| mismatch phenomenon | явище неспівпадіння |
| wobble | коливання |

II. Answer the following questions.

1. Why are proteins fundamental to life? 2. What important elements are proteins composed of? 3. What is proteins classification based upon? 4. How are the three steps in protein synthesis called? 5. What phenomenon is called wobble?

III. Find the English equivalents of the following Ukrainian word combinations.

тканини тварин та рослин, чистий протеїн, складається з амінокислот, містить вуглець, повноцінний білок, не зовсім повноцінний, більш – менш, достатній для, підтримує ріст, перенос інформації, копіювання та переписування, перший крок, опізнавання кодону, вслід за, шаблон амінокислоти, код опізнається, парування основ, послідовність основ, нерегулярне парування основ, явище неспівпадіння.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. The living tissues of plants and animals consist of protein material. 2. Egg's yolk is an example of pure protein. 3. Protein takes many forms and is fundamental to life. 4. Proteins make up the vital part of essential jelly material of the living cell – the protoplasm. 5. The reaction starts immediately. 6. The genes attach to the cells. 7. Proteins are complex in nature. 8. The chemist's achievements contributed to biotechnology.

V. Fill in the gaps with the verb to be.

1. A complete protein _____ supporting normal growth and maintaining life. 2. Most animal proteins _____ complete. 3. Diet with plant proteins only will _____ deficient. 4. In *E. coli* there _____ two lysine codons. 5. In *E. coli* here _____ only one lysyl tRNA. 6. We _____ developing contacts with many countries. 7. Where have you _____ up to now? 8. _____ a good student means to read much.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. Children grow better on proteins. 2. A partially complete protein does not support normal growth. 3. The experiment has proved the theory. 4. The compound is disintegrating quickly. 5. I had been expecting the letter for a long time. 6. Were you glad to receive a good mark? 7. Do you like to ask questions? 8. The microorganisms grew on molasses. 9. I will wait for you at the library.

VII. Transform the verbs into the past tense.

1. Proteins are classified as complete, partially complete and incomplete. 2. The scientists design new technologies. 3. Each nation has developed different traditions. 4. He is taking an active part in the conferences. 5. We have been watching the reaction for half an hour. 6. Do you try to remember everything? 7. They have not taken their decision yet. 8. Everything is done to increase productivity.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. The (good) food is the vegetarian one. 2. (Many) animal proteins are complete. 3. Carbohydrates are used much (easy) by the body than proteins. 4. Old people need (little) calories. 5. Hunger gives us the (bad) of sufferings. 6. We usually choose what is (easy) to cook. 7. Antibiotics discovery was the (much) significant event. 8. What food contains the (little) amount of calories?

IX. Copy the sentences using personal, possessive, objective, and reflexive pronouns.

1. Choose (you) diet (you). 2. If any one inquires about me, tell (they) that I am well. 3. Each of the students worked (he). 4. Ask (I) any questions. 5. (I) favourite branch of biotechnology is food additives. 6. (She) has passed well all (she) credit tests and exams. 7. We find (we) ways and means (we). 8. There is only one lysyl tRNA, and (it) anticodon can base pair with either AAA or AAG.

X. Translate the sentences into English using the grammar of the test.

1. Живі тканини тварин і рослин складаються з протеїну. 2. Протеїн утворює важливу частину клітини – протоплазму. 3. Амінокислоти – складові протеїнів. 4. Деякі протеїни містять залізо та фосфор. 5. Україна – найпрекрасніша країна у світі. 6. Що ви робили? 7. Не питайте всі разом. 8. Студенти вивчать рецепти різних ліків.

Variant 5

I. Read, copy and translate the following text.

Lipids

Carbohydrates bond to major biochemicals, forming glycoproteins and glycolipids. Glycoproteins and glycolipids found on cellular surfaces identify the cells either as belonging to the body or as invading organisms. These compounds also relay hormonal signals through the membrane.

In addition to carbon, hydrogen, and oxygen, lipids contain other elements, such as nitrogen or phosphorous. Lipids possessing a molecular group that can be hydrolyzed are called saponifiable lipids, while those that cannot be hydrolyzed are referred to as nonsaponifiable lipids. The types of carboxylic acid found in saponifiable lipids are long-chain molecules. When the three hydroxyl groups

contained in the lipid glycerol are bonded to three fatty acids, the ester triacylglycerol, or triglyceride, is formed. Fats and oils are both triglycerides.

In the phosphoglycerides, phosphate, rather than fatty acid, is bonded to glycerol. One sphingolipid, sphingomyelin, is a component of the myelin sheath, the coating around the axons of nerve cells.

Among the nonsaponifiable lipids, one group, the steroids, are characterized by a fused ring system consisting of three rings with six linked atoms and one ring with five atoms. Cholesterol, a steroidal alcohol, is especially abundant in the myelin sheath around nerve axons. Another lipid group, the prostaglandins, consists of 20-carbon fatty acids present in all tissues.

Fatty acids that are common in food fats and oils fall into three broad classes according to their degree of saturation: fully saturated, monounsaturated, polyunsaturated. They may be of different chain length; so there are short chain and long chain fatty acids. Saturated fatty acids may be of any chain length, from 4 to 18 or more carbons. The most common ones and their chain length are: stearic (18), palmitic (16), myristic (14) and lauric (12). Polyunsaturated fatty acids essential for nutrition are: linoleic, linolenic and arachidonic

Vocabulary

| | |
|---------------------------|------------------------|
| bond, link | приєднувати |
| invade | захоплювати |
| contain, possess | мати |
| saponifiable | мильний |
| be referred to, be called | називатися |
| belong | належати |
| derive | походити |
| find | знаходити |
| myelin sheath | мієлінова оболонка |
| nerve axon | нейрит |
| fused ring system | система злитого кільця |
| consist of | складатися з |
| tissue | тканина |
| fatty acid | амінокислота |
| saturated | насичений |
| chain | ланцюг |

II. Answer the following questions.

1. How are lipids formed? 2. What elements do lipids contain? 3. What lipids are called saponifiable and nonsaponifiable? 4. What two lipids are found in the myelin sheath around nerve axons? 5. How are fatty acids classified?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

які мають молекулярну групу, утворюють глікопротеїни, передають сигнали, в додаток, належить до, називається як, клас органічних сполук, мильні ліпіди, походить від, знаходиться у ліпідах, містять азот, молекула з

довгим ланцюгом, приєднана до, розкладається на, складається з трьох кілець, розповсюджений у, оболонка навколо, присутній в усіх тканинах, насичена жирна кислота, довжина ланцюга, важливий для харчування.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. Carbohydrates bond to major biochemicals, forming glycoproteins and glycolipids. 2. Glycoproteins and glycolipids relay hormonal signals through the membrane. 3. Steroid's fused ring system consists of three rings. 4. Fat makes our food palatable and satisfying. 5. In the advanced Western countries eating habits have changed in favour of higher fats. 6. The formula represents a chemical compound. 7. The grown-up's diet should include more plant oils than animal fats. 8. Proteins have a special function of building new tissues and of keeping old tissues in repair.

V. Fill in the gaps with the verb to be.

1. My breakfast ____ over at a quarter past seven. 2. At half past seven I ____ ready to leave for my university. 3. The university buildings ____ situated in Volodymyrska Street. 4. I have always ____ in time for my classes. 5. At a quarter past eight I ____ sitting at the lecture. 6. There will ____ lectures, practical classes, and laboratory works today. 7. My favourite subject at school ____ chemistry. 8. We will ____ studying more chemistries next year.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. Carbohydrates bond to major biochemicals. 2. Tomorrow I will go to the university. 3. My friend is waiting for me now. 4. My sister had been working here since after the academy. 5. The vitamins A, B, C, D, are the most important to the nutritionist. 6. They were investigating the properties of different nutrients. 7. You have put too much acid in the solution. 8. Ergosterol occurs in plants.

VII. Transform the verbs into the past tense.

1. They find glycoproteins and glycolipids on cellular surfaces. 2. Winter brings snow and ice. 3. Working people rise early. 4. They have told everything to us. 5. The scientists are writing articles in scientific journals. 6. Impure water contains gems. 7. They do some research. 8. He is a wonderful lecturer.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. If you eat a lot you will get (fat). 2. The (good) country is a native country. 3. Medicine is the (old) science. 4. He doesn't work (hard) than I do. 5. Man learnt to make his food (much) digestible. 6. Animal fats are (bad) than plant oils for the body. 7. The selected seeds were of (good) quality than the ordinary. 8. The last is not always the (little).

IX. Copy the sentences using personal, possessive, objective, and reflexive

pronouns.

1. Are (you) a student? 2. Tell (I) about (you) studies. 3. Let (we) discuss the vitamins. 4. We study lipids. Let's discuss (they) composition. 5. I study this subject (I). 6. (They) recipes are known all over the world. 7. The products are (they). 8. (You) knowledge will be of use to you.

X. Translate the sentences into English using the grammar of the test.

1. Вуглеводи – сполуки вуглецю, водню та кисню. 2. З якими речовинами з'єднуються вуглеводи? 3. Існують насичені (saturated) та ненасичені, високомолекулярні (long chain) та низькомолекулярні (short chain) жирні кислоти. 4. Вуглеводи утворюють глікопротеїни і гліколіпіди. 5. Ліпіди містять також азот і фосфор. 6. Коли ви закінчили школу? 7. Вона вже зробила свою роботу. 8. Ви ще будете мене питати?

Variant 6

I. Read, copy and translate the following text.

Nucleic Acids

The nucleic acids deoxyribonucleic acid (DNA) and ribonucleic acid (RNA) are macromolecules — polynucleotides composed of monomers called *nucleotides*. By directing the synthesis of proteins within the cell, nucleic acids provide the means of biochemical regulation.

The general structure of nucleotides of DNA and RNA is very similar. The nucleotides consist of a five-carbon sugar, either ribose (in RNA) or deoxyribose (in DNA); a phosphate group, and a nitrogen-containing base. Nucleotides, especially adenosine triphosphate (ATP) are releasing chemical energy for reactions in the cell during the cleavage of a phosphate bond. The monosaccharide ribose serves as the sugar group for RNA, while deoxyribose is found in DNA. The bases contained in DNA – adenine, thymine, guanine and cytosine – are also present in RNA, with the exception of thymine, which RNA replaces with uracil.

One DNA differs from another in the sequence of bases attached to the sugar-phosphate backbone. Thus variations among organisms are based on differences in this base *sequence*. The yeast genome is closer to the human genome than anything else. DNA carries the genetic blueprint for the cell while RNA converts the blueprint into defined amino acid sequences in proteins. The sequence of nucleotides in a DNA or RNA molecule is referred to as its primary structure. The pattern of folding in RNA is referred to as its secondary structure.

RNA plays three crucial roles in the cell. *Messenger RNA* (mRNA) contains the genetic information of DNA in a single-stranded molecule complementary in base sequence to that of DNA. The informational content of a nucleic acid is determined by the sequence of nitrogen bases along the polynucleotide chain. *Transfer RNAs* (tRNAs) convert the genetic information from the language of nucleotides to the language of amino acids. *Ribosomal RNAs* (rRNAs), are important structural and

catalytic components of the *ribosome*, the protein-synthesizing system of the cell.

Vocabulary

| | |
|-----------|----------------|
| direct | спрямовувати |
| means | засіб |
| accept | приєднувати |
| base | основа |
| provide | забезпечувати |
| convert | перетворювати |
| serve | служити |
| differ | відрізнятися |
| sequence | послідовність |
| backbone | кістяк, основа |
| fold | згортати |
| cleavage | розщеплення |
| release | вивільняти |
| determine | визначати |
| bond | зв'язок |
| blueprint | інформація |

II. Answer the following questions.

1. What do the abbreviations RNA and DNA mean? 2. How are they called chemically? 3. What do they consist of? 4. What are variations among organisms based on? 5. What is the difference between the messenger RNA, transfer PNA and ribosomal RNA?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

нуклеїнова кислота, забезпечують засіб, складаються з мономерів, спрямовують синтез, вивільняти енергію, розщеплятися на, служить як, фосфатний зв'язок, за винятком, знаходиться в ДНК, замінює урацилом, називається як, одиниця цукру, приєднаний до, кістяк структури, послідовність основ, відрізнятися від, генетична інформація, геном дріжджів, проміжна молекула, перетворює генетичну інформацію.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. The cell's synthesis of proteins is directed by nucleic acids. 2. The nucleic acid's informational content is determined by the sequence of nitrogen bases along the polynucleotide chain 3. The man's body is composed of the protein material. 4. Vegetarian diets provide adequate nourishment 5. Monomers form nucleic acids. 6. The monosaccharide ribose serves as the sugar group for RNA. 7. The DNA's bases are also present in RNA. 8. One DNA differs from another.

V. Fill in the gaps with the verb to be.

1. I ____ born in Ukraine. 2. My native town, Glukhiv, ____ an important

industrial and trade centre. 3. It _____ situated to the West of Kyiv. 4. There _____ many residential houses, schools, shops there. 5. My native town _____ constantly building. 6. Many new offices and markets have already _____ built in it. 7. I _____ proud of my native town. 8. I hope there _____ work for me there after my graduation.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. DNA and RNA are polynucleotides. 2. By directing the synthesis of proteins within the cell, nucleic acids provide the means of biochemical regulation. 3. *Transfer RNAs* (tRNAs) is converting the genetic information from the language of nucleotides to the language of amino acids 4. The reaction will go on faster with enzymes. 5. We had passed our entrance examinations successfully. 6. They were discussing their reports at that time yesterday. 7. Scientists have been studying plant and animal metabolism for centuries. 8. You will catch infection if you don't take care.

VII. Transform the verbs into the past tense.

1. We have chemistry on the time-table. 2. He works as a laboratory assistant at the university. 3. The blue mold has grown on the bread. 4. There are many genera of bacteria. 5. We are having laboratory work just now. 6. Bacteria and fungi cause diseases. 7. The student writes the formula on the blackboard. 8. The chemical elements form a compound.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. Meats develop (much) toxins than the plant food. 2. Nobody wants the (bad), everyone wants the (good). 3. (Young) people have (good) digestion. 4. The (much) undesirable effect of modern food is loss of man's resistance to diseases. 5. The yeast genome is (close) to the human genome than anything else that had been completely sequenced up to that time. 6. People with bad liver are recommended to eat (little) fat 7. There are amino acids (much) essential in nutrition. 8. The weather is getting (bad).

IX. Copy the sentences using personal, possessive, objective and reflexive pronouns.

1. (She) mother is a director of the bread plant. 2. (I) point of view is quite different. 3. Tell (they) what to do. 4. Let (we) add some sugar into the mixture. 5. What is (you) future specialty? 6. (They) usual occupation is to grow plants. 7. The professor of chemistry checked the laboratory tests (he). 8. (We) lecturer spoke about the calories in food.

X. Translate the sentences into English using the grammar of the test.

1. Нуклеїнові кислоти складаються з мономерів. 2. Нуклеїнові кислоти спрямовують синтез мономерів у клітині. 3. Мономери, які утворюють нуклеїнову кислоту, складаються з п'ятикарбонного цукру. 4. Нуклеотиди вивільняють хімічну енергію для реакцій у клітині. 5. Ви колись бували у

Житомирі? 6. Я дуже люблю моє рідне місто. 7. Промисловість міста розвивається здавна. 8. Я вірю, що моє місто буде сучасним і багатим.

Variant 7

I. Read, copy and translate the following text.

Anabolism, Catabolism, and Metabolism

Anabolism refers to the range of biochemical reactions that occur in living cells, in which larger molecules are synthesized from smaller ones, as in the construction of proteins from amino acids. These processes usually require energy and are therefore is used by the cells to store it. An organism's *catabolism* is made up of the pathways through which larger molecules are broken down into smaller ones, releasing the energy needed for muscle contraction, waste removal, transmission of nerve impulses, and all other cellular processes. Together, an organism's anabolism and catabolism are referred to as its *metabolism*. A series of anabolic and catabolic processes produces the molecules ultimately used as the major source of cellular energy.

Catabolism of Simple Sugars. During digestion – the first step in the process of extracting energy from food – polysaccharides, proteins, and fats are hydrolyzed yielding simple sugars, amino acids, and fatty acids. *The catabolism of the simple sugar glucose* includes a ten-step reaction known as *glycolysis*, or *the Embden-Meyerhof pathway*, in which each glucose molecule is converted into two three-carbon molecules called pyruvate. These then undergo decarboxylation (loss of carbon dioxide), forming a two-carbon acetate group, which subsequently attaches to the compound known as coenzyme A, forming acetyl coenzyme A (acetyl CoA), a molecule essential to the further release of energy.

Each of *the 20 amino acids* is catabolyzed by means of its own unique pathway. In each case the molecule's nitrogen is removed, either as part of an ammonium ion or by transamination, in which the amino group (NH₂) of the amino acid is transferred to a keto acid, specifically an α -keto acid, prior to being used in the formation of another amino acid.

Vocabulary

| | |
|----------------|------------------------------------|
| muscle | contraction |
| release | вивільняти |
| wastes removal | видалення відходів |
| transmission | передача |
| brake down | розщепляти |
| digestion | травлення |
| yield | призводити до, мати результатом |
| extract energy | видобувати енергію |
| major source | головне джерело |
| essential | важливий, необхідний |

| | |
|------------|---------------|
| convert | перетворювати |
| form | утворювати |
| amino acid | амінокислота |
| pathway | шлях |

II. Answer the following questions.

1. What processes does metabolism refer to? 2. What is the difference between the two metabolic processes? 3. What is the first step in extracting energy from food? 4. What is glycolysis? 5. What does transamination enable?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

відноситься до, реакція проходить, складається з шляхів, через які, розкладається на менші, вивільняючи енергію, видалення відходів, передача нервових імпульсів, утворюючи прості сахари, жирні кислоти, перетворюється на, проходить втрату карбона, називається як (2), використовується у, приєднується до, відомий як, важливий для, молекулярний азот видаляється, свій шлях, амінокислота переноситься.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending -s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. Anabolism refers to the range of biochemical reactions that occur in living cells. 2. In anabolism larger molecules are synthesized from smaller ones. 3. In an organism's catabolism the energy needed for cellular processes is released. 4. Together, an organism's anabolism and catabolism are referred to as its metabolism. 5. A series of anabolic and catabolic processes produces the molecules. 6. The catabolism of the simple sugar glucose includes a ten-step reaction known as glycolysis. 7. During each turn of the *Citric acid cycle* or *Krebs cycle*, two carbon dioxides are produced. 8. Oxaloacetic acid, which bonds to another acetyl CoA, is starting the whole cycle again.

V. Fill in the gaps with the verb to be.

1. Digestion ____ the first step in the process of extracting energy from food. 2. Fats ____ hydrolyzed yielding simple sugars, amino acids, and fatty acids. 3. Two three-carbon molecules ____ forming a two-carbon acetate group. 4. Besides studies I ____ fond of art, music, literature and cinema. 5. There ____ few theories on this subjects. 6. The reaction has ____ going on since that time. 7. You will ____ surprised to see the results. 8. Darwin ____ a prominent scientist.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. Anabolic and catabolic processes usually require energy. 2. Pyruvates undergo decarboxylation. 3. The two-carbon acetate group is forming acetyl coenzyme A. 4. The catabolism of the simple sugar glucose includes a ten-step reaction known as glycolysis. 5. Up to now I did not hear anything from him. 6. He has been studying the phenomenon carefully for nearly a year. 7. Have you said anything? 8. When will you come to Kyiv?

VII. Transform the verbs into the past tense.

1. When the lectures are over I go to the students' canteen. 2. Usually I dine with my friends. 3. When I have got many homeworks I go to the library. 4. In the reading hall I am preparing for my seminars and practical classes. 5. When I am tired I go back to the students' hostel. 6. It takes me little time. 7. Before going to bed I am looking through the newspapers. 8. Sometimes I play chess with my friends or watch TV.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. Through the pathways (large) molecules are broken down into (small) ones. 2. Anabolism and catabolism are the (much) important biochemical reactions that occur in living cells. 3. The (good) the catabolic-anabolic processes the (little) are losses of nutrients. 4. Time goes (fast) at work than at leisure. 5. The substance is disintegrating much (slow) than before. 6. Physical and mental inactivity is the (bad) of all. 7. You will receive (high) education. 8. They produce (many) new drugs than before.

IX. Copy the sentences using personal, possessive, objective, and reflexive pronouns.

1. Doctors recommend (we) to eat more fresh fruits and vegetables. 2. (You) body needs motion. 3. They can develop better methods (they). 4. Open (I) the secret of (you) good looks. 5. (She) is putting off (she) weight now. 6. Tell (they) to study more literature. 7. Let (we) start (we) lesson. 8. (He) often told (I) about (he) experiments.

X. Translate the sentences into English using the grammar of the test.

1. Анаболізм являє собою серію біохімічних реакцій у живій клітині. 2. В процесі анаболізму більші клітини синтезуються з менших. 3. Катаболізм – процес, в якому більші молекули рощеплюються на менші з виділенням енергії. 4. Анаболізм та катаболізм забезпечують обмін речовин у нашому організмі (body). 5. Головні процеси у людському організмі були давно відомі. 6. Людина з добрим здоров'ям буде добре працювати. 7. Біохіміки дослідили багато процесів у організмі людини. 8. Зараз вони розробляють ліки проти найбільш тяжких хвороб.

Variant 8

I. Read, copy and translate the following text.

Oxidation. ADP to ATP

In order to fulfill their functions, cells need energy, which is derived from the chemical breakdown of food materials (mainly carbohydrate, protein, and fat). There are two main strategies of energy metabolism. One, the more efficient, employs the oxidative breakdown of molecules – in particular, simple sugars – into smaller units, such as carbon dioxide and water.

Whether a reaction occurs in a laboratory or a living organism, every oxidation reaction must be accompanied by a reduction. In the cell certain oxidations are coupled to the reduction of the coenzyme – nicotinamide adenine dinucleotide NAD^+ and others to the reduction of FAD – flavine adenine dinucleotide, depending on the chemical bonds being formed in the oxidized compound. The final step in the catabolism of food is the conversion of the molecule adenosine diphosphate (ADP) to adenosine triphosphate (ATP), a high-energy compound that can be used to drive cellular reactions. By itself, ATP is a rather unreactive molecule, which makes it a stable vehicle for energy storage. The energy is released only in an enzyme-catalyzed reaction in which ATP loses a phosphate group and converts back to ADP.

The conversion of ADP to ATP occurs in a pathway called the electron transport sequence, in which electrons and protons picked up in the citric acid cycle by the coenzymes NADH and FADH_2 are transferred to oxygen, releasing large amounts of energy and causing the oxygen to combine with hydrogen, forming water. Some of the energy released during the transport sequence is picked up for the conversion of ADP to ATP. The transport sequence also converts the two coenzymes back to their oxidized form, enabling them to again serve as oxidizing agents in the citric acid cycle. In the absence of oxygen most organisms have only a limited ability to extract energy from food.

Vocabulary

| | |
|--------------------|---------------------|
| reduction | підвищення |
| pathway | шлях |
| couple | з'єднуватися |
| pick up | захватити |
| convert | перетворювати |
| transport sequence | транспортний ланцюг |
| chemical bond | хімічний зв'язок |
| transfer | переносити |
| release | вивільняти |
| stable vehicle | постійний засіб |
| energy storage | зберігання енергії |

II. Answer the following questions.

1. How is energy derived? 2. What is the more efficient strategy of energy metabolism? 3. What process must every oxidation reaction be accompanied by? 4. What is the final step in the food catabolism? 5. How does conversion of ADP to ATP occur?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

шлях катаболізму, отримувати енергію, окисне розкладення, живий організм, супроводжується редукцією, поєднується з, залежно від, утворювати хімічні зв'язки, перетворення молекули, високоенергетична сполука, проводити реакцію, надійний засіб, зберігання енергії, енергія вивільняється, переносяться до кисню, спричиняти об'єднання, транспортний ланцюг, захоплені електрони, обмежена здатність, добувати енергію.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. Cells need energy for their functions. 2. Energy is derived from the chemical breakdown of food materials. 3. The transport sequence also converts the two co-enzymes back to their oxidized form. 4. The oxidative breakdown of molecules into smaller units involves a complex cycle of enzymatic breakdown. 5. Many of the reactions involve oxidation. 6. The cell's certain oxidations are coupled to the reduction of NAD^+ . 7. ATP can drive cellular reactions. 8. Man's activity depends on the body functioning.

V. Fill in the gaps with the verb to be.

1. Carbohydrate, protein, and fat ____ food materials. 2. There ____ two main strategies of energy metabolism. 3. Energy-requiring processes are taking place in the cell. 4. What ____ the name of your university? 5. When ____ your university founded? 6. Where ____ your university situated? 7. What faculty ____ you a student at? 8. What will you ____ after the university?

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. Energy metabolism employs the oxidative breakdown of molecules. 2. In an enzyme-catalyzed reaction ATP is losing a phosphate group. 3. ATP is then converting back to ADP. 4. Energy has released during the transport sequence. 5. The transport sequence will also converts the two coenzymes back to their oxidized form. 6. ATP is a rather unreactive molecule. 7. Unreactiveness makes ATP a stable vehicle for energy storage. 8. The scientists gave much effort to discover the biochemical processes.

VII. Transform the verbs into the past tense.

1. Have you ever been at our university? 2. Our university occupies several buildings. 3. There are many lecture halls, laboratories and shops, a programming classes, experimental sugar plant and a computer centre. 4. The university library provides the students with all necessary literature. 5. In the reading halls the students are preparing for the lectures, seminars, practical classes, credit tests, examinations and reading periodicals. 6. The graduates of the university work in various branches of the national economy. 7. Do you like our university? 8. You have a good opportunity to receive knowledge in your future speciality.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. The (much) efficient strategy of energy metabolism employs the oxidative breakdown of molecules into smaller units. 2. In the absence of oxygen (many) organisms have only a limited ability to extract energy from food. 3. Alcohol is our (bad) enemy. 4. Some products are of (little) nutritional importance than other. 5. The Soviet Army have proved themselves (brave) of the brave. 6. She knows her lesson (good) of all. 7. Venezuela is (young) socialist country. 8. There is no (good) rest than a good sleep.

IX. Copy the sentences using personal, possessive, objective and reflexive pronouns.

1. We learnt about the oxidative reactions in (we) body. 2. (I) students describe (I) their chemical experiments. 3. (You) will find answers to all (you) questions. 4. (He) profession is chemist. 5. They must answer (they). 6. (She) book helped me most. 7. He discovered it all (he). 8. The book was interesting for (he).

X. Translate the sentences into English using the grammar of the test.

1. Клітина потребує енергію для виконання своїх функцій. 2. Клітина отримує енергію від розщеплення поживних речовин. 3. У процесі окиснення молекули розпадаються на менші одиниці – хімічні елементи. 4. Остання стадія катаболізму їжі – перетворення АДФ у АТФ. 5. У відсутності кисню організму буде важко отримувати енергію з їжі. 6. Ви взяли добрий приклад. 7. Люди виробляють ферментовані харчові продукти протягом сторіч. 8. Ми віддавали багато часу навчанню.

Variant 9

I. Read, copy and translate the following text in writing.

Photosynthesis

Photosynthesis is the anabolic process by which green plants and certain green and purple bacteria use the energy of sunlight for the synthesis of organic compounds. It is the ultimate source of food for almost all organisms on earth. Plants absorb sunlight and convert it into chemical energy that is stored in carbohydrates and some other organic compounds. Subsequently the plants transform carbohydrates into proteins, fats, vitamins, and a multitude of other organic compounds.

In this process carbon dioxide (CO₂) is the source of carbon, and water (H₂O) provides the hydrogen atoms needed to transform carbon dioxide into carbohydrates. The formation of glucose, the main carbohydrate unit of such polysaccharides as cellulose and starch that make up the bulk of plant products is the main product of plant photosynthesis. An important by-product of plant photosynthesis is oxygen gas, liberated from water as its hydrogen atoms are incorporated into carbohydrate molecules. The plant stores the carbohydrates in special components called chloroplasts.

Photosynthesis includes a dark phase and a light phase. The dark phase involves a series of enzymic reactions of assimilating carbon dioxide. The light phase includes reactions that convert the energy of sunlight into forms of chemical energy needed for carbon dioxide assimilation. Plant photosynthesis is represented by the equation: $n \text{ CO}_2 + n \text{ H}_2\text{O} \xrightarrow{\text{light}} (\text{CH}_2\text{O})_n + n \cdot \text{O}_2$, in which n is usually assigned the value of 6 to represent the formation of glucose.

In photosynthesis carried on by bacteria, elucidated by the American microbiologist Cornelius B. van N'iel, carbon dioxide as well as organic acids or other simple organic compounds may be the source of carbon. The hydrogen in bacterial photosynthesis comes from reduced sulfur compounds, hydrogen gas, or the

decomposition of organic compounds. Hence oxygen is not given off in bacterial photosynthesis, with sulfur as the by-product excreted or accumulated inside the bacteria.

Vocabulary

| | |
|------------------|--------------------|
| source | джерело |
| earth | земля |
| plant | рослина |
| unicellular | одноклітинний |
| provide | забезпечувати |
| liberate | вивільняти |
| make up | складати |
| carry on | проводити |
| dark phase | темна стадія |
| acid | кислота |
| convert | перетворювати |
| reduced compound | відновлена сполука |
| derive | походити |
| assimilation | засвоєння |

II. Answer the following questions.

1. What is the function of photosynthesis in plants? 2. What chemical compounds take part in the process of photosynthesis? 3. What is the main product of photosynthesis? 4. Where does the plant store the carbohydrates? 5. How many phases does photosynthesis include and what are they?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

зелені рослини, засвоюють (2) енергію, утворювати глюкозу, зберігається у вуглеводах, кінцеве джерело, постачають атоми, головний продукт, побічний продукт, вивільнений з води, походить з, проста органічна сполука, розклад сполук, органічні кислоти, темна фаза, світла фаза, відновлена сполука, включають реакцію, перетворюють енергію, представлені рівнянням, приписується величина.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. Green plants and certain green and purple bacteria use the energy of sunlight for the synthesis of organic compounds. 2. It is the ultimate source of food for almost all organisms on earth. 3. Plants absorb sunlight and convert it into chemical energy that is stored in carbohydrates and some other organic compounds. 4. Plant's chloroplasts store carbohydrates. 5. The student's knowledge depends much on himself. 6. The facts are the best proofs. 7. The test shows the changes in the structure and distribution of the components. 8. The bacteria's nucleus performs various functions.

V. Fill in the gaps with the verb to be.

1. I ____ a student of the National University of Food Technologies. 2. Our university ____ founded in 1930. 3. The university ____ situated in Volodymyrska street. 4. There ____ 8 faculties in our university. 5. They ____: the faculty of economics and management; the faculty of meat, dairy and sugar technology; the faculty of fermentation and bread-baking technology; the faculty of biotechnology, ecology and production; the faculty of the hotel and restaurant business; the faculty of machines and apparatuses; the energy faculty; the faculty of automation and computer systems. 6. There are classrooms, laboratories, lecture halls, computer classes for the students at the university. 7. Our university has always ____ one of the most popular education establishments in Ukraine. 8. I ____ a specialist in biotechnology after the university.

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. The plants transform carbohydrates into proteins, fats, vitamins, and a multitude of other organic compounds. 2. In photosynthesis carbon dioxide (CO₂) is the source of carbon. 3. The dark phase involves a series of enzymic reactions of assimilating carbon dioxide. 4. They didn't know the answer. 5. We rose very early yesterday. 6. We will take part in any peace programme. 7. Researchers were investigating the plant proteins at that time. 8. He has been working with enthusiasm.

VII. Transform the verbs into the past tense.

1. After breakfast I go to the bathroom where I clean my teeth and wash myself. 2. Then I comb and brush my hair. 3. When I have dressed myself I am having my breakfast. 4. Usually I have two eggs and bread and butter and drink a cup of tea or coffee with milk. Sometimes I eat porridge. 5. The road to the university takes half an hour. 6. In the bus and metro I am reading my newspaper. 7. Our university is situated in Volodymyrska street. 8. Lectures start at a quarter past eight.

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs.

1. The (good) the plant is lighted the (bright) its colour. 2. Always choose the (green) cabbage. 3. The (cheap) food is not always the (bad) one. 4. The (little) we eat the (good) our body functions. 5. Much (many) people live today on plant food. 6. At the exhibition you can see (wonderful) species of fruits and vegetables. 7. (Bad) of all evils is to overeat. 8. He is (beautiful) of all who is (kind).

IX. Copy the sentences using personal, possessive, objective, and reflexive pronouns.

1. Tell (he) not to forget (he) notes. 2. Are those books (you) or (I)? 3. We can see how trees develop (they) leaves in spring. 4. Green and purple bacteria give a flower (it) bright colour. 5. I will finish the book (I). 6. Help (I) to translate (I) article, please. 7. We have taken (we) dictionaries. 8. She wrote (she) notes.

X. Translate the sentences into English using the grammar of the test.

1. Фотосинтез – процес синтезу органічних сполук зеленими та пурпуровими бактеріями під дією сонячного світла. 2. Рослина перетворює сонячну енергію на хімічну з утворенням вуглеводів. 3. Потім рослина перетворює вуглеводи на протеїни, вітаміни, жири та інші органічні сполуки. 4. Існує дві стадії фотосинтезу – темнова та світлова. 5. Американський мікробіолог Корнелій ван Ніл описав фотосинтез бактерій. 6. Студенти будуть вивчати фотосинтез. 7. Вони взяли нового лаборанта. 8. Вчені досліджують природні явища з давніх часів.

Variant 10

I. Read, copy and translate the following text.

Cell Division

Cells must divide in order to increase their numbers. A different strategy, however, must be employed in producing male and female gametes (sex cells) for sexual reproduction. If the egg and the sperm each possessed the normal (diploid) number of chromosomes, the number of chromosomes in the fertilized egg would double with each generation. To ensure adequate mixing of the genetic pool, the strategy of cell division by *meiosis* has been adopted by developing gametes.

During a series of changes, called *prophase* the nuclear membrane breaks down, the centrioles migrate to opposite ends of the nucleus and form a mitotic spindle apparatus, and the duplicated, but still attached, chromosomes condense and move toward the equator of the mitotic spindle. This process is called *the metaphase plate*. The nucleus is now in *metaphase*. At this point, the duplicated members of each chromosome separate from one another and migrate toward opposite poles of the mitotic spindle. The nucleus is now in *anaphase*. Toward the end of the migration, bundles of microfilaments (actin) become aligned below the cell surface in the same plane as the metaphase plate. The nucleus is now in *telophase*. The microfilaments contract, causing a constriction in the cytoplasm called the cleavage furrow. When the cleavage furrow has completely separated the dividing cell into two parts (that is, the daughter cells), the cell has finished mitosis.

Meiosis reduces the number of chromosomes in gametes from the normal diploid (2N) number to half of that – haploid (N). This is accomplished by a two-stage series of cell divisions, a reductional division and an equational division. As the cell divides during the embryonic period, some of the daughter cell begin to differ from one another and become specialized, to form the cell types characteristic of the adult. This process of specialization called differentiation is the result of unequal expression of genetic information contained in the nucleus

Vocabulary

divide, double, duplicate ділитися

| | |
|---------------------|-------------------|
| in order to | для того, щоб |
| increase, raise | збільшити |
| adequate | належний |
| develop | розвивати |
| generate, reproduce | породжувати |
| fertilized egg | запліднене яйце |
| genetic pool | генетичний набір |
| spindle | веретено |
| opposite | протилежний |
| contract, constrict | скорочуватися |
| cause | спричиняти |
| cleavage furrow | лінія розщеплення |
| microfilament | мікрОВОЛОКНО |
| possess | мати, належати |

II. Answer the following questions.

1. How do cells divide? 2. Are male and female cells produced in the same way? 3. What kind of change is called *prophase*? 4. What is the difference between *metaphase*, *anaphase* and *telophase*? 5. What stage is called *meiosis*?

III. Find in the text the English equivalents of the following Ukrainian word combinations.

ділення клітини, збільшити їх число, призводити до, застосовувати стратегію, чоловічі та жіночі гамети, запліднене яйце, належний розподіл, який супроводжується, генетичний набір, прикріплені хромосоми, подвоєння ДНК, відділяються один від одного, проходять серію змін, мембрана тріскається, протилежні кінці, рухаються до екватора, пучки мікрОВОЛОКОН, вишикуються під поверхнею клітини, спричиняють скорочення, лінія розщеплення.

IV. Write down and translate the sentences. Underline the predicates. Define the function of the ending –s: as the form of the verb in the 3-d person singular, possessive case or plural of a noun.

1. Cells must divide in order to increase their numbers. 2. The cell's ability to divide is employed in producing male and female gametes. 3. The strategy of cell division by *meiosis* has been adopted by developing gametes. 4. The nucleus undergoes a series of changes, called *prophase*. 5. The grouping of chromosomes at the spindle's equator is called *the metaphase plate*. 6. The cells divide both in plants and animals. 7. Unequal expression of genetic information in the nucleus results in differentiation of the cells. 8. Meiosis reduces the number of chromosomes in gametes.

V. Fill in the gaps with the verb to be.

1. What _____ the name of your university? 2. When _____ your university founded? 3. Where _____ your university situated? 4. How many faculties _____

there at your university? 5. What faculty _____ you a student at? 5. _____ you studying in the day time? 6. Have you _____ in the university computing centre? 7. Will you _____ studying genetics? 8. Can you say, "I _____ a good student?"

VI. Read and translate the sentences. Define the tense form of the predicate and give its infinitive.

1. Cells increase their numbers by division. 2. They employ different strategies in producing male and female gametes for sexual reproduction. 3. The strategy of cell division by *meiosis* has been adopted by developing gametes. 4. The nuclear membrane breaks down. 5. The microfilaments are causing a constriction in the cytoplasm. 6. The cleavage furrow has completely separated the dividing cell into two parts. 7. After the division cells begin to differ from one another and become specialized. 8. The cells will form the cell types characteristic of the adult.

VII. Transform the verbs into the past tense.

1. They learn the structure of the cell. 2. The cell has finished dividing. 3. They are discussing the problem now. 4. Microorganisms study leads to new discoveries. 5. They like what they make. 6. The librarian gives us all necessary books. 7. It has been already raining for three days. 8. Do you always come in time?

VIII. Copy and translate the following sentences, using different degrees of comparison of adjectives and adverbs and adverbs.

1. Dividing the cells produce (many) cells. 2. Cells division is (fast) in (young) people. 3. Kyiv is one of the (much) beautiful cities in the world. 4. What is the name of the (high) mountain in Great Britain? 5. The English love even the (bad) weather. 6. It isn't any (warm) to-day than it was yesterday, is it? 7. It isn't the (good) book on this subject. 8. He is (good) as a lecturer than as a writer.

IX. Copy the sentences using personal, possessive, objective and reflexive pronouns.

1. The cells increase (they) numbers. 2. Vegetarians show (we) a good example. 3. Do (you) morning exercise. 4. (She) put off (she) weight and it is becoming to (she). 5. We prepare (we) lessons in the evening. 6. I must pay for everything (I). 7. Either do the job (you) or let's do it together. 8. Try to remember (I) lessons.

X. Translate the sentences into English using the grammar of the test.

1. Клітина розмножується діленням. 2. Ділення клітини включає стадії профуз, метафази, анафази, телофази. 3. Студенти вивчають ділення клітини. 4. Під електронним мікроскопом видно, як хромосоми рухаються у ядрі. 5. Коли хромосоми розмістилися на протилежних кінцях міотичного стрижня, мікроволокна розщепляють клітину на дві. 6. Клітина закінчила мітоз. 7. Після ділення має місце спеціалізація та диференціація деяких клітин. 8. Такі клітини виробляють характеристики дорослої людини.

TEST № 2

Variant 1

I. Read, copy and translate the following text.

Microbial Physiological Diversity

Microorganisms include microbes (bacteria), molds, fungi, viruses. Microbial diversity is closely linked to *metabolic* diversity. All cells also require genetic mechanisms to allow for replication and to adapt to variations in their environments. These processes are highly energy demanding. Energy can be obtained in three ways in nature: *organic* chemicals, *inorganic* chemicals, or *light*. Energy being obtained by *oxidizing* (removing electrons from) the compound, it is conserved in the cell as the energy-rich compound, *adenosine triphosphate* (ATP). Some microorganisms can extract energy from the compound only in the presence of oxygen (*aerobes*), others only in the absence of oxygen (*anaerobes*). Still others that can break down organic compounds in either the presence or absence of oxygen are called *chemoorganotrophs*. Most microorganisms that have been cultured are chemoorganotrophs.

Oxidation of the organic or inorganic chemicals yields ATP in chemotrophic organisms. A number of prokaryotes — *Bacteria* and *Archaea* are *chemolithotrophs*. *Phototrophs* contain pigments that allow them to converse solar energy to chemical energy, and thus their cells are colored. Phototrophy of cyanobacteria and their phylogenetic relatives is called *oxygenic photosynthesis* where O₂ is evolved. The other form, *anoxygenic photosynthesis*, occurs in the purple and green bacteria, and does not result in O₂ evolution.

All cells require *carbon* as a major nutrient. Microbial cells are either *heterotrophs*, requiring one or more organic compounds as their carbon source, or *autotrophs*, where CO₂ is the carbon source. Chemoorganotrophs are also nearly heterotrophs. By contrast, many chemolithotrophs and virtually all phototrophs are autotrophs. Autotrophs are sometimes called *primary producers* because chemoorganotrophs feed directly on the primary producers or live off products they excrete. All organic matter on Earth has been synthesized by autotrophic organisms.

Vocabulary

| | |
|------------|------------------|
| diversity | різноманіття |
| motility | рухливість |
| tap | вивільняти |
| extract | добувати |
| yield | мати продуктом |
| conversion | перетворення |
| compound | сполука |
| evolve | виробляти |
| source | джерело |
| nutrient | поживна речовина |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

evolve, tap, yield, break, excrete, conversion, nutrient, compound.

1. Some microorganisms can extract energy from the ____ only in the presence of oxygen (*aerobes*). 2. Others can ____ down organic compounds in either the presence or absence of oxygen. 3. Oxidation of the organic or inorganic chemicals ____ ATP in chemotrophic organisms. 4. ____ of solar energy to chemical energy occurs in phototrophic organisms. 5. A number of prokaryotes can ____ the energy available in *inorganic* compounds. 6. Phototrophy of cyanobacteria and their phylogenetic relatives is called *oxygenic photosynthesis* where O₂ is ____ . 7. All cells require *carbon* as a major ____ . 8. Chemoorganotrophs feed directly on the primary producers or live off products they ____ .

IV. Transform the verbs into Passive Voice.

1. Scientists link microbial diversity to metabolic diversity. 2. Microbes obtain energy in three ways in nature: organic chemicals, inorganic chemicals, or light.. 3. They conserve energy in the cell as the energy-rich compound, adenosine triphosphate (ATP). 4. Some microorganisms can extract energy from the compound only in the presence of oxygen (*aerobes*). 5. Technologists have mostly cultured chemoorganotrophs. 6. She is keeping the reagents in test tubes. 7. They will grow the mold on the preparations. 8. They opened the university in 1930.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. Microbial diversity is closely (link) to *metabolic* diversity. 2. Energy (be) obtained by *oxidizing* the compound, it is (conserve) in the cell as *adenosine triphosphate* 3. Bacteria are (conserve) solar energy to chemical energy. 4. They are (call) extractives for they are (extract) by (boil) water. 5. *Heterotrophs* are (require) one or more organic compounds as their carbon source. 6. (Use) sunlight plants synthesize organic compounds. 7. In photosynthesis (carry) out by bacteria carbon dioxide may be a source of carbon. 8. (Synthesize) organic matter autotrophic organisms created life on the Earth.

VI. Fill in the gaps with the missing modal verbs and their equivalents. Copy and translate the sentences.

1. Energy ____ be obtained in three ways in nature: *organic* chemicals, *inorganic* chemicals, or *light*.. 2. Some microorganisms ____ extract energy from the compound only in the presence of oxygen (*aerobes*). 3. *Phototrophs* contain pigments that ____ them to convert solar energy to chemical energy. 4. I will ____ to finish my work in a month. 5. We ____ to take part in the competitions. 6. All your dreams ____ come true. 7. The doctor ____ examine the child. 8. We ____ to take care of our health.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. _____ microorganisms can break down organic compounds in either the presence or absence of oxygen. 2. Have you read _____ books on microbiology? 3. You can find _____ necessary at the laboratory. 4. _____ told that to me. 5. There is _____ rule without exception. 6. Put the chemicals _____ in a safe place. 7. Always try to do _____ useful in the day time. 8. If you can't do all the job do _____ of it.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. These processes are highly energy demanding. 2. O₂ is evolved. in *photosynthesis*. 3. *Anoxygenic photosynthesis* does not result in O₂ evolution. 4. They _____n't have chemistry yesterday. 5. You _____ do this task as soon as possible. 6. _____ everything in time. 7. If you _____ to speak at the conference contact us. 8. The students _____ to submit their thesis in January.

IX. Use indirect speech.

1. A tourist said, "I read that the territory of Ukraine is 603,700 square kilometres." 2. "The Ukraine population is 48 million," said the guide. 3. "What largest rivers in Ukraine do you know?" asked the guest. 4. "I can mention the Dnieper, the Dniester, the Southern Bug, the Visla as the largest rivers," answered the guide. 5. "You will find the highest mountain — the Goverla in the Carpathian Mountains," went on the guide. 6. "I heard that there are many mineral resources in Ukraine," said the tourist. 7. "Iron ore, coal, natural gas, oil were developed here since long ago," told the guide. 8. We added, "Ukraine is a highly-developed industrial country. All branches of industry were developed here."

X. Translate the sentences into English using the grammar of the test.

1. Багато енергії вимагається для життєвих процесів мікроорганізмів. 2. Енергія може бути отримана за допомогою органічних, неорганічних хімічних речовин, або світла. 3. Пігмент дозволяє фототрофам перетворювати сонячну енергію на хімічну. 4. Деякі організми виробляють енергію, розщепляючи органічні сполуки у присутності кисню чи без нього. 5. Їй сказали, що статтю вже всі прочитали. 6. Аноксигенний фотосинтез, якій зустрічається у зелених та пурпурових бактерій, не призводить до виділення CO₂. 7. Хтось повинен відповісти на телефонний дзвінок. 8. Об'явили, що кожен зможе взяти участь у конференції

Variant 2

I. Read, copy and translate the following text.

Fungi and Molds

Nearest to the protozoa, fungi contain cell walls and spores, among many other differences. Two groups of fungi are recognized: the *molds*, and the

mushrooms. Fungi inhabit soil or dead plant matter and play crucial roles in the mineralization of organic carbon. Fungi are parasites of terrestrial plants and animals.

Fungal cell walls resemble plant cell walls architecturally, but not chemically. Fungal cell walls are typically 80-90% polysaccharide cellulose, with proteins, lipids, polyphosphates, and inorganic ions making up the wall-cementing matrix. An understanding of fungal cell wall chemistry is important because of the extensive biotechnological uses of fungi. The chemical nature of the fungal cell wall has been used in classifying fungi for research and industrial purposes. Most fungi contain chitin, a polymer of the glucose derivative, N-acetylglucosamine, in their cell walls. Other polysaccharides such as mannans galactosans, and chitosans replace chitin in some fungal cell walls. Fungi are chemoorganotrophs and typically have simple nutritional requirements. Many fungi are common contaminants of food products, microbial culture media, and surfaces.

Yeasts are single-celled, colorless plants, true fungi, with round or oval cells much larger than bacteria, found in nature on the fruit and leaves of plants and in the soil. Yeast is a rich source of protein, amino acids, carbohydrates, minerals, fat, the B-complex vitamins, vitamin D₂.

Molds are microbial eukaryotes that have phenority to both fungi and protozoa. Like fungi, slime molds undergo a life cycle and produce spores. However, like protozoa molds are motile and can move across a space rather rapidly. Molds are divided into two groups, the molds, whose vegetative forms are amoebae, and the acellular slime molds, whose forms are masses of protoplasm called *plasmodia*, such as *Physarum*. The molds are *filamentous fungi*. They are widespread in nature and are commonly seen on stale bread, cheese, or fruit. Most molds are obligate aerobes. The extensive biotechnological uses of fungi is widely known.

Vocabulary

| | |
|---------------------|-------------------|
| fungi (одн. fungus) | гриби |
| protozoa | протисті |
| mold | пліснява |
| terrestrial | земний |
| resemble | нагадувати |
| derivative | похідний |
| nutritional | поживний |
| filamentous | волокнистий |
| yeasts | дріжджі |
| soil | почва |
| source | джерело |
| grow | рости, вирощувати |
| purpose | потреба |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

derivative, filamentous, resemble, yeast, soil, source, mold, grown, fungi,

nutritional.

1. Nearest to the protozoa, ____ contain cell walls and spores, among many other differences. 2. Two groups of fungi are recognized: the ____, and the mushrooms. 3. Fungal cell walls ____ plant cell walls architecturally, but not chemically. 4. Most fungi contain chitin, a polymer of the glucose ____, N-acetylglucosamine, in their cell walls. 5. Fungi are chemoorganotrophs and typically have simple ____ requirements. 6. The molds are ____ fungi. 7. Yeasts are ____ for bread making, food, feed, and medicinal purposes. 8. Yeast is a rich ____ of protein, amino acids, carbohydrates, minerals, fat, the B-complex vitamins, vitamin D₂.

IV. Transform the verbs into Passive Voice.

1. The scientists recognize two groups of fungi. 2. They have used the chemical nature of the fungal cell wall in classifying fungi for research and industrial purposes. 3. We find yeasts in nature. 4. All knew extensive biotechnological uses of fungi. 5. They will use molds in studying antibiotics. 6. They have found their names in the article. 7. We were taking examples from life. 8. Teachers are using many methods.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. (Recognize) two groups of fungi: the *molds*, and the *mushrooms* we ascribe yeast to them. 2. Fungi (inhabit) soil or dead plant matter play crucial roles in the mineralization of organic carbon. 3. (Be) chemoorganotrophs fungi have simple nutritional requirements. 4. Organic carbon is (mineralize) by fungi. 5. Yeasts (find) on the fruit and leaves of plants and in the soil. 6. (Discover) the useful properties of fungi gave people many medicines. 7. Penicillin was produced from mold (grow) on bread. 8. Molds and fung have always been (contaminate) foods.

VI. Fill in the gaps with the missing modal verbs and their equivalents. Copy and translate the sentences.

1. Molds are motile and ____ move across a space rather rapidly. 2. People ____ use fungi in food production. 3. Biotechnology students ____ learn the kinds and useful properties of fungi and molds. 4. Pharmacologists will ____ to produce drugs without toxic effects. 5. We ____ to plan our work in advance. 6. Children not ____ to buy toxic drugs. 7. The researchers ____ to make many experiments on mice. 8. ____ me to introduce myself.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. ____ fungi are used in dairy industry, other in brewing. 2. Do ____ fungi contaminate food? 3. Other polysaccharides replace chitin in ____ fungal cell walls. 4. ____ is important in nutrition. 5. There is ____ new in each day. 6. Is there ____ sense to repeat the experiment? 7. One cannot create something out of _____. 8. There is ____ use to repeat the same.

VIII. Copy the following sentences supplying the verbs to be, to have, to do and translate them into Ukrainian.

1. Fungi _____ parasites of terrestrial plants and animals. 2. The chemical nature of the fungal cell wall _____ been used in fungi classification. 3. Molds are microbial eukaryotes that _____ phenority to both fungi and protozoa. 4. The molds _____ *filamentous fungi*. 5. They have always _____ widespread in nature. 6. Always _____ good to yourself and others. 7. If you _____ to work with chemicals put on the rubber gloves. 8. Why _____ you choose this speciality?

IX. Use indirect speech.

1. The guide told, "Industrial enterprises of Ukraine were producing tractors and locomotives, excavators and cars, TV sets and computers." 2. "Ukrainian scientists have enriched both national and world science," he continued. 3. "They have many important discoveries and inventions, haven't they?" inquired a tourist. 4. The guide answered, "They have developed the methods of electric welding, manufacturing artificial diamonds, obtaining necessary medicines and synthetics." 5. "Many Ukrainians scientists have become members of the Ukrainian academy and the academies of foreign countries," added he. 6. One tourist asked, "Will you tell us about Ukrainian culture?" 7. "You will see that there are many educational establishments, theatres, museums, libraries in Ukrainian towns and cities," he said. 10. "Ukraine is a member of the United Nations Organization," he finished.

X. Translate the sentences into English using the grammar of the test.

1. Грибки знаходять на мертвих рослинах, у почві, на їжі. 2. Грибки широко використовуються у фармацевтичній та харчовій промисловості. 3. На відміну від простіших, грибки мають клітинну стінку та спори. 4. Подібно до простіших, пліснява може швидко рухатися. 5. Студентам сказали, що вони зможуть взяти участь у виробничому процесі. 6. Студентам — заочникам дозволяють брати відпустку на сесію. 7. Його запитали, чи можна скористуватися його мобільним телефоном. 8. Студенти могли перевірити свої знання мови на комп'ютері.

Variant 3

I. Read, copy and translate the following text.

General Properties of Viruses

Viruses can exist in either extracellular or intracellular forms. In the *extracellular* form, a virus is a minute particle containing nucleic acid (DNA or RNA) surrounded by protein and, occasionally, depending on the specific virus, other macromolecules. In the extracellular form, the virus particle, also called the *virion*, is metabolically inert and does not carry out respiratory or biosynthetic functions. The virion is the structure by which the virus genome moves from the cell in which it has been produced to another cell where the viral nucleic acid can be introduced. Once in the

new cell, the *intracellular state* is initiated. In the intracellular state, virus replication occurs: new copies of the virus genome are produced, and the components that make up the virus coat are synthesized in the process called *infection*. The cell is called *the host*.

Viruses are genetic elements that replicate independently of a cell's chromosome(s) but not independently of cells themselves. Like plasmids and some other genetic elements of the metabolic machinery, viruses can confer important news on their host cell. These properties will be inherent. The host cell divides if each new cell also have viral genome. These changes may even be beneficial. Viruses can replicate what is destructive to the host cell. Some viruses are agents of disease.

The differences between prokaryotic cells and eukaryotic cells impose some constraints on the viruses that infect them. Viruses of procariotes are known that infect *Bacteria* and those that infect *Archaea*. Most known bacterial viruses are with DNA genomes. There are many bacteriophages with other genomes. The simplest bacteriophages are those with RNA genomes. Many bacteriophages contain genomes of the plus configuration. In such viruses the viral *genome* – plus strand RNA – and the *mRNA* are of the same complementarity. The complete nucleotide sequences of several RNA phage genomes are known; the genome of the RNA phage MS2 is 3569 nucleotides long.

Vocabulary

| | |
|-----------|-----------|
| exist | існувати |
| surround | оточувати |
| particle | частинка |
| state | стан |
| introduce | вводити |
| move | рухатися |
| coat | оболонка |
| host | хазяїн |
| replicate | копіювати |
| confer on | наділяти |
| inherent | спадковий |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

surround, inherent, exist, *host*, state, replicate, confer, move.

1. Viruses can ____ in either extracellular or intracellular forms. 2. In the *extracellular* form, a virus is a minute particle containing nucleic acid (DNA or RNA) ____ by protein. 3. The virion is the structure by which the virus genome ____ from the cell in which it has been produced to another cell where the viral nucleic acid can be introduced. 4. In the intracellular ____ virus replication occurs: new copies of the virus genome are produced. 5. The cell is called *the* _____. 6. Viruses are genetic cells elements that ____ independently of a cell's chromosome(s) but not independently of

themselves. 7. Like plasmids and some other genetic elements of the metabolic machinery of the, viruses can ____ important news on their host cell. 8. These properties will be ____.

IV. Transform the verbs into Passive Voice.

1. Virus produces new copies of the virus genome. 2. Virus synthesizes the components that make up the virus coat. 3. They call infected cell *the host*. 4. The host cell has divided. 5. The students didn't waste time. 6. The lab-assistant made the samples of the media. 7. They have given him the details how to obtain the product. 8. Practical examples will illustrate the use of enzymes.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. In the *extracellular* form, a virus is a minute particle (contain) nucleic acid (DNA or RNA). 2. A virus is (surround) by protein. 3. A virus is occasionally (depend) on the specific virus, other macromolecules. 4. In the extracellular form, the virus particle, also (call) the *virion*, is metabolically inert. 5. The virus genome moves from the cell in which it has been (produce) to another cell. 6. In another cell the viral nucleic acid can be (introduce). 7. Once in the new cell, the *intracellular state* is (initiate). 8. (Infect) with viruses one may have serious complications.

VI. Fill in the gaps with the missing modal verbs and their equivalents. Copy and translate the sentences.

1. Viruses ____ exist in either extracellular or intracellular forms. 2. The changes ____ even be beneficial. 3. We ____ know the elementary notions of biotechnology. 4. I'm very glad you were ____ to come. 5. We ____ to finish the work by Tuesday. 6. You ____n't phone so early. 7. We ____ to be careful not to catch infection. 8. ____ us to open the conference.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. Like plasmids and ____ other genetic elements of the metabolic machinery, viruses can confer important news on their host cell. 2. ____ viruses are agents of disease. 3. ____ student of our faculty knows the properties viruses. 4. ____ knows about this experiment yet. 5. Is there ____ who can tell that he is always right? 6. ____ unusual was produced. 7. ____ changes at all in the substance composition was observed. 8. The mold has grown ____.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. New copies of the virus genome ____ produced. 2. The components that make up the virus coat ____ synthesized in the process called *infection*. 3. The chief ____ already held a meeting. 4. They ____ no second period yesterday. 5. We ____ growing wiser with age. 6. He ____ n't have enough money now. 7. We ____ to attend our classes regularly and to do our home tasks in time. 8. The government ____ to take measures to stop the epidemic.

IX. Use indirect speech.

1. The guide told, "You know that Kyiv was founded more than 1500 years ago." 2. "Who built Kyiv?" demanded the guest. 3. "Kyiv was built by princes Kyi, Schekh, and Khoriv," answered the guide. 4. "We will see many ancient buildings in Kyiv: the Sofievsky Cathedral, the Golden Gate, the Kyiv-Pechersk Monastery," continued the guide. 5. "The reconstruction changed the general aspect of the city," he added. 6. "Will you tell us about the Kyiv industry?" wondered a tourist. 7. "Kyiv was known all over the world for its production of industrial and agricultural machinery," continued the guide. 8. "Kyiv was destroyed much during the Great Patriotic War, but it has been restored and rebuilt since that time," finished the guide.

X. Translate the sentences into English using the grammar of the test.

1. Вірус може існувати у позаклітинній чи внутрішньоклітинній формі. 2. Вірус у позаклітинній формі називається віріоном. 3. Вірус розмножується у внутрішньоклітинному стані. 4. Деякі віруси – збудники серйозних хвороб. 5. Всі знали, що у лікарні можна зробити щеплення проти вірусу грипу. 6. Повідомили, що школярі були вимушені залишатися удома з-за епідемії. 7. Дозвольте мені застерегти вас. 8. Ви зможете зробити багато для здоров'я людей.

Variant 4

I. Read, copy and translate the following text.

Antibiotics History And Sources

Antibiotics are chemical substances produced as intermediates or end products of metabolism by various species of microorganisms and other living systems that are capable in small concentrations of either inhibiting the growth of or killing bacteria and other microorganisms.

The use of molds and other crude materials to treat superficial infections can be traced back to at least 1500 B.C. through an Egyptian papyrus. In 1877 Pasteur noted the antagonism of some growing organisms for other groups when he studied the rate of growth of different bacteria species. In 1889 Vuillemin coined the term "antibiosis" to denote antagonism between living creatures. Emmerich first attempted the use of antibiotics therapeutically against anthrax, diphtheria, typhoid fever, and bubonic plague bacilli in 1898. In 1928 Alexander Fleming discovered penicillin. Chain and Florey developed the antibiotic preparation for human use, and in 1941 it became commercially available. Waksman isolated actinomycin, streptothricin, streptomycin, and neomycin, and introduced the word, antibiotic.

Microbes that produce antibiotics are generally found in the soil, the particularly prolific producers being actinomycetes, filamentous soil bacteria, which produce a great variety of medically significant antibiotics. *Streptomyces hurroscopicus* produces more than 60 antibiotics. Antibiotics, produced from bacteria polypeptides: tyrotrcin, gramicidin from *Bacillus Brevis*, bacitracin from *Bacillus Subtilius*,

polymexin from *Bacillus Polymixa*.

Among the products of molds are: penicillin of the mold *Penicillium Notatum*, *Penicillium Chrysogenum* etc., Cephalosporin of the mold *Cephalosporinum* etc. Naturally occurring cephalosporins and cephamycins include cephalosporin C and its derivatives. At least 18 carbapenems, have been isolated from fermentation broths (d). Natural nocardicins include nocardicin A-G. Natural monobactams include (iso)sulfazecins, SQ26180, and related structures. Antifungal antibiotic Nisin, formed by *Streptococci* is used as a preservative in food production.

Vocabulary

| | |
|--------------|------------------------------|
| intermediate | посередник |
| inhibit | стримувати |
| rate | швидкість, рівень |
| attempt | спроба |
| anthrax | карбункул, сибірська виразка |
| plague | чума |
| available | доступний, наявний |
| interference | втручання |
| antifungal | протигрибковий |
| presevative | консервант |
| canning | консервування |
| acceptable | допустимий |
| pursue | тут продовжувати |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

introduce, develop, preparation, inhibit, acid, derivative, compose, canning, compound.

1. Antibiotics are capable of ____ the growth or killing other bacteria. 2. Chain and Florey ____ antibiotic for human use. 3. Nisin is also used in ____ fruits. 4. Peptid antibiotics are ____ of peptid linked amino acids. 5. Polyenes are a group of over 50 _____. 6. Cycloserine is ____ entirely by chemical synthesis. 7. Fleming ____ penicillin. 8. Chloramphenicol is a nitrobenzene derivative of dichloroacetic _____.

IV. Transform the verbs into Passive Voice.

1. Pasteur studied the rate of growth of different bacteria species. 2. In 1877 Pasteur noted the antagonism of some growing organisms for other groups when 3. Chain and Florey developed the antibiotic preparation for human use. 4. Antibiotics are helping people. 5. People buy medicines in the drug-stores. 6. Pharmacologists have produced a great variety of medically significant antibiotics. 7. Pharmacology is developing. 8. They are making up medicines at the pharmacological plant.

V. Open the brackets using Participle I and Participle II. Define their

functions. Copy and translate the sentences.

1. Microbes (produce) antibiotics are generally found in the soil. 2. There are many useful microorganisms, particularly prolific producers (be) actinomicetes, filamentous soil bacteria. 3. Antibiotics, (produce) from bacteria polipeptides include tyrotrcin, gramicidin etc. 4. (Visit) the plant the delegates saw new types of equipment 5. The instruction (enclose) tells the buyers how to use the medicine. 6. The (rise) prices may be the sign of inflation. 7. A person (bring) good news is always welcome. 8. (Discover) antibiotics the scientists have saved many lives.

VI. Fill in the gaps with the missing modal verbs and their equivalents.

Copy and translate the sentences.

1. People are ____ to fight the most terrible diseases with antibiotics. 2. The use of molds and other crude materials to treat superficial infections ____ be traced back to at least 1500 B c. 3. The bacteriologists ____ to do use antibiotics against many diseases to check their effect. 4. We ____ to plan everything in advance. 5. It ____ be impossible to develop medicine without modern equipment. 6. Research ____ the student to know deeper their future speciality. 7. In old times people ____ use only natural substances to cure ailments. 8. We ____ be proud of the achievements of the Ukrainian pharmacology.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs.

Copy and translate the sentences.

1. ____ bacteria and fungi contaminate our food. 2. ____ microorganism can be studied for its life and reproduction. 3. Fungi do not develop where there are ____ nutrients. 4. ____ knows about the outstanding discoveries in microbiology. 5. Their books are published _____. 6. Have you ever used ____ antibiotics? 7. ____ is possible with good health. 8. We should take ____ when we are ill.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. Antibiotics ____ chemical substances produced by various species of microorganisms. 2. People ____ to use medicines against illness. 3. Much ____ been done to fight infectious diseases. 4. Where ____ people use fungi? 5. ____ you to read many books this term? 6. ____ you much time for reading now? 7. ____ there many students present at the lecture yesterday? 8. Working ____ much good to people.

IX. Use indirect speech.

1. "Do you know that the official name of Great Britain is the United Kingdom of Great Britain and Nothern Ireland?" asked the guide? 2. "We know that Great Britain consists of England, Scotland, Wales and Nothern Ireland," responded the Ukrainian tourist. 3. "It is situated on the islands and its population reach 56 million people," added another. 4. "London, the capital of Great Britain was built on the river Thames," said the guide. 5. "The longest rivers are the Thames, the Trent and the Severn; and the highest mountain is Ben Nevis in the mountains Grampians," continued the guide. 6. "Great Britain has been a highly-developed industrial country

since middle ages,” said the guide. 7. “Coal-mining, machinery, textile, ship-building, electronic and other industries were developed in Great Britain, especially in London, Glasgo, Birmingham, Manchester, and other big towns,” continued he. 8.”Great Britain is a constitutional monarchy with Parliament — legislative authority and the queen who does not rule the country officially,” finished the guide.

X. Translate the sentences into English using the grammar of the test.

1. Антибіотики – хімічні речовини, які виробляються мікроорганізмами.
2. Антибіотики можуть пригнічувати ріст бактерій та грибків або вбивати їх.
3. Властивості антибіотиків були відкриті Луї Пастером.
4. Надалі антибіотики розроблялися Емеріхом, Флемінгом, Чейном та Флорі.
5. Відкривши пеніцилін, Флемінг заклав основу для його виробництва.
6. Нас запитали, які сучасні ліки ми знаємо.
7. У рекламі говорилося, що ці ліки допомогли мільйонам людей.
8. Деякі властивості дозволяють застосовувати їх у харчовій промисловості.

Variant 5

I. Read, copy and translate the following text.

Antibiotics Classification

Chemically, the antibiotics are low molecular weight compounds of various chemical structures, composition, and properties. They have been classified according to the chemical structure, microbial source, and mechanism of action. Following the classification of Garrod, Lambert, and O'Grady, based on the general similarity of chemical structure, those manufactured today can be divided into the following groups:

Penicillin and related antibiotics with a β -lactam ring in their structure, include the natural penicillins, the semisynthetic penicillins, the cephalosporins, the clavulanic acids and thienamycins and the monolactams. Aminoglycoside antibiotics, which have amino sugars in glycosidic linkage, include the streptomycins, neomycin, kanamycin, paromomycin, gentamicin, tobramycin, and amikacin. Macrolide antibiotics, which consist of a macrocyclic lactone ring to which sugars are attached, comprise erythromycin, oleandomycin, and spiramycin. Tetracycline antibiotics, which are derivatives of polycyclic naphthacenecarboxamide, include tetracycline, chlortetracycline, demeclo-cycline, oxytetracycline, and minocycline.

Antibiotics that kill bacteria are called bactericidal, while those that only inhibit their growth are referred to as bacteriostatic. Peptide antibiotics are composed of peptide-linked amino acids which commonly include both D- and L-forms. This group includes bacitracin, gramicidin, and the polymyxins. Antifungal antibiotics include polyenes, which are a group of over 50 compounds including nystatin and amphotericin B, and other antifungal antibiotics including 5-fluorocytosine, clotrimazole, and griseofulvin. Nisin formed by *Streptococci* is used as a preservative in food production. It is a short polypeptide containing seven amino acids, and it is now recognized as an antibiotic that is particularly active against clostridia and

lactosecond, interfering with genetic mechanisms and with intracellular enzymic activity.

Vocabulary

| | |
|-------------------|-------------|
| compound | сполука |
| property | властивість |
| similarity | схожість |
| divide | ділити |
| source | джерело |
| weight | вага |
| manufacture | виробляти |
| according to | згідно з |
| relate | пов'язувати |
| ring | кільце |
| include, comprise | включати |
| linkage | зв'язок |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

ring, derivative, property, weight, treat, link, acid, application.

1. Chemically, antibiotics have low molecular _____. 2. Antibiotics are compounds of various _____. 3. Microlide antibiotics consist of macrocyclic lacton _____. 4. Tetracyclin antibiotics are _____ of polycyclic naphthacenecarbox-amides. 5. These antibiotics include clavulanic _____. 6. This group has been chemically _____ to tetrazol. 7. The therapeutic _____ of these antibiotics is wide. 8. They are used for _____ a variety of bacterial infections.

IV. Transform the verbs into Passive Voice.

1. The scientists classify antibiotics according to the chemical structure, microbial source, and mechanism of action. 2. Garrod, Lambert, and O'Grady based their antibiotics classification on the general similarity of chemical structure. 3. The natural penicillins, the semisynthetic penicillins, the cephalosporinsetc are included into the group of penicillins. 4. They call antibiotics that kill bacteria bactericidal. 5. Doctors are using nisin against clostridia and lactosecond. 6. The cures have inhibited the activity of microorganisms. 7. New antibiotics will be added to the existing list. 8. They are improving the properties of medicines.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. (Follow) the classification of Garrod, Lambert, and O'Grady antibiotics can be divided into several groups. 2. Antibiotics classification, (base) on the general similarity of chemical structure, include penicillins, aminoglycosides, tetracyclines, ansamacrolides. 3. Antibiotics (manufacture) today are safer and more reliable. 4. (Classify) antibiotics according to their chemical structure microbiologists

defined their properties. 5. Nisin (form) by *Streptococci* is (use) as a preservative in food production. 6. Nisin is a short polypeptide (contain) seven amino acids. 7. (Improved) antibiotics the pharmacologists increased their application. 8. Much has been (do) to develop less dangerous antibiotics.

VI. Fill in the gaps with the missing modal verbs and their equivalents. Copy and translate the sentences.

1. Antibiotics _____ be divided into the several groups. 2. Antibiotics _____ decompose upon heating to elevated temperatures. 3. They _____ be soluble in polar solvents, especially water or in organic solvents as their free acids. 4. You _____ be most careful during the experiment. 5. We _____ to be present at the meeting. 6. He _____ to be at the institute yesterday. 7. You _____ never forget your profession. 8. _____ to work people should look after themselves.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. _____ antibiotics are killing bacteria and some are only inhibiting their growth. 2. _____ medicine should interfere with genetic mechanisms. 3. _____ that cures people is called a medicine. 4. The material for microbial preparations can be found _____. 5. Every day _____ new appears in drugs. 6. Can _____ live without using medicines at all? 7. Antibiotics are used in medicine and _____ else. 8. _____ is more important than peoples' health.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. For the most part, these antibiotics _____ white, off-white, tan, or yellow solids that _____ usually amorphous but sometimes crystalline. 2. Most _____ a free carboxyl group as their salts. 3. Nisin _____ used as a preservative in food production. 4. The scientists _____ been tryind to intencify the food processing even before. 5. I have never _____ to English speaking countries. 6. I _____ at work on yesterday morning. 7. We all _____ to think hard. 8. New discoveries will _____ made.

IX. Use indirect speech.

1. "We know, that the United States of America are situated in the central part of the North American Continent," said the tourist. 2. "It was devided into 50 states and has a population of 230 mln people," added the guide. 3. "The capital of the USA Washington was built on the Potomac River," continued he. 4. "There is the Congress and the Supreme Court in Washington too," went on the guide. 5. "We heard that the USA is rich in natural resources," said a tourist. 6. "All industries has been developed here, especially engineering, electroengineering, electronic, machine-building," told the guide. 7. "The largerst cities: Boston, Chicago, San Francisco, Los Angeles and others contributed to the development of the USA economy," he continued. 8. "The executive power in the USA belongs to the President, the legislative power to the Congress, and the judicial power to the Supreme Court," told the guide.

X. Translate the sentences into English using the grammar of the test.

1. Антибіотики – сполуки різної структури та властивостей. 2. Лікарі попереджали (warned), що багато антибіотиків вживати не можна. 3. Багато людей казали, що лікування (treatment) антибіотиками врятувало їм життя. 4. Антибіотики класифікують згідно хімічної структури, мікробному джерелу та властивостям. 5. Антибіотики поділяються на пеніциліни, аміноглікозиди, анзамакроліди, тетрацикліни, поліпептиди, ін. 6. Бактеріостатичні препарати можуть тільки пригнічувати ріст бактерій. 7. Протигрибковий препарат нізін, утворений *Streptococci*, застосовується проти клостридії та лактосеконд. 8. Антибіотики спричиняють лікувальну дію (cure), вбиваючи шкідливі (harmful) бактерії.

Variant 6

I. Read, copy and translate the following text.

Production of β -Lactam Antibiotics

The β -lactam antibiotics have in their chemical structures a four-membered lactam.

The parent structure of all penicillins is *β -aminopenicillanic acid* (6-APA), which consists of a thiazolidine ring with a condensed β -lactam ring. The 6-APA carries a variable side chain in position. If the penicillin fermentation is carried out without addition of side-chain precursors, the natural penicillins are produced. By adding to the broth a *side-chain precursor* one desired biosynthetic penicillin is produced.

To produce the most useful penicillins, those with activity against *gram-negative Bacteria*, such as *ampicillin*, a combined fermentation and chemical approach is used that leads to the production of semisynthetic penicillins. In this case, a microbially produced natural penicillin is split either chemically or enzymatically to yield 6-APA; the latter is then chemically modified by the addition of a side chain. Penicillin G is produced by the mold *Penicillium chrysogenum* in fermentors. Being a highly aerobic process it requires efficient aeration. Penicillin is a typical secondary metabolite. During the growth phase, very little penicillin is produced, but once the carbon source has been nearly exhausted, the penicillin production phase begins. By supplying additional carbon and nitrogen, the production phase can be extended for several days.

A major ingredient of most penicillin production media is *corn steep liquor*, which contains nitrogen as well as several growth factors. The carbon source is generally *lactose*, obtained from whey. Lactose is the initial carbon source. As the lactose becomes limiting, "feedings" with glucose later in the fermentation maximize penicillin yield. Penicillin is excreted into the medium, the cells are removed by filtration, the pH of the medium is lowered and the antibiotic extracted with an organic solvent. After concentration into the solvent, the antibiotic is back-extracted into an alkaline aqueous medium, concentrated further, and crystallized.

Vocabulary

| | |
|-----------|-----------------|
| precursor | попередник |
| chain | ланцюг |
| ring | кільце |
| approach | підхід |
| mold | пліснява |
| growth | ріст |
| exhaust | вичерпувати(ся) |
| supply | постачати |
| media | середовище |
| obtain | отримувати |
| yield | кількість, збір |
| remove | видаляти |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

mold, yield, supply, obtain, media, growth, exhaust, ring.

1. *β-aminopenicillanic acid* (6-APA) consists of a thiazolidine ring with a condensed β -lactam _____. 2. Penicillin G is produced by the _____ *Penicillium chrysogenum* in fermentors. 3. During the _____ phase, very little penicillin is produced. 4. Once the carbon source has been nearly _____, the penicillin production phase begins. 5. By _____ additional carbon and nitrogen, the production phase can be extended for several days. 6. A major ingredient of most penicillin production _____ is *corn steep liquor*, which contains nitrogen as well as several growth factors. 7. The carbon source is generally *lactose*, _____ from whey. 8. As the lactose becomes limiting, "feedings" with glucose later in the fermentation maximize penicillin _____.

IV. Transform the verbs into Passive Voice.

1. Who has given you this book? 2. Who discovered penicillin 3. The mold grows in fermentors. 4. The fresh air and the sun have always been natural remedies. 5. They are using enzymes to produce antibiotics. 6. The doctor prescribed him a long rest. 7. They inoculated everybody. 8. We will never forget the doctors' aid.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. The penicillin fermentation may be (carry) out without addition of side-chain precursors. 2. Then the natural penicillins are (produce). 3. (Adding) to the broth a *side-chain precursor* one desired biosynthetic penicillin is (produce). 4. A (combine) fermentation and chemical approach is used. 5. Microbially (produced) natural penicillin is split either chemically or enzymatically. 6. (Be) a highly aerobic process it requires efficient aeration to yield 6-APA. 7. Lactose having become limiting, "feedings" with glucose is necessary. 8. Glucose (add) later in the fermentation to maximize penicillin yield.

VI. Fill in the gaps with the missing modal verbs and their equivalents. Copy and translate the sentences.

1. During the growth phase, very little penicillin ____ be produced. 2. They ____ supply additional carbon and nitrogen. 3. The production phase ____ be extended for several days. 4. After concentration into the solvent, the antibiotic ____ be back-extracted into an alkalineaqueous medium. 5. Penicillin G ____ be produced by the mold *Penicillium chrysogenum* in fermentors. 6. They ____ to choose special media for the penicillins production. 7. Bacteria were ____ to grow in the broth. 8. The antibiotic is ____ to concentrate further, and crystallize in an alkalineaqueous medium.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. By adding to the broth a *side-chain precursor* ____ biosynthetic penicillins are produced. 2. ____ microorganism needs favourable conditions for growth. 3. ____ is done to provide the population with medicines. 5. One can buy medicines ____ in the drug-stores. 6. There is ____ alternative for ____ penicillins. 7. ____ can do without quality drugs. 8. People had to do ____ against epidemics of infectious diseases.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

I. 6-APA ____ chemically modified by the addition of a side chain. 2. Penicillin G has ____ produced by the mold *Penicillium chrysogenum* in fermentors. 3. Penicillins ____ typical secondary metabolites. 4. The government ____ to introduce new forms of economic management in pharmacology. 5. The country ____ enough resources to supply its population with medical aid. 5. New medicines are ____ developed by the biotechnologists. 6. The scientists ____ to predict the post-effects of using medicines. 7. We should ____ justice to our pharmacologists. 8. ____ you carry out research?

IX. Use indirect speech.

1. The speaker announced, "We observe with a condensed β -lactam ring." 2. The researcher agreed, "The 6-APA carries a variable side chain." 3. The lecture pointed out, "fermentation will be carried out without addition of side-chain precursors." 4. "A *side-chain precursor* was added to the broth," mentioned the laboratory assistant. 5. They understood, "The lactose becomes limiting." 6. "Are natural penicillins produced?" asked a student. 7. "Many natural penicillins have been produced," answered the professor. 8. "A combined fermentation and chemical approach is used in the production of semisynthetic penicillins," underlined the technologist.

X. Translate the sentences into English using the grammar of the test.

1. Лектор розповідав, що зараз виробляють багато синтетичних антибіотиків. 2. Лектор відмітив, що синтетичні пеніциліни виробляються з

попередником з боковим ланцюгом. 3. Студент запитав, що слугує джерелом лактози. 4. Виробляючи найважливіші пеніциліни, застосовують комбіновану ферментацію. 5. Пеніциліни можуть бути приготовлені на кукурудзяному екстракті. 6. Усякі ліки вимагають випробування (trial). 7. Держава повинна бути здатною забезпечити населення ліками. 8. Підготовані зразки (samples) були ретельно вивчені студентами.

Variant 7

I. Read, copy and translate the following text.

Aminoglycosides

Aminoglycoside antibiotics, which have amino sugars in glycosidic linkage, include the streptomycins, neomycin, kanamycin, paromomycin, gentamicin, tobramycin, and amikacin. Macrolide antibiotics, which consist of a macrocyclic lactone ring to which sugars are attached, comprise erythromycin, oleandomycin, and spiramycin.

Aminoglycosides, among the oldest known antibiotics, all contain an aminocyclitol unit as well as being aminoglycosides, and are more accurately known as aminocyclitol or aminoglycoside-aminocyclitol antibiotics. With the exception of dihydrostreptomycin, made by the chemical reduction of streptomycin, all clinically useful compounds in this class were naturally occurring until 1973. Important new entries are the semisynthetic compounds, such as dibekacin, amikacin, and netilmicin.

The aminoglycoside-aminocyclitol antibiotics are relatively small, basic, water-soluble molecules which form stable acid addition salts; they are biosynthesized from carbohydrate components of their fermentation media. The aminoglycoside-aminocyclitol antibiotics are broad spectrum, active against gram-positive and particularly against gram-negative bacteria, eg, *Escherichia coli*, *Klebsiella*, *Proteus*, and *Enterobacter*. None are absorbed well from the alimentary tract or when applied topically and must be administered parenterally for systemic use. None are effective against anaerobic bacteria or aerobic organisms growing under anaerobic conditions. Some are active against *Pseudomonas aeruginosa* which constitutes an important use for this class of antibiotics. None are effective when used alone against streptococci, and they have varying activities against mycobacterium tuberculosis. Their action is bactericidal, rather than bacteriostatic, involving binding to bacterial ribosomes with inhibition of protein synthesis. All antibiotics of this group encounter some problems of bacterial resistance following several years of extensive use.

Vocabulary

| | |
|----------------|----------------------------|
| new entry | нове надходження |
| active against | діяти на |
| bacteriocidal | що знищує бактерії |
| bacteriostatic | що пригнічує ріст бактерій |
| bind to | зв'язувати з |

| | |
|---------------------|-----------------------|
| alimentary trace | травний шлях |
| parenterally | всередину |
| topically | місцево |
| administer | призначати |
| inhibit | стримувати |
| encounter a problem | стикатися з проблемою |
| extensive use | широке вживання |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

water-soluble, parenterally, bactericidal, alimentary, resistance, contain, compound, condition.

1. Aminoglycosides all ____ aminocyclitol. 2. Aminoglycosides are clinically useful _____. 3. Aminoglycosides are relatively small ____ molecules. 4. The medicines must be administered ____ for systematic use. 5. Many antibiotics are absorbed well from the ____ trace. 6. None are effective against anaerobic bacteria or aerobic organisms growing under anaerobic _____. 7. Their action is _____, rather than bacteriostatic. 8. All antibiotics of this group encounter some problems of bacterial _____.

IV. Transform the verbs into Passive Voice.

1. We know aminoglycosides as aminocyclitol or aminoglycoside-aminocyclitol antibiotics. 2. They make dihydrostreptomycin by the chemical reduction of streptomycin. 3. They developed many clinically useful antibiotics in the XX-th century. 4. They have biosynthesized aminoglycoside-aminocyclitol antibiotics from carbohydrate components of their fermentation media. 5. People will use these antibiotics extensively. 6. These medicines showed their bacteriocidal properties. 7. Aminoglycoside antibiotics include the streptomycins. 8. They treat tuberculosis.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. None are (absorb) well from the alimentary trace or when (apply) topically. 2. None are effective against anaerobic bacteria or aerobic organisms (grow) under anaerobic conditions. 3. None are effective when (use) alone against streptococci. 4. Their action is bactericidal rather than bacteriostatic, (involve) binding to bacterial ribosomes with inhibition of protein synthesis. 5. All antibiotics of this group encounter some problems of bacterial resistance (follow) several years of extensive use. 6. (Introduce) electronic equipment into antibiotics' production pharmacologists improved their quality and quantity. 7. (Use) extensively by the population antibiotics are rated as up-to-date medicines. 8. Doctors are (administer) these medicines parenterally.

VI. Fill in the gaps with the missing modal verbs and their equivalents. Copy

and translate the sentences.

1. The aminoglycoside-aminocyclitol antibiotics ____ be administered parenterally for systemic use. 2. This class of antibiotics ____ be used against pneumonia. 3. We ____ to be inoculated against diphtheria. 4. Microbial preparations ____ to treat contagious diseases. 5. Without these drugs doctors were ____ to save the ill. 6. Spray ____ to be used against sore throat. 7. Medicines ____ be in pills, powder, mixture or injection. 8. Children are not ____ to buy a number of drugs.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. ____ antibiotics are active against *Pseudo-monas aeruginosa*. 2. There are ____ aminoglycoside-aminocyclitol antibiotics that are absorbed well when applied topically. 3. ____ should know cures against his diseases. 4. We always take ____ against cold. 5. We can hear ____ about universal curatives. 6. We buy drugs at the drug-store if we haven't got _____. 7. If we have not ____ serious we can do without antibiotics. 8. Preparations are made with _____ bacterias, herbs, minerals and vitamins.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. He ____ a well known scientist in the past century. 2. The aminoglycoside-aminocyclitol antibiotics ____ active against gram-positive and particularly against gram-negative bacteria. 3. They ____ varying activities against mycobacterium tuberculosis. 4. Their action ____ bactericidal. 5. There will ____ hope, there will ____ recovery. 6. The bacterial culture ____ been placed in the fermentor. 7. The pharmacologists ____ to select the most productive culture. 8. If some medicine ____ not help the doctor will prescribe another.

IX. Use indirect speech.

1. The students were told, "We will go to the pharmaceutical plant." 2. The speaker told, "Penicillins are white or off-white crystalline substances." 3. The lecturer was asked, "When were antibiotics discovered?" 4. The lecturer answered, "Antibiotics were discovered in the late IX-th century". 5. "Not all antibiotics have been studied for their post-effects," objected the scientist. 6. "The aminoglycoside-aminocyclitol antibiotics are active against gram-positive and particularly against gram-negative bacteria," the professor pointed out 7. The biotechnologist explained, "Macrolide antibiotics consist of a macrocyclic lactone ring with sugars attached." 8. "Many antibiotics are synthetic compounds," agreed the pharmacologist.

X. Translate the sentences into English using the grammar of the test.

1. Доповідач відмітив, що деякі методи давно застосовувалися в отриманні антибіотиків. 2. Студентам сказали, що вони будуть складати рецепти ліків. 3. Лектора запитали, чи він знайомий з якимись новими надходженнями до антибіотиків. 4. Змішавши компоненти таблеток, їх пресують. 5. Антибіотики – широко вживані ліки. 6. Їх можна застосовувати проти багатьох інфекційних

хвороб. 7. Аміноглікозиди відомі як антибіотики аміноциклітоли. 8. У деяких випадках доводиться призначати ін'єкції.

Variant 8

I. Read, copy and translate the following text.

Rifamycins and Benzoquinoid Ansamacrolides

At least five substances having biological activity are designated rifamycins A through E. Thousands of derivatives have been prepared in the rifamycins. Rifamycins B, O, and S have served as starting materials for a large group of derivatives.

Treatment of rifamycin B with amines, hydrazines, and alcohols yields the corresponding amides, hydrazides, and esters, respectively. Rifamycin O reacts with a variety of aromatic amines, hydrazides, amidrazones, and aminoguanidines to give quinonimine derivatives. Reaction of rifamycin S with a variety of o-phenylenediamines and o-aminophenols produces a series of phenazines and phenoxazines, respectively; rifazine is the simplest of the phenazines. Rifamycin S also undergoes conjugate addition reactions to the quinone ring by a variety of nucleophiles to give the C-25 substituted derivatives of rifamycin SV, many of which show excellent antibacterial properties. Rifampicin is a therapeutically useful derivative of a rifamycin S aminomethyl derivative and is active against a variety of gram-negative and gram-positive bacteria and is used in the treatment of tuberculosis. In addition, a number of oxime derivatives of rifaldehyde have been prepared.

Geldanamycin is active against protozoa and fungi. It undergoes reaction with o-phenylenediamines and o-aminophenols to give compounds similar to rifazine. Unlike other ansamacrolides, the maytansinoids are isolated after repeated column chromatography and preparative thin-layer chromatography from ethanol extracts of plants obtained in Ethiopia and Kenya. Maytansinoids are compounds similar to maytansine; they are possessing the macrocyclic ring system but lacking the ester moiety. The maytansides (maysin, normaysine, maysenine and maytansinol) lack antitumor activity, indicating that the ester side chain is a requirement for activity.

Vocabulary

| | |
|------------|------------|
| designate | визначати |
| serve | служити |
| yield | отримати |
| derivative | похідний |
| ester | естер |
| ring | кільце |
| treatment | лікування |
| show | показувати |

| | |
|-------------|-------------|
| substitute | замінник |
| property | властивість |
| useful | корисний |
| in addition | в додаток |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

treatment, treat, comprise, link, acid, application, derivative, ring.

1. Rifamycin S also undergoes reactions to the quinone _____. 2. Rifamycin _____ have excellent antibacterial properties. 3. Rifamycin is therapeutically useful in the _____ of tuberculosis. 4. β -Lactams _____ two groups of therapeutic agents. 5. These antibiotics include clavulanic _____. 6. This group has been chemically _____ to tetrazol. 7. The therapeutic _____ of these antibiotics is wide. 8. They are used for _____ a wide variety of bacterial infection.

IV. Transform the verbs into Passive Voice.

1. Pharmacologists have prepared thousands of derivatives in the rifamycins. 2. Microbiologists are treating rifamycin B with amines, hydrazines, and alcohols. 3. Reaction of rifamycin S with a variety of o-phenylenediamines and o-aminophenols produces a series of phenazines and phenoxazines, respectively. 4. They use rifamycin in the treatment of tuberculosis. 5. They have prepared a number of oxime derivatives of rifaldehyde. 6. The Ethiopians and Kenyans obtained extracts of local plants for the maytansinoids preparation. 7. The C-25 will substitute the rifamycin SV. 8. Useful properties of rifamycins make them an important curative.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. At least five substances (have) biological activity are (designate) rifamycins A through E. 2. Rifamycins B, O, and S have (serve) as (start) materials for a large group of derivatives. 3. Treatment of rifamycin B with amines, hydrazines, and alcohols yields the (correspond) amides, etc. 4. The maytansinoids are (isolate) after (repeat) column chromatography and preparative thin-layer chromatography. 5. Ethanol extracts are (prepare) of plants obtained in Ethiopia and Kenya. 6. Maytansinoids are (possess) the macrocyclic ring system but (lack) the ester moiety. 6. The maytansinoids lack antitumor activity, (indicate) that the ester side chain is a requirement for activity. 7. (React) with o-phenylenediamines and o-aminophenols Geldanamycin gives compounds similar to rifazine. 8. There are derivatives of rifamycin SV, many of which (show) excellent antibacterial properties.

VI. Fill in the gaps with the missing modal verbs and their equivalents.

Copy and translate the sentences.

1. Rifamycin O ____ react with a variety of aromatic amines. 2. Rifamycin S ____ also undergo conjugate addition reactions to the quinone ring by a variety of nucleophiles. 3. The ester side chain ____ be added to the maytansides for their antitumor activity. 4. Geldanamycin ____ kill protozoa and fungi. 5. Modern methods will ____ to make complex operations with microorganisms. 6. As a result the pharmacologists ____ to obtain high-quality remedies. 7. All medicines ____ be used after consulting a doctor. 8. The results ____ be different under some other conditions.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. Each antibiotic has ____ derivatives. 2. ____ antibiotic is a product of microbiology. 3. ____ student of microbiology studies microorganisms and enzymes. 4. Scientists do ____ possible to discover the curative properties of microorganisms. 5. ____ people need treatment. 6. ____ will get interested in the fantastic world of microorganisms. 7. There are ____ uninteresting sciences. 8. If we know ____ about a new medicines we try to test them on ourselves.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. At least five substances having biological activity ____ designated rifamicins A through E. 2. A number of oxime derivatives of rifaldehyde ____ been prepared. 3. Rifamycins and benzoquinoid ansamacrolides ____ therapeutically useful antibiotics. 4. They ____ to use chromatography to prepare antibiotics. 5. The instruction to use ____ to include the components of the preparation. 6. Herbal preparations ____ substituting antibiotics today. 7. Preference will ____ given to the medicines increasing immunity. 8. Herbal preparations ____ not destroy blood cells.

IX. Use indirect speech.

1. The professor asked, "By what methods are the antibiotics obtained?" 2. The student answered, "We will use preparative thin-layer chromatography." 3. The technologist told, "Thousands of derivatives have been prepared in the rifamycins." 4. The researcher pointed out, "The maytansides lack antitumor activity." 5. The lab assistant repeated, "Chemical glasses, test-tubes, flasks, and retorts are washed." 6. The director wrote, "We are requiring more reagents for the laboratory classes." 7. The assistant knew: "All his students are preparing for the seminar". 8. "The problems will be solved," assured the technologist.

X. Translate the sentences into English using the grammar of the test.

1. Рифаміцини мають багато похідних. 2. Похідні утворюють, обробляючи рифаміцини амінами, алкоголями, ін. 3. Професор запитав, якій найпростіший феназін знає студент. 4. Лектор пояснив, проти яких бактерій застосовували рифаміцин 5. Рифаміцин може застосовуватися для лікування

туберкульозу. 6. Багато замінників рифаміцину SV відома за високі антибактерійні властивості. 7. Майтанзиноїди виділяють з екстракту рослин, отриманого в Ефіопії та Кенії. 8. Розвиваючи науку, ми боремося з темрявою.

Variant 9

I. Read, copy and translate the following text.

Search For New Antibiotics

Traditionally, antibiotics were discovered by *screening*. In this approach, a large number of isolates of possible antibiotic-producing microorganisms are obtained from nature in pure culture – culture containing a single kind of microorganism, and these isolates are then tested for antibiotic production by seeing whether they produce any diffusible materials that are inhibitory to the growth of test bacteria. The test bacteria are chosen to be representative of, or related to, bacterial pathogens.

The enrichment culture technique is a means of obtaining pure cultures from natural samples. Common isolation procedures include the streak plate, the agar shake, and liquid dilution. For organisms that grow well on agar plates, the streak plate is quick, easy, and the method of choice. By repeated picking and restreaking of a well-isolated colony, a pure culture can be obtained that can then be transferred to a liquid medium

The classical procedure for testing new microbial isolates for antibiotic production is the *cross-streak* method. Those isolates that show evidence of antibiotic production are then studied further to determine if the antibiotics they produce are new. Once an organism producing a new antibiotic is discovered, the antibiotic is produced in sufficient amounts for structural analyses and then tested for toxicity and therapeutic activity in infected animals. An antibiotic that is to be produced commercially must be produced successfully in large-scale industrial fermentors. The next stage is *to purify* the product efficiently. If the antibiotic is soluble in an organic solvent, it may be relatively simple to purify it by extraction into all volume of the solvent. If the antibiotic is not solvent soluble, then it must be extracted by adsorption, ion exchange, or chemical precipitation. In all cases, the goal is to obtain a crystalline product of high purity. One of the major tasks of the industrial microbiologist is thus to *isolate high-yielding strains*. Strain selection involves mutagenesis of the initial culture, plating of mutant types, and testing of these mutants for antibiotic production.

Vocabulary

| | |
|---------------|---------------------------|
| discovery | відкриття |
| screening | просіювання |
| obtain, yield | отримувати |
| diffusible | здатний до розповсюдження |
| inhibitory | що стримує |

| | |
|---------------------|--|
| cross-streak method | метод посіву культури перехресним штрихом |
| determine | вирішувати |
| purify | очищати |
| solvent | розчинник |
| extract | видобувати |
| strain | штам |
| plating | розводка, посів на чашку Петрі |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

obtain, solvent, determine, strain, cross-streak, screening, purify, discovery.

1. Pharmaceutical companies currently do much of their drug _____. 2. A large number of isolates of possible antibiotic-producing microorganisms are _____ from nature in pure culture. 3. Traditionally, antibiotics were discovered by _____. 4. The classical procedure for testing new microbial isolates for antibiotic production is the _____ method. 5. Those isolates that show evidence of antibiotic production are then studied further to _____ if the antibiotics they produce are new. 6. The next stage is to _____ the product efficiently. 7. If the antibiotic is soluble in an organic _____, it may be relatively simple to purify it by extraction into all volume of the solvent. 8. One of the major tasks of the industrial microbiologist is thus to isolate *high-yielding*_____.

IV. Transform the verbs into Passive Voice.

1. Microbiologists have discovered antibiotics by *screening*. 2. In this approach, they obtain a large number of isolates of possible antibiotic-producing microorganisms from nature in pure culture. 3. Then they will test these isolates for antibiotic production. 4. They choose the test bacteria to be representative of, or related to, bacterial pathogens. 5. They purify the bacteria in an organic solvent. 6. They are infecting animals to test the preparations. 7. Biotechnologists used bacteria in food production long ago. 8. Different strains of bacteria produce enzymes fermenting foods.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. They test the isolates for antibiotic production by seeing whether they produce any diffusible materials that are inhibitory to the growth of test bacteria. 2. Once an organism producing a new antibiotic is discovered, the antibiotic is produced in sufficient amounts. 3. The antibiotic is then tested for toxicity and therapeutic activity in infected animals. 4. One of the major tasks of the industrial microbiologist is thus to *isolate high-yielding strains*. 5. The substance was coagulating quickly. 6. The results obtained were used in production. 7. Having selected the strain the technologists prepared the media. 8. While learning the language we learn the science.

VI. Fill in the gaps with the missing modal verbs and their equivalents. Copy and translate the sentences.

1. An antibiotic that _____ to be produced commercially _____ be produced successfully in large-scale industrial fermentors. 2. If the antibiotic is soluble in an organic solvent, it _____ be relatively simple to purify it 3. A pure culture _____ be obtained and then transferred to a liquid medium. 4. If the antibiotic is not solvent soluble, then it _____ to be extracted by adsorption. 5. Some organisms _____ to grow well on agar plates. 6. The preparation _____ be toxic. 7. It _____ be therapeutically active. 8. Chemical precipitation _____ to obtain a crystalline product.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs. Copy and translate the sentences.

1. Pure culture is _____ culture containing a single kind of microorganism. 2. The test bacteria must be related to _____ bacterial pathogens. 3. _____ must be done to decrease the bacterial toxicity. 4. Microorganisms are taken _____ from natural sources. 5. _____ is so important as purity of the preparation. 6. Among _____ methods of strain selection are mutagenesis of the initial culture, plating of mutant types, and their testing for antibiotic production. 7. If the infected animal shows _____ symptoms of disease the antibiotic is active. 8. _____ can use the preparation according to the instruction.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. The classical procedure for testing new microbial isolates for antibiotic production _____ the *cross-streak* method. 2. Those isolates that show evidence of antibiotic production _____ to be studied further to determine if the antibiotics they produce are new. 3. The test bacteria _____ chosen to be representative of, or related to, bacterial pathogens. 4. We _____ touched upon only a few points. 5. Microscope _____ to show us the viruses of the diseases. 6. Calculations _____ helping to solve different problems. 7. All discoveries and inventions will _____ published. 8. The solution has _____ heated.

IX. Use indirect speech.

1. "Can you tell us about Shevchenko?" asked a tourist. 2. "Taras Grigorovich Shevchenko was born on March, 9, 1814 in the village of Morintsy, near Kyiv into the family of a serf," started the guide. 3. "As far as I know Shevchenko was bought off his serfdom," continued the tourist. 4. "Yes, he was, and later he received a higher education in the Petersburg Academy of Arts," continued the guide. 5. "Why was Shevchenko sent in exile?" asked the tourists. 6. "He was exiled for his revolutionary poems "Haidamaki", "A Dream", "The Caucasus" and others," explained the guide. 7. "When did Shevchenko die?" asked a tourist. 8. "Shevchenko died in 1861 and was buried on the hill over the Dipro according to his poetical "Testament," finished the guide.

X. Translate the sentences into English using the grammar of the test.

1. Аналіз показав, що виділені бактерії можуть пригнічувати деякі

шкідливі мікроорганізми. 2. Біотехнолог запитав, чи отримана достатня кількість бактерій. 3. Посів на чашку Петрі дозволяє отримати чисту культуру. 4. Якщо антибіотик нерозчинний, його можна естрагувати адсорпцією. 5. Виділені бактерії мають виробляти новий антибіотик. 6. Мікробіологи вирішували, які штами бактерій будуть використані для нових ліків. 7. Кожного дня щось нове з'являється в медицині. 8. Препарат має бути перевірений на токсичність.

Variant 10

I. Read, copy and translate the following text.

Wastewater treatment

Modern wastewater treatment is generally divided into three phases: primary, secondary, and tertiary. Each of these steps produces sludge, which can be disposed of or used for various purposes.

Primary treatment, or plain sedimentation, developed in the early 1900's, removes only the settleable solids from wastewaters. A modern system for primary treatment entails collecting the wastewaters, conveying them to a central point for treatment, using screens to remove large objects and grit chambers to remove grit, and using primary sedimentation tanks to remove the suspended settleable solids.

There are two basic methods used in modern secondary treatment: *the trickling filter and the activated-sludge process*. In a *trickling filter* the wastewater is applied to the filter through rotary distributors and it is allowed to trickle down over large stone or plastic beds that are covered with microorganisms. The beds are not submerged, thus air can reach the organisms at all times. In *the activated-sludge process*, heavy concentrations of aerobic microorganisms, called biological floc or activated sludge, are suspended in the liquid by agitation that is provided by air bubbling into the tank or by mechanical aerators, final sedimentation tanks are needed to separate the material from the flowing liquid. Most of the biologically active sludge is then returned to the aeration tank to treat the incoming water.

Tertiary treatment is primarily intended to further clean or polish, secondary treatment plant effluents by removing additional suspended material and lowering the BOD (biological oxygen demand), generally by filtration. To eliminate such constituents of wastewater as dissolved solids, including the nutrients, synthetic organic chemicals, and heavy metals, coagulation, sedimentation, precipitation, adsorption on activated carbon or other adsorbents, foam separation, electrodialysis, reverse osmosis, ion exchange, and distillation are used.

Vocabulary

| | |
|-----------------------|--------------------|
| wastewaters, effluent | стічні води |
| treatment | обробка, переробка |
| convey | переносити |
| screen | сито |

| | |
|--------------------------|-----------------------|
| grit chamber | камера з решіткою |
| sedimentation | осадження |
| suspended | підвішений |
| settleable solids | твердий осад |
| the trickling filter | капаючий фільтр |
| activated-sludge process | процес активного мулу |
| biological floe | біологічне середовище |
| cover | покривати |
| submerged | занурений |
| liquid | рідина |
| agitation | перемішування |

II. Ask 10 questions of different types: general, special, disjunctive, alternative on the text.

III. Fill in the gaps. Copy and translate the sentences.

trickle, treatment, effluent, cover, remove, activated-sludge, wastewater, submerge.

1. Modern ____ treatment is generally divided into three phases: primary, secondary, and tertiary. 2. A modern system for primary ____ entails collecting the wastewaters. 3. Screens are used to ____ large objects and grit chambers to remove grit. 4. In a ____ filter the wastewater is applied to the filter through rotary distributors. 5. Wastewater is allowed to trickle down over large stone or plastic beds that are ____ with microorganisms. 6. The beds are not ____, thus air can reach the organisms at all times. 7. In ____ process, heavy concentrations of aerobic microorganisms are suspended in the liquid by agitation provided by aerators.. 8. Tertiary treatment is primarily intended to further clean, or polish, secondary treatment plant ____ by removing additional suspended material.

IV. Transform the verbs into Passive Voice.

1. They divide wastewater treatment into three phases: primary, secondary, and tertiary. 2. Each of these steps produces sludge. 3. They developed primary treatment, or plain sedimentation in the early 1900's. 4. Primary treatment removes only the settleable solids from wastewaters. 5. A modern system for primary treatment entails collecting the wastewaters, conveying them to a central point for treatment, etc. 6. Screens remove large objects. 7. They are using grit chambers to remove grit. 8. Primary sedimentation tanks will remove the suspended settleable solids.

V. Open the brackets using Participle I and Participle II. Define their functions. Copy and translate the sentences.

1. There are two basic methods (use) in modern secondary treatment. 2. One of the methods is *the (trickle) filter*. 3. In *a trickling filter* the wastewater is (apply) to the filter through rotary distributors. 4. The beds are not (submerge). 5. In *the (activate)-sludge* process, heavy concentrations of aerobic microorganisms, (call) biological floe or activated sludge, are (suspend) in the liquid. 6. Agitation is

provided by air (bubble) into the tank or by mechanical aerators. 7. Most of the biologically active sludge treats the (income) water. 8. Dissolved solids, (include) the nutrients, are removed by adsorption on (activate) carbon.

VI. Fill in the gaps with the missing modal verbs and their equivalents.

Copy and translate the sentences.

1. Sludge ____ be disposed of or used for various purposes. 2. Water is ____ to trickle down over large stone or plastic beds. 3. Final sedimentation tanks are ____ to separate the material from the flowing liquid. 4. Large objects ____ be removed first. 5. Then water ____ be cleaned from suspended solids. 6. Air ____ reach the organisms at all times. 7. Tertiary treatment ____ to further clean or polish, secondary treatment plant effluents. 8. As a result of water treatment the citizens ____ to obtain drinkable running water at home.

VII. Fill in the gaps with the indefinite and negative pronouns and adverbs.

Copy and translate the sentences.

1. ____ is well that ends well. 2. ____ risks to catch infectious diseases with impure water. 3. ____ must be removed from waste water during treatment. 4. ____ suspended or settleable solids must be left after the treatment. 5. In activated-sludge process ____ biological floc cover the large stone or plastic beds. 6. Water is clean when ____ harmful is left in it. 7. Liquid waste agitation is provided by ____ air bubbling into the tank. 8. ____ waste water undergoes biochemical analysis.

VIII. Copy the following sentences using the verbs to be, to have, to do and translate them into Ukrainian.

1. Large stone or plastic beds ____ covered with microorganisms. 2. BOD ____ biological oxygen demand. 3. They ____ measure BOD at each stage of waste water treatment. 4. BOD ____ to be lowered by filtration. 5. *A trickling filter* ____ rotary distributors. 6. Industrial waste water will ____ used for communal purposes. 7. Industrial waste water ____ undrinkable. 8. It cannot ____ used as running water in homes.

IX. Use indirect speech.

1. The inspector asked, "What methods are used to clean the waste water?" 2. The citizens inquired, "What was the water disinfected with?" 3. The biotechnologist explained, "After the primary treatment waste water will be conveyed to the trickling filters." 4. The citizens doubted, "Can we use unboiled running water?" 5. The microbiologists of the water treatment station assured, "Water has been cleaned." 6. The sanitary inspection pointed out, "BOD is not low enough." 7. The laboratory assistants promised, "We will make more analyses." 8. The measurement proved, "Water is drinkable."

X. Translate the sentences into English using the grammar of the test.

1. Переробка стічних вод поділяється на три стадії: первинну, вторинну та третинну. 2. Мул, який залишається після кожної стадії, може бути використаний на різні потреби. 3. Станції очистки стічних вод відвідує

санепідемстанція. 4. Лікар запитав, чи рівень чистоти води відповідає стандарту. 5. Біотехнолог відповів, що вміст бактерій у пробах (samples) був задовільним. 6. Міська адміністрація запевнила киян, що питна вода буде чистою. 7. Великі предмети видаляються ситами. 8. В процесі переробки тверді, взвішені, хімічні речовини мають бути видалені із стічних вод.

TEST N 3

Variant 1

I. Read, copy and translate the following text.

Catalysis and Enzymes

Most of the chemical changes that occur in living tissues are regulated by biocatalysts, the enzymes. Enzymes exist in nature as fungi or bacteria on plant and animal matter. In man and the higher animals, the juices emptying into the alimentary tract contain the enzymes necessary to render foods soluble before absorption.

A catalyst is a substance that alters the speed of a reaction already in progress without appearing as part of the final products and without changing the energy content of the reactants and resultants. Catalysts permit reactions to occur under milder conditions than would otherwise be possible.

Enzymes comprise one class of proteins and have no distinctive features that would mark them chemically from other kinds of proteins. Proteins are composed of amino acids, for which the general formula is $\text{R}-\text{CH}-\text{COOH}$



Thus we have within the molecule a basic group, NH_2 , capable of coupling with an acidic group, COOH , similarly capable of coupling with a basic group, with the elimination of water in each case. This is, in fact, the way in which protein synthesis takes place.

All known enzymes contain a globular protein – apoenzyme, joined to a nonprotein compound known as a cofactor. The cofactor may be an inorganic ion or a small organic molecule called a coenzyme. Together the apoenzyme and cofactor form the holoenzyme. Most catalysts have a well-defined specificity. Thus carbon monoxide and hydrogen are converted to methane and water almost quantitatively when passed over nickel; but the same compounds yield methyl alcohol quantitatively in the commercial process using a mixture of zinc and chromic oxides; whereas, with alkali and iron, a mixture of higher alcohols, ketones, and hydrocarbons is obtained. Enzymes that catalyze oxidation of organic compounds by the removal of hydrogen atoms are called *dehydrogenases*. Two organic molecules that serve as temporary hydrogen acceptors and act as coenzymes (q.v.), are pyridine nucleotides or diphosphopyridine nucleotide (DPN) and triphosphopyridine nucleotide (TPN), from which energy is released.

Vocabulary

| | |
|----------------------|------------------|
| enzyme | фермент |
| carry out | проводити |
| digest | перетравлювати |
| release | вивільняти |
| join | приєднувати(ся) |
| reactant | реагент |
| resultant | кінцевий продукт |
| distinctive feature | відрізняюча риса |
| couple | з'єднувати |
| elimination, removal | видалення |
| precursor | попередник |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

catalyze, solution, absorb, finish, chemical, eliminate, synthesize, acid, mix, remove.

III. Match the synonyms.

1) happen, control, matter, change, include, differ, consist, join, eliminate, create, let out.

2) couple, substance, vary, occur, be composed, check, remove, comprise, alter, release.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. Enzymes can be found on plant and animal matter. 2. The digesting juices contain the enzymes necessary to render foods soluble before absorption. 3. Catalysts permit reactions to occur under milder conditions than would otherwise be possible. 4. All enzymes are known to contain a globular protein – apoenzyme. 5. Nonprotein compound is known to be a cofactor. 6. The cofactor may be an inorganic ion or a small organic molecule called a coenzyme. 7. To yield methyl alcohol quantitatively in the commercial process a mixture of zinc and chromic oxides is used. 8. To have been reacting with stomach juices enzymes must be present in intestines.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. Food ____ be dissolved in alimentary trace before absorption. 2. We ____ have problems with digestion with lack of necessary enzymes. 3. Enzymes have no distinctive features that would mark them chemically from other kinds of proteins. 4. Carbon monoxide and hydrogen are converted to methane and water almost quantitatively ____ they are passed over nickel. 5. The biotechnologists assured that enzymes ____ be in excess. 6. Catalysts permit reactions to occur under milder conditions than ____ otherwise be possible. 7. The technologists said that the reaction ____ start soon. 8. Catalyst ____ be used to speed up the reaction.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. Most of the chemical changes ____ occur in living tissues are regulated by biocatalysts, the enzymes. 2. A catalyst is a substance ____ alters the speed of a reaction already in progress. 3. ____ is, in fact, the way in which protein synthesis takes place. 4. One can see a basic group, NH_2 , in the molecule. 5. ____ is capable of coupling with an acidic group. 6. Enzymes comprise ____ class of proteins. 7. There is the apoenzyme and cofactor. Together ____ form the holoenzyme. 8. The reaction started. ____ was the sign to add other ingredients.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. 2. Enzymes always (exist) in nature as fungi or bacteria. 2. A catalyst just (alter) the speed of a reaction. 3. The compounds (yield) methyl alcohol if we use a mixture of zinc and chromic oxides. 4. The energy content of the reactants and resultants (change) at the moment. 5. Protein synthesis (take) place in plants. 6. With alkali and iron, a mixture of higher alcohols, ketones, and hydrocarbons (obtain). 7. Two organic molecules (serve) as temporary hydrogen acceptors and (act) as coenzymes (q.v.). 8. They (call) pyridine nucleotides.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. Enzymes being proteins, they are composed of amino acids. 2. The general formula comprising a basic group, NH_2 , this is capable of coupling with an acidic group. 3. Enzymes are known to be important in digestion. 4. Most catalysts are known to have a well-defined specificity. 5. Energy was observed to be releasing from pyridine nucleotides. 6. Enzymes having been applied historically, food production enlarged their list. 7. Catalysts permit reactions to occur under milder conditions. 8. Enzymes are necessary for us to render foods soluble before absorption.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. It is known that Charles Robert Darwin, the revolutioner in biology, was born in Shrewsbury, England on February, 12, 1809. 2. His father, as the history goes, was a wealthy physician. 3. Darwin liked neither Shrewsbury School, nor Edinburgh medical College, then Cambridge Christ's College which he attended. 4. Further on, his acquaintance with John Stevens Henslow, the professor of botany, influenced his choice of profession. 5. Owing to his friend Darwin went on a trip around the world. 6. The book "The Origin of Species" which Darwin wrote after the trip layed the bases of his theory of evolution. 7. In his book Charles Darwin wrote that both plants and animals had come from the very simple plants and animals. 8. He proved that neither two animals nor plants of the same kind are exactly alike.

X. Translate the sentences into English using the grammar of the test.

1. Всі процеси в людському організмі регулюються різними ферментами. 2. Ферменти необхідні для того, щоб розчиняти їжу в травному шляху перед всотуванням. 3. Оскільки ферменти являють собою каталізатори, вони змінюють швидкість реакції. 4. Відомо, що ферменти включають один клас протеїнів. 5. Протеїни складаються з амінокислот, і їхня загальна формула наведена вище. 6. Кислотна група з'єднується з основною групою. 7. Таким чином протікає синтез протеїну. 8. Без каталізаторів реакції при нижчих температурах були б неможливі.

Variant 2

I. Read, copy and translate the following text.

Enzymes Diversity

Enzymes are produced commercially from both fungi and bacteria. Proteases, as rennin, used in cheesemaking, are enzymes that attack proteins. The traditional source is rennet, prepared from the stomachs of calves. The alternative sources are microbial – *Bacillus cereus*, *Endothia paracitica*, *Irpex lacieus*, *Mucor michei*, and *Mucor pusillus*. The action of rennin is to reduce a 'water-soluble' milk protein, caseinogen, to casein interacting with calcium in the milk to form a cheese curd. Tenderizing meats can be achieved by reducing them to hydrolysates by means of the digestive enzymes, pepsin and trypsin.

A number of non-protease enzymes include glucose oxidase, isolated from the mould, *Aspergillus niger*. It is used to prevent the browning reaction between the aldehydic group of sugars and amino groups of proteins. This enzyme will also remove oxygen and has been used in stabilizing citrus-juice-based soft drinks etc. Other important enzymes manufactured commercially are amylases and glucoamylases, which are used in the production of glucose from starch. The glucose can then be converted by the enzyme *glucose isomerase* to produce fructose, which is about twice as sweet as glucose. The final result is the production of a *high-fructose syrup* from corn, wheat, or potato starch.

Next there are the carbohydrase. Carbohydrases attack polysaccharide linkages and produce smaller and more easily digested sugar units. They are used in the baking industry, and also for making 'modified starches', which can act as emulsifier stabilizers. Again the sources are microbial: *Arthrobacter*, *Aspergillus niger*, *Aspergillus crysae*, *Saccharomyces* spp., *Bacillus subtilis*. Finally there is catalase, a peroxidase, which has found use both in the dairy industry and in the pasteurization of eggs. It acts on hydrogen peroxide to release oxygen and produce water. There is, in fact, a coupled reaction in which one molecule of peroxide is oxidized and another reduced.

Vocabulary

| | |
|--------------------|-----------------------|
| fungi | гриби |
| stomachs of calves | шлунки телят |
| manufacture | виробляти |
| corn starch | кукурудзяний крохмаль |
| sweet | солодкий |
| wheat | пшениця |
| soft drink | безалкогольний напій |
| yeast | дріжджі |
| treat | обробляти |
| yield | утворювати |
| substrate | основа |
| release | вивільняти |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

commerce, tradition, cheese, digest, hydrogen, fruite, finish, react, produce, easy.

III. Match the synonyms.

- 1) comprise, apply, separate, kind, transform, ferment, quantity, produce, receive, process.
- 2) isolate, species, use, enzyme, amount, manufacture, obtain, include, treat, convert.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. The action of rennin is to reduce a 'water-soluble' milk protein caseinogen to casein. 2. Casein interacting with calcium in the milk is known to form a cheese curd. 3. Tenderizing meats can be achieved by reducing them to hydrolysates. 4. *Aspergillus niger* is used to prevent the browning reaction. 5. The enzyme glucose oxidase will also remove oxygen. 6. The glucose can be converted by the enzyme *glucose isomerase* to produce fructose. 7. Enzymes are known to be used in detergents. 8. The product to obtain must have certain properties.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. Glucose oxidase should be used to prevent the browning reaction. 2. Without enzymes there would be no digestion. 3. Should the reaction yield the necessary compound, then our theory is proved. 4. People knew that enzymic reaction might produce a curative effect. 5. The experiment showed that they should add some more sugar. 6. People wanted to know if enzymes would render food more digestible. 7. All people should consume fermented foods. 8. Without fermented food we would not be provided with necessary nutrients.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. Proteases, as rennin, are enzymes ____ attack proteins. 2. Glucose oxidase is isolated from *Aspergillus niger*. ____ is used to prevent the browning reaction. 3. ____ enzyme will also remove oxygen. 4. Other important enzymes are amylases and glucoamylases. ____ are used in the production of glucose from starch. 5. ____ of the enzymes is rennin. 6. The glucose can be converted into fructose, ____ is about twice as sweet as glucose. 7. Carbohydrases produce more easily digested sugar units. ____ are used in the baking industry. 8. One can use them also for making 'modified starches'. ____ can act as emulsifier stabilizers.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. Enzymes (produce) commercially from both fungi and bacteria. 2. Proteases, such as rennin, always (use) in cheese making. 3. Proteases (be) enzymes that attack proteins. 4. Earlier they (prepare) rennet from the stomachs of calves. 5. Now they (use) the microbial sources – *Bacillus cereus*, *Endothia paracitica*, *Irpex lacius*, etc. 6. Glucose oxidase also (remove) oxygen later. 7. Glucose oxidase always (use) in stabilizing citrus-juice-based soft drinks. 8. Acting on hydrogen peroxide a peroxidase (release) oxygen and produces water.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. *Glucose isomerase* producing fructose, this is about twice as sweet as glucose. 2. The final result is the production of a *high-fructose syrup* from corn, wheat, or potato starch to be used in pharmaceutical and other industries. 3. Enzymes sources include the carbohydrase, the latter attacking polysaccharide linkages. 4. The carbohydrase is known to produce smaller and more easily digested sugar units. 5. They use the carbohydrase sugar units to produce baked products. 6. Enzymes seem to have been used everywhere. 7. The general reaction of fermentation being the same, there is difference in the material and the products. 8. The temperature increasing, the fermentation processes go faster.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. There is, in fact, a coupled reaction in which one molecule of peroxide is oxidized and another reduced. 3. Both fungi and bacteria are used in producing enzymes. 4. Either natural or bacterial sources are used in obtaining rennin. 5. Enzymes are used in food additives as well as in laundry detergents. 6. As a rule a *high-fructose syrup* is manufactured from corn, wheat, or potato starch. 7. To exemplify, 'modified starches' can act as emulsifier stabilizers. 8. Considering enzymes sources we should mention yeasts.

X. Translate the sentences into English using the grammar of the test.

1. Відомо, що ферменти виробляються як з грибків, так і з бактерій. 2. Протеаза використовується у сироваренні, при цьому вона діє на протеїн. 3. Казеїноген перетворює протеїн молока на казеїн, а казеїн реагує з кальцієм у молоці. 4. Без ферментів у людини не було б нормального травлення. 5. Людям старшого віку слід обов'язково споживати їжу, багату на ферменти. 6. Якщо молоко обробили ферментами, то воно скоріше згорнеться. 7. Пероксидаза застосовується як в молочній промисловості, так і в пастеризації яєць. 8. Глюкоза оксидаза застосовується у стабілізації безалкогольних напоїв.

Variant 3

I. Read, copy and translate the following text.

Fermentation Mechanism

Fermentation is an energy-yielding metabolic process that involves the decomposition of carbohydrates in the absence of oxygen.

The biochemical pathway of fermentation is known as *glycolysis*. In the course of this series of reactions glucose, which is a 6-carbon sugar, is broken down to two molecules of pyruvic acid, a 3-carbon compound. The pyruvic acid then may be reduced to form lactic acid, or it may lose carbon dioxide to form acetaldehyde, which is subsequently reduced to form ethyl alcohol. The reactions

of glycolysis are also important as the initial steps in aerobic respiration. In respiration the final product of the glycolytic pathway is pyruvic acid, which is then introduced into the citric acid cycle, where it is further degraded (with the stepwise release of large quantities of energy) to carbon dioxide and water.

Energy obtained by the cells for growth and multiplication from the orderly breakdown of organic compounds, entails a series of oxidation and reduction reactions. The biological oxidation of organic compounds involves the removal of two hydrogen atoms; this reaction is called *dehydrogenation*. Enzymes, its catalysts are called *dehydrogenases*. Two organic molecules that serve as temporary hydrogen acceptors act as coenzymes (q.v.), belong to the class of pyridine nucleotide, and are called diphosphopyridine nucleotide (DPN) and triphosphopyridine nucleotide (TPN). The reduction of such compounds involves the addition of two hydrogen atoms to an organic molecule; this reaction is called *hydrogenation*. The compound that loses the hydrogen atoms is called the *hydrogen donor*; the compound that accepts hydrogen is called the *hydrogen acceptor*.

Fermentation does not yield much energy. The energy released is stored in the high-energy chemical bonds of a compound known as adenosine triphosphate (ATP).

Vocabulary

| | |
|-----------------|---------------------------|
| energy-yielding | що виробляє енергію |
| decomposition | розпад |
| occur | зустрічатися |
| multicellular | багатоклітинний |
| reduce | відновлювати, підвищувати |
| loose | втрачати |
| respiration | дихання |
| compound | сполука |
| obtain | отримати |
| remove | видаляти |
| growth | ріст |
| acid | кислота |
| plant | рослина |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

ferment, metabolism, decompose, carbon, biochemistry, pyruvate, grow, multiply, oxide, add.

III. Match the synonyms.

1) include, happen, join, liberate, carry out, breathing, receive, split, create, disintegrate.

2) occur, respiration, obtain, break down, fall into, add, involve, release, drive, form.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. To grow and multiply the cells must have energy. 2. The cells obtain the energy from the orderly breakdown of organic compounds. 3. For the organic compound to oxidize two hydrogen atoms should be removed. 4. The biochemical pathway of fermentation is known to be called *glycolysis*. 5. The pyruvic acid then may be reduced to form lactic acid. 6. The pyruvic acid may lose carbon dioxide to form acetaldehyde. 7. Acetaldehyde is subsequently reduced to form ethyl alcohol. 8. Pyruvic acid is further degraded with the release of large quantities of energy to carbon dioxide and water.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. The reactions of glycolysis ____ be studied as the initial steps in aerobic respiration. 2. It was known that the compound ____ lose the hydrogen atoms in the reaction. 3. It was defined that the compound ____ be called the *hydrogen acceptor*. 4. Oxygen ____ be absent for fermentation to take place. 5. There ____ be more energy but less fermentation in the presence of oxygen. 6. There ____ be enough sugar for the microorganisms. 7. ____ the enzymes be added, the rate of the reaction would rise. 8. They said they ____ produce fermented sausages.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. Fermentation is an energy-yielding metabolic process ____ involves the decomposition of carbohydrates in the absence of oxygen. 2. The compound ____ loses the hydrogen atoms is called the *hydrogen donor*. 3. The ____ that accepts hydrogen is called the *hydrogen acceptor*. 4. Pyruvic acid is then introduced into the citric acid cycle, where ____ is further degraded. 5. ____ the enzymes that make our food more tasty. 6. ____ who tasted yoghurt could enjoy fermented food. 7. ____ can say that fermentation does not release much energy. 8. We know ____ that food industry could not succeed without fermentation process.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. In the course of this series of reactions glucose, (break) down to two molecules of pyruvic acid, a 3-carbon compound. 2. glucose, is a 6-carbon sugar. 3. The compound that accepts hydrogen (call) the hydrogen acceptor. 4. These bacteria (multiply) if we add sugar. 5. The substance (degrade) slowly into carbon and water. 6. They (observe) how the rate of fermentation changed. 7. The fermentation already (end). 8. Chemical reaction (carry) out under mild conditions. 9. They (tell) about fermentation by their professors before.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes

1. Fermentation being an energy-yielding metabolic process, it involves the decomposition of carbohydrates. 2. There is a series of reactions to produce

fermented products. 3. Glucose, being a 6-carbon sugar, is broken down to two molecules of pyruvic acid. 4. Pyruvic acid is known to be a 3-carbon compound. 5. The pyruvic acid then may be reduced to form lactic acid. 6. Acetaldehyde is formed, this forming ethyl alcohol. 7. The reactions of glycolysis are used to prove aerobic respiration. 8. In respiration the final product of the glycolytic pathway being pyruvic acid, it is then introduced into the citric acid cycle.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. Darwin took interest in everything as far as it concerned botany. 2. He collected and studied both insects and plants. 3. It is known that Darwin was bitten by a beetle during his journey. 4. Although Darwin got seriously ill he didn't stop his work on the theory of evolution. 5. Neither strong pain nor other problems could make him leave his work. 6. In order to fulfil his task he had to suffer much. 7. Nevertheless his research helped him to bear the pain. 8. Since Darwin had no children he gave all his time to work.

X. Translate the sentences into English using the grammar of the test.

1. Ферментація відома як процес, який виробляє енергію. 2. Вуглеводи розкладаються у відсутності кисню, і в цьому процесі виробляється енергія. 3. Піруватна кислота підвищується з утворенням молочної кислоти. 4. Піруватна кислота вступає в цикл цитринової кислоти і розкладається на двоокис вуглецю та воду. 5. Реакція гліколізу відома як первинна стадія аеробного дихання. 6. Слід додавати ферменти, щоб прискорити реакцію. 7. Було доведено, що тимчасові акцептори водню – коензими – належать до класу піридин-нуклеотидів. 8. Сполука, відома як аденозин трифосфат (АТФ), слугує для зберігання енергії.

Variant 4

I. Read, copy and translate the following text.

Yeast Cell Production

Yeasts are single-celled, colorless plants, true fungi, with round or oval cells much larger than bacteria, found in nature on the fruit and leaves of plants and in the soil. Yeast is a rich source of protein, amino acids, carbohydrates, minerals, fat, the B-complex vitamins, vitamin D₂.

Baker's yeast is a strain of *S. cerevisiae* grown on a medium of molasses and ammonia or molasses and grain extracts. *Brewer's yeasts* are strains of *S.*

cerevisiae that slowly ferment the extract of malt, cereals, and hops to produce beer (bottom-fermenting yeast) or ale (top-fermenting yeast). *Wine yeasts* are strains of *S. cerevisiae*, var. *ellipsoideus*, the species that ferment grape juice. Dried medical yeast, *Medicinal Cerevisiae* has a second species, strains of *C. utilis*, added.

Yeast for baking or nutritional purposes is cultured in large aerated fermentors in a medium containing molasses as a major ingredient. Molasses contains large amounts of sugar as the source of carbon and energy, and also contains minerals, vitamins, and amino acids used by the yeast. To make a complete medium for yeast growth, phosphoric acid (a phosphorus source) and ammonium sulfate (a source of nitrogen and sulfur) are added.

Beginning with the pure stock culture, several intermediate stages are needed to scale up the inoculum to a size sufficient to inoculate the final stage. It is undesirable to add all the molasses to the fermentor at once because this results in a sugar excess. The yeast then ferments much of the sugar to alcohol plus CO₂ rather than turning it into yeast cells. Then as the yeast culture grows and consumes this sugar, more molasses is added in controlled "feedings." At the end of the growth period, the yeast cells are recovered from the broth by centrifugation. The cells are then washed by dilution with water and recentrifuged until they are light in color. Baker's yeast is marketed in two ways, either as compressed cakes or as a dry powder. *Compressed yeast cakes* are made by mixing the centrifuged yeast with emulsifying agents, starch, and other additives that give it a suitable consistency and reasonable shelf life.

Vocabulary

| | |
|-----------------------|-----------------------|
| baker's yeast, leaven | пекарські дріжджі |
| strain | штам культури |
| medium | середовище |
| grain extract | екстракт зерна |
| nutritional purpose | зادля харчування |
| pure stock culture | чиста культура |
| intermediate stage | проміжна стадія |
| scale up the inoculum | прискорити інокуляцію |
| excess | надлишок |
| consume | споживати |
| recover | відновити |
| broth | бульон |
| dilution | розбавлення |
| dry powder | сухий порошок |
| shelf life | строк зберігання |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

color, slow, nutrition, ferment, medicine, bake, inoculate, emulsify, add, suite.

III. Match the synonyms.

1) ground, make, species, meals, aim, component, quantity, surrounding, use,

develop.

2) food, purpose, application, part, grow, environment, produce, soil, amount, kind.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. *Brewer's yeasts* are strains of *S. cerevisiae*. 2. *Brewer's yeasts* slowly ferment the extract of malt, cereals, and hops to produce beer or ale. 3. To make a complete medium for yeast growth, phosphoric acid and ammonium sulfate are added. 4. Beginning with the pure stock culture, several intermediate stages are needed to scale up the inoculum to a size sufficient to inoculate the final stage. 5. It is undesirable to add all the molasses to the fermentor at once because this results in a sugar excess. 6. A half a century ago analysts used chemical methods to estimate proteins, fats, and carbohydrates in foods. 7. To solve a chemical problem means to write the formula of a chemical reaction. 8. They are believed to be producing high quality food.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. Yeasts ____ be used as food additives. 2. It was known that the product obtained ____ be well used by the body. 3. We ____ use dry medicinal yeast to supply necessary vitamins. 4. Should ammonium sulfate be added it ____ supply nitrogen and sulfur. 5. The technologist said that molasses ____ be the media for fermentation. 6. The laboratory assistant doubted that the media ____ be adequate. 7. ____ you like to see the process of fermentation? 8. Emulsifying agents, starch, and other additives ____ give compressed yeast a suitable consistency and reasonable shelf life.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. Yeast are small fungi that are found in nature on the fruit and leaves of plants. 2. ____ who cook use the yeast. 3. One can say that yeast is rich in nutrients. 4. ____ is used in food preparation. 5. Yeast ____ are used in breadmaking is cultured in large aerated fermentors. 6. ____ is necessary to observe the amount of sugar. 7. ____ is undesirable to add all the molasses to the fermentor at once. 8. ____ results in a sugar excess.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. Yeasts (be) the primary products of the fermentation process. 2. Yeasts grown for bread making, food, feed, and medicinal purposes (produce) little alcohol. 3. *Medicinal Cerevisiae* (have) a second species, strains of *C. utilis*, added. 4. Yeast (use) for many purposes. 5. In bread production yeast (leaven) bread. 6. In wine industry yeast (use) for centuries. 7. Hops (give) bitterness and taste to beer when you add it. 8. Yeast slowly (consume) sugar.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. Phosphoric acid being a phosphorus source, it serves as nutrient for yeast. 2. Yeast having been added, the reaction started. 3. The centrifuged yeast having been mixed with emulsifying agents, starch, and other additives, a suitable consistency and reasonable shelf life is given to it. 4. For the yeast to produce alcohol it should ferment grape juice. 5. Strains of *S. cerevisiae*, var. *ellipsoideus* are known to be *Wine yeasts*. 6. them to 7. We know *Medicinal Cerevisiae* to have a second species, strains of *C. utilis*, added. 8. They apply molasses to culture yeast for baking or nutritional purposes.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. You know that English has a long history. 2. Since early times the first inhabitants of Great Britain were the Celts. 3. The Romans who first occupied of Great Britain left roads and fortresses with Roman names. 4. The German tribes of Angles, Saxons and Jutes were the founders both of the English nation and the English language. 5. The land on which they settled was called England and the language they spoke English. 6. After the Norman conquest Great Britain was under William the Conqueror. 7. Though the Normans became the masters and the English their slaves, the English didn't want to speak the language which the Normans spoke. 8. So the Anglo-Saxon language changed a little by the Normans became the real English language.

X. Translate the sentences into English using the grammar of the test.

1. Дріжджі – маленькі грибки, які знаходяться на рослинах, тваринах та у землі. 2. Відомо, що дріжджі широко використовуються у харчовій промисловості. 3. Коли до виноградного соку додаються дріжджі, розпочинається ферментація. 4. Слід стежити за вмістом цукру. 5. Необхідно додавати нутрієнти до середовища. 6. Оскільки дріжджі багаті на вітаміни та амінокислоти, виробляють сухі медичинські дріжджі. 7. Для того, щоб дріжджі мали достатнє середовище, додаються фосфорна кислота та сульфат амонію. 8. Люди здавна знали, що додавання цукру до соку призведе до його бродіння.

Variant 5

I. Read, copy and translate the following text.

The Mechanism of Alcoholic Fermentation

Alcoholic fermentation may be defined as the enzymatic conversion of carbohydrate into ethanol and carbon dioxide with small amounts of erol and traces of other products. The basic scheme of alcoholic fermentation generally accepted at the present time is referred to as the Embden—Meyerhof scheme. Glycolysis is the process by which carbohydrates including glycogen, glucose, levulose, or mannose are metabolized to pyruvic acid (or lactic acid). Pyruvic acid is decarboxylated to yield carbon dioxide and acetaldehyde; the acetaldehyde acts as the final hydrogen acceptor and is converted to ethyl alcohol. Pyruvat undergoes transamination with the formation of amino acids. It is the product oxidized by oxygen in respiration through the Kreb's cycle and the cytochrome oxidase system; and it may also lead to fat formation.

That applies in a practical sense to the conversion of starches (after saccharification) or sugars into alcohol and carbon dioxide by *Saccharomyces nae*, commonly known as yeast. Alcoholic fermentation can be brought about, however, by microorganisms other than *Saccharomyces cerevisiae*. Thus *Escherichia coli*, commonly found in the intestines of animals, also forms ethanol in relatively large quantities. *Sarcina ventriculi*, a species of bacteria, certain fungi, e.g., species of *Fusarium*, may be considered to possess an alcoholic type of fermentation.

The basic mechanism of alcoholic fermentation is basically similar to that which underlies an anaerobic cellular metabolism in green plants, animals, bacteria, yeasts, and fung, and that similarity occurs between cells of different tissues of the same organism, e.g., brain, liver, muscle.

Alcoholic fermentation is refered to as an anaerobic metabolism, which do not require atmospheric oxygen. Pasteur considered such a process as an intramolecular oxidation in which part of the glucose is oxidized, whereas another part is reduced. When grown in the presence of air, as in the industrial production of yeast cells, yeast produce little alcohol.

Vocabulary

| | |
|-------------|-------------------|
| define | визначати |
| convert | перетворювати |
| amount | кількість |
| trace | мікродоза |
| accept | приймати |
| refer to as | називати |
| apply to | застосовувати |
| undergo | підлягати |
| respiration | дихання |
| fat | жир |
| starch | крохмаль |
| bring about | викликати |
| intestines | кишки |
| formic acid | мурав'їна кислота |

II. Find in the text the derivatives of the folowing words. Define these parts of speech and translate them into Ukrainian.

alcohol, convert, enzyme, form, common, relative, cell, similar, atmosphere, industry.

III. Match the synonyms.

1) determine, transform, bring, be present, quantity, is called, have, form, breathing, species.

2) decide, amount, yield, is referred, convert, inhalation, kind, lead, be found, possess.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. Alcoholic fermentation may be defined as the enzymatic conversion of carbohydrate into ethanol and carbon dioxide 2. To be metabolized to pyruvic acid (or lactic acid) carbohydrates undergo the process of glycolysis. 3. Pyruvic acid is decarboxylated to yield carbon dioxide and acetaldehyde. 4. Pyruvate undergoes transamination to form amino acids. 5. Pyruvate may also lead to fat formation. 6. Alcoholic fermentation can be brought about, however, by microorganisms other than *Saccharomyces cerevisiae*. 7. Species of *Fusarium*, may be considered to possess an alcoholic type of fermentation. 8. To obtain large amounts of alcohol *Saccharomyces cerevisiae* is used industrially.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. It was said that alcoholic fermentation ____ take place in absence of oxygen. 2. With air yeast ____ produce little alcohol. 3. Alcoholic fermentation ____ be referred to as an anaerobic metabolism. 4. We ____ point out that both bacteria and certain fungi form ethanol. 5. Should *Escherichia coli* be applied it ____ also form ethanol in relatively large quantities. 6. It was decided that they ____ use *Escherichia coli*. 7. The bacteria ____ multiply better in another media. 8. They found out that the acetaldehyde ____ be converted to ethyl alcohol.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. ____ is the product oxidized by oxygen in respiration through the Krebs's cycle and the cytochrome oxidase system. 2. ____ may also lead to fat formation. 4. The basic mechanism of alcoholic fermentation is basically similar to ____ which underlies an anaerobic cellular metabolism in green plants, animals, bacteria, yeasts, and fungi. 5. ____ similarity occurs between cells of different tissues of the same organism, e.g., brain, liver, muscle. 6. ____ can say that starches are as good as sugars as a source of alcohol. 7. ____ is quantity that is important. 8. *Saccharomyces cerevisiae*, *Escherichia*, *Sarcina ventriculi* are made use of as ____ are most productive.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. The basic scheme of alcoholic fermentation already (accept) 2. The basic scheme of alcoholic fermentation (refer) to as the Embden—Meyerhof scheme. 3. The acetaldehyde (act) as the final hydrogen acceptor and is converted to ethyl alcohol. 4. Pyruvate (undergo) transamination forming amino acids. 5. Pasteur (consider) alcoholic fermentation as an intramolecular oxidation. 6. Acetaldehyde (act) as the final hydrogen acceptor. 7. They (find) trace elements in baking yeast. 8. Glycolysis (be) the process by which carbohydrates including glycogen, glucose, levulose, or mannose are metabolized to pyruvic acid (or lactic acid).

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. The acetaldehyde acting as the final hydrogen acceptor, it is converted to ethyl alcohol. 2. When grown in the presence of air as in the industrial production of yeast cells, yeast produce little alcohol. 3. Thus, *Escherichia coli* was found to form ethanol in relatively large quantities. 4. Starches (after saccharification) or sugars are converted into alcohol and carbon dioxide by *Saccharomyces nae*. 5. Yeast is known to be represented by *Saccharomyces nae*. 6. Pasteur is known to have discovered the alcoholic fermentation. 7. For the starch to be turned into alcohol it must be processed with microorganisms. 8. We know the bacteria to be very productive.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. The English language is the mother tongue of Great Britain as well as of the USA, New Zealand, Canada and other countries. 2. As for such countries as India, Australia, New Zealand, etc., they are the former British colonies. 3. That is why English was imposed on their nations. 4. We know that English is an international language today. 5. So it is important to know English. 6. English is studied both in schools and higher educational establishments. 7. At the English classes we can read, write as well as speak English. 8. As I can speak English fluently I would like to visit Great Britain.

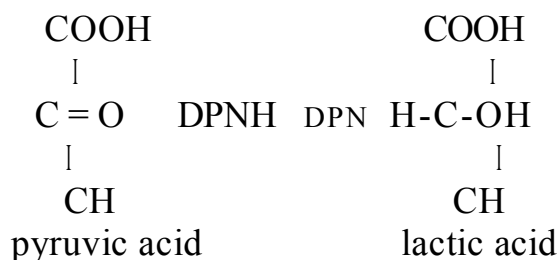
X. Translate the sentences into English using the grammar of the test.

1. Давно було винайдено, що сік під дією ферментів буде перетворюватися на алкоголь. 2. Схема Мейєрхофа-Ембдена відома як основна схема алкогольної ферментації. 3. Необхідно забезпечити достатнє середовище. 4. Оскільки цукор є їжею для мікроорганізмів, тому його використовують у виробництві алкоголю. 5. Важливо, щоб реакція протікала у відсутності кисню. 6. Слід пам'ятати про кількість продукту. 7. Такі бактерії, як *Saccharomyces cerevisiae* та *Escherichia coli*, вважаються продуктивними. 8. Ферментація – клітинний метаболізм у живих організмах, і такий самий процес спостерігається між клітинами тварин.

I. Read, copy and translate the following text.

Fermentation In Dairy Industry

Lactic fermentation takes place in fermented milk products. Glycolysis is the process by which carbohydrates including glycogen, glucose, levulose, or mannose are metabolized to pyruvic acid (or lactic acid). During the course of glycolysis four hydrogen atoms are released, and these atoms are temporarily picked up by DPN to form two molecules of DPNH.



In the manufacture of cheese and butter the lactic acid bacteria *Aspergillus niger* and *Micrococcus lysodeikticus* are used to ferment the milk sugar lactose to lactic acid. The final products of the dissimilation of *Aerobacter aerogenes* are: acetic, formic, lactic, and succinic acid; of the *Propionic Acid Bacteria* – propionic, succinic, and acetic acids, and carbon dioxide. Such an organism as *Escherichia coli*, commonly found in the intestines of animals, while forming lactic acid, acetic acid, formic acid, carbon dioxide, and hydrogen from glucose, also forms ethanol in relatively large quantities. In lactic fermentation the pyruvic acid acts as the final hydrogen acceptor, resulting in the formation of lactic acid.

The lactic acid causes the milk to sour, but it also acts as a preservative. Coagulation of milk proteins produces a solid material called *curd*. The refining of the curd is brought about by the further action of the lactic acid bacteria or by other bacteria or fungi. In the manufacture of Swiss cheese, for example, a subsequent fermentation by the propionic acid bacteria produces both propionic acid and carbon dioxide. The propionic acid gives Swiss cheese its characteristic flavor, while the carbon dioxide is responsible for the large holes.

In the manufacture of butter, the souring of cream by lactic acid is followed by the separation of butterfat in the churning process. Some of the lactic acid bacteria also ferment citrate and acetoin. This compound is spontaneously oxidized to diacetyl to give butter its characteristic flavor and aroma.

Vocabulary

| | |
|-------------------|-----------------|
| manufacture | виробляти |
| butterfat | масляний жир |
| cheese | сир |
| prevent, preserve | зберігати |
| cause sour | зкислювати |
| curd | творог |
| refine | очищати |
| fungi | грибки |
| lactic acid | молочна кислота |

flavour
churning

смак, запах
визрівання

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

ferment, lactose, dissimilate, accept, relative, preserve, coagulate, character, separate, fat.

III. Match the synonyms.

1) free, take, finish, create, production, microorganism, make, division, sour, taste.

2) end, manufacture, accept, cause, bacteria, produce, separation, acid, liberate, flavour.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. The atoms are temporarily picked up by DPN to form two molecules of DPNH. 2. To manufacture cheese and butter the lactic acid bacteria *Aspergillus niger* and *Micrococcus lysodeikticus* are used. 3. Microorganisms are used to ferment the milk sugar lactose to lactic acid. 4. Pyruvate may be considered to be the cardinal intermediate of metabolism. 5. The terminal phases of anaerobic dissimilation may vary with species and environment. 6. The lactic acid causes the milk to sour, but it also acts as a preservative. 7. To have treated milk with bacteria gave sour milk. 8. The substance to be obtained is formic acid.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. It is necessary that the products _____ be preserved. 2. Much attention _____ be given to the refining of the curd. 3. They said the cheese _____ have a specific flavour. 4. They _____ obtain more propionic acid from bacteria. 5. The producer decided that he _____ increase the production. 6. _____ the compound disintegrate, the components _____ react with the media. 7. The technologists wondered if they _____ add some more. 8. They waited when the fermentation _____ end.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. Four hydrogen atoms are released, and _____ atoms are temporarily picked up by DPN. 2. Pyruvate may be considered to be the cardinal intermediate in metabolism. 3. _____ terminates the common phase and initiates terminal phases of anaerobic dissimilation. 4. Some of the lactic acid bacteria also ferment citrate and acetoin. _____ compound is spontaneously oxidized to diacetyl. 5. _____ is citrate and acetoin that give butter its characteristic flavor and aroma. 6. _____ can say that the carbon dioxide is responsible for the large holes. 7. _____ microorganism, *Propionic Acid Bacteria*,

produces propionic, succinic, and acetic acids, and carbon dioxide. 8. It is the propionic acid ____ gives Swiss cheese its characteristic flavor.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. Everyone (see) how milk got sour. 2. *Aerobacter aerogenes* (dissimilate) acetic, formic, lactic, and succinic acids. 3. Lactic fermentation already (take) place. 4. Glycolysis is the process by which carbohydrates including glycogen, glucose, levulose, or mannose (metabolize) to pyruvic acid (or lactic acid). 5. We (watch) the curd formation when we boil sour milk. 6. In the manufacture of Swiss cheese, if we ferment the curd by the propionic acid bacteria, propionic acid and carbon dioxide (produce). 7. Cream always (sour) by lactic acid. 8. Butterfat (separated) later in the churning process.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. Fermentation is known to take place in anaerobic conditions. 2. For the cheese to churn they treated it with bacteria. 3. Milk being heated, it may turn. 4. Bacteria are known to be found on cheese. 5. Fermentation is proved to be produced both by fungi and bacteria. 6. Milk being a source of sugar, it is fermented easily. 7. Milk containing vitamins, its products are of high nutritional value. 8. Fermenting agents have special characteristics to be mentioned.

IX. Translate the sentences paying attention to the introductory and connective words.

1. Sir Alexander Fleming (1881-1955), who was a world known British bacteriologist, was born in Lochfield, Scotland on August 6, 1881. 2. He attended the Polytechnic College in London, after that he entered the medical school of St. Mary's hospital from which he graduated in 1908. 3. Then he began his research in the laboratory of A.E. Wright known as a pioneer immunologist. 4. During World War Two both Fleming and Wright studied wound infections which they observed in war hospitals. 5. Then they developed disinfectants and antiseptics. 6. Owing to his work Fleming became assistant director of the inoculation department of St. Mary's hospital and professor of bacteriology. 7. In 1928, while experimenting with *staphylococcus* bacteria cultures, Fleming noted that one culture plate was contaminated by mold. 8. Fleming identified the molds as a species of *Pennicilium*.

X. Translate the sentences into English using the grammar of the test.

1. Відомо, що молочна ферментація спричиняється певними мікроорганізмами. 2. Доведено, що не тільки бактерії, але й грибки можуть здійснювати ферментацію. 3. В процесі гліколізу вуглеводи метаболізуються до піруватної кислоти, і два атоми водню відділяються. 4. Для того, щоб швейцарський сир мав аромат, його слід обробляти пропіоновою кислотою. 5. Оскільки піруватна кислота є акцептором водню, утворюється молочна кислота. 6. Всі спостерігали, як молоко згортається. 7. *Escherichia coli* використовують у молочній промисловості, оскільки вона утворює велику

кількість етанолу. 8. Коли сполука окислилася до діацетилу, масло набуло характерного смаку та аромату.

Variant 7

I. Read, copy and translate the following text.

Citric Acid Manufacture

Citric acid is widely used in the food industry as a supplement in beverages, confectionaries, and other foods, and in the leavening of bread, and is also used industrially in the treatment of certain metals, as a detergent additive in place of phosphates, and in various pharmaceutical applications. Citric acid is produced microbiologically by a fermentation using the mold *Aspergillus niger*. Although it is normally considered in connection with the cytric acid cycle, in certain organisms such as *A. niger*, excretion of large amounts of citric acid can be obtained. The fermentation is carried out aerobically in large fermentors, and a key requirement for high citric acid yield is that the medium be *iron deficient*. The iron deficiency makes cells of *A. niger* overproduce citric acid as a chelator to scavenge iron. Therefore, the medium used for production is treated to remove most of the iron.

Growth media used for citric acid production contain any variety of starting materials including starch, starch hydrolysates, glucose syrup from saccharified starch, sucrose, sugarcane syrup, arcane molasses, and sugar beet molasses. If starch is used, amylase formed is added to the fermentation broth and hydrolyzes the starch to sugars. The sugars are catabolized through the glycolytic pathway and enter the citric cycle where citrate production occurs.

Most citric acid today is produced by submerged pocesses in large fermentors. However, because *A. niger* is an aerobe, it is crucial to this fermentation to make sure that the culture stays properly aerated. Citric acid is raced in this way as a typical secondary metabolite. During the growth phase, sucrose is converted into glucose and fructose, and by the time stationary phase is reached, large amounts of these hexoses remain and are converted to citric acid to counter iron starvation .

Citric acid is purified following removal of fungal biomass by adding lime (CaO); this precipitates calcium citrate. The latter is concentrated by filtration and treated with sulfuric acid to form a solution of citric acid and calcium sulfate (CaSO₄, a solid). Following a second filtration to remove crystals of CaSO₄, crystals of citric acid are formed by evaporation.

Vocabulary

| | |
|-----------------------------|-------------------|
| citric acid | цитринова кислота |
| mold | пліснява |
| excretion | виділення |
| key requirement | головна вимога |
| yield | виробляти |
| iron deficiency, starvation | нестача заліза |

| | |
|-----------------------|--------------------|
| overproduce | виробляти надлишок |
| scavenge | видаляти |
| stainless steel | неіржавіюча сталь |
| glass lined | обкладене склом |
| growth media (medium) | поживне середовище |
| starch | крохмаль |
| molasses | меляса |
| pathway | шлях |
| solution | розчин |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

citrate, industry, treat, phosphorus, pharmacology, microbiology, connect, require, starve, evaporate.

III. Match the synonyms.

- 1) apply, believe, receive, take out, conduct, transform, process, get in, have, diversity.
- 2) carry on, enter, use, variety, suggest, convert, treat, obtain, grow, remove,

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. Citric acid is widely used in the food industry for bread to be leavened. 2. Citric acid is also used industrially to treat certain metals. 3. Fermentation is normally considered to be connected with the cytric acid cycle. 4. In certain organisms such as *A. niger*, excretion of large amounts of citric acid can be obtained. 5. Fermentors themselves must be made of stainless steel glass lined. 6. To have purified citric acid lime was added. 7. Citricis calcium citrate is known to form a solution of citric acid and calcium sulfate (CaSO_4 , a solid). 8. Following a second filtration to remove crystals of CaSO_4 , crystals of citric acid are formed by evaporation.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. Fungal biomass ____ be removed from citric acid. 2. It was proved that the iron deficiency ____ make cells of *A. niger* overproduce citric acid. 3. It is necessary that citric acid ____ be used in pharmaceutical applications. 4. They said that the second filtration ____ remove crystals. 5. It was agreed that there ____ be a variety of starting materials. 6. It is desirable that detergents ____ contain citric acid in place of phosphates. 7. It was made sure that the culture ____ be properly aerated. 8. If large amounts of these hexoses were converted to citric acid there ____ be iron starvation.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. ____ is crucial to this fermentation to aerate the culture. 2. To make sure ____ the culture stays properly aerated the culture is placed in aerated fermentors. 3. It is by ____ method that citric acid is manufactured. 4. ____ can say that cytric acid

production is connected with the cytric acid cycle. 5. ____ is the bacteria that yeild citric acid. 6. ____ is necessary that the yield was high. 7. ____ small organisms are very productive. 8. ____ who take part in fermented foods production know the whole process of fermentation.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. Starch hydrolysates (be) starting material for citric acid production. 2.They (obtain) glucose syrup from saccharified starch now. 3. Sugarcane syrup, arcane molasses, and sugar beet molasses (prove) a good medium. 4. When the growth phase starts then sucrose (convert) into glucose and fructose. 5. Then stationary phase already (reach). 6. Large amounts of hexoses (remain). 7. Hexoses remnant (convert) to citric acid slowly. 8. With citric acid excess there (be) iron starvation later.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. Citric acid accumulating, it generates low pH. 2. The medium used for production having been treated, it will remove most of the iron. 3. Treating is known to prevent leaching of iron from the fermentor walls. 4. Calcium citrate being concentrated by filtration, it is treated with sulfuric acid. 5. Sulfuric acid.was observed to have been removed. 6. The formula of the compound being known, we can calculate the molecular weight. 7. For the substance to be colourless, it should be freshly prepared. 8. Iron and sulphur combine to form ferrous sulphide.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. Fleming identified the molds as a species of *Penicillium*. 2. Fleming named the powerful antibacterial substance which he found penicillin. 3. Later he found that penicillin was nontoxic. 4. Penicillin inhibited growth of many harmful bacteria. 5. Because the amount of penicillin obtained was small, it was enough only for experiments. 6.12 years later Florey and Chain obtained so much penicillin that they could try it clinically. 7. For his discovery of penicillin Fleming was awarded Nobel Prize. 8. Fleming shared his Nobel Prize with two other British scientists – How-and Walter Florey and Ernst Boris Chain.

X. Translate the sentences into English using the grammar of the test.

1.Як відомо, цитринова кислота широко використовується у харчовій промисловості. 2. Цитринова кислота застосовується для дріжджування хліба. 3. Деякі мікроорганізми можуть виробляти велику кількість цитринової кислоти. 4.Середовище для виробництва цитринової кислоти може бути різним, в тому числі ним може бути крохмаль. 5. Для того, щоб видалити грибкову біомасу, розчин фільтрують. 6. Оскільки стінки ферментатора прокладені склом, то залізо не надходить до середовища. 7. Якщо в середовищі створився надлишок заліза, то його будуть видаляти. 8. Для гідролізу крохмаю до сахарів до ферментаційного бульйону додається амілаза.

Variant 8

I. Read, copy and translate the following text.

Vitamins Production

Vitamins and amino acids are growth factors that are used pharmaceutically or are added to foods as supplements. Seven important vitamins and amino acids are produced commercially by biocatalytic processes. Vitamin B₁₂ and riboflavin are the most important of the vitamins.

Vitamin B₁₂ is synthesized in nature lively in the gut of the animal by intestinal microorganisms. As a coenzyme, vitamin plays an important role in animal biochemistry — in the intramolecular rearrangements in which a hydrogen atom on one carbon atom and a substituent on adjacent carbon atom exchange places. In industrial production of vitamin B₁₂, microbial strains are employed that have been specifically selected for the high yields of the vitamin. Members of the bacteria genera *Propionibacterium* and *Pseudomonas* are the commercial producers. Cobalt is a metal found in vitamin B₁₂ and yields of the vitamin are increased by addition of small amounts of cobalt in culture medium.

Riboflavin (vitamin B₂) is the parent compound of flavins, FAD and FMN, coenzymes that play important roles in enzymes involved in oxidation-reduction reactions in virtually all organisms. Riboflavin has a heterocyclic nitrogen-containing ring system coupled to a sugar group. The vitamin must be converted to a nucleotide before it becomes active. It then acts as a coenzyme, that is, in concert with an enzyme, for systems that are concerned with either oxygen, hydrogen, or electron transport. The vitamin is produced in the plant world by germinating seeds and growing shoots, and in man by intestinal bacteria.

Riboflavin is synthesized by many microorganisms, including bacteria, yeasts, and fungi. The fungus *Ashbya gossypii* naturally produces huge amounts of this vitamin. Despite this good yield, there is an economic competition between the microbiological and strictly chemical synthesis. Vitamins K (quinone), D (sterol), biotin and folic acid are other vitamins produced by intestinal bacteria.

Vocabulary

| | |
|------------------|------------------------|
| add | додавати |
| growth | ріст |
| supplement | добавка |
| source of supply | джерело постачання |
| intestines | кишки |
| substituent | замінник |
| intramolecular | внутрішньомолекулярний |
| adjacent | що прилягає |

| | |
|-----------------|------------------|
| exchange places | мінятися місцями |
| strain | штам культури |
| employ | застосовувати |
| yeasts | дріжджі |
| fungi | грибки |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

biocatalist, synthesis, intestine, molecule, enzyme, substitute, reduce, nucleus, nature, economy.

III. Match the synonyms.

- 1) rise, employ, crop, attach, manufacture, additive, quantity, choose, kind, surrounding.
- 2) join, genera, use, increase, yield, environment, produce, select, supplement, amount.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. It is necessary to take vitamins. 2. Vitamins are known to be nutrients. 3. To produce vitamins commercially members of the bacteria genera *Propionibacterium* and *Pseudomonas* are used. 4. Riboflavin must be converted to a nucleotide before it becomes active commercial producer. 5. Riboflavin is known to act as a coenzyme. 6. To act as a coenzyme means to act in concert with an enzyme. 7. To increase the yield of vitamin B₁₂ small amounts of cobalt are added in culture medium. 8. The microorganisms to produce riboflavin naturally is the fungus *Ashbya gossypii*.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. _____ people consume food without vitamins they would die. 2. Vitamins _____ be added to foods as supplements. 3. It is necessary that everyone _____ understand the importance of plant food. 4. Even in ancient times people understood that they _____ be stronger with fruits and vegetables. 5. The doctors advise us that we _____ take vitamins. 6. The doctor said that he _____ prescribe me polyvitamins. 7. If our body could synthesize all vitamins we _____ not need them as food additives. 8. Vitamin B₁₂ and riboflavin _____ be pointed out as the most important of vitamins.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. Vitamins and amino acids are growth factors. _____ are used pharmaceutically or are added to foods as supplements. 2. _____ can tell that plants were the first food of a man. 3. Riboflavin (vitamin B₂) is the parent compound of flavins _____ play important roles in metabolism. 4. _____ became plain to the scientists long ago that carbohydrates, proteins, and fats are not the only food constituents. 5. _____ must know the main constituents of food. 6. _____ vitamins are

produced that can not be produced by the body. 7. Many microorganisms produce vitamins and ____ are selected for productivity. 8. ____ has always been important to take vitamins against all diseases.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. Seven important vitamins and amino acids now (produce) commercially by biocatalytic processes. 2. Vitamin B₁₂ and riboflavin (be) the most important of vitamins. 3. Microbial strains specifically always (select) for the high yields of the vitamins. 4. Vitamin B₁₂ (synthesize) in nature lively by intestinal microorganisms. 5. You (find) bacteria in the guts of the animals. 6. As a coenzyme, vitamin (play) an important role in animal biochemistry in the intramolecular rearrangements. 7. Those who (live) on fruits and vegetables all their life had never suffered from vitamins deficiency. 8. You (be) healthier if you have diet rich in vitamins.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. Cobalt having been found in vitamin B₁₂, yields of the vitamin are increased by addition of small amounts of cobalt to culture medium. 2. Riboflavin (vitamin B₂) is known to be the parent compound of flavins. 3. Coenzymes FAD and FMN playing important roles in enzymes, the latter are involved in oxidation-reduction reactions. 4. Riboflavin is found to have a heterocyclic nitrogen-containing ring system coupled to a sugar group. 5. For a vitamin to become active it must be converted to a nucleotide. 6. They know it to act as a coenzyme for systems that are concerned with either oxygen, hydrogen, or electron transport. 7. Riboflavin being synthesized by many microorganisms, the fungus *Ashbya gossypii* naturally produces huge amounts of this vitamin. 8. It is observed to give good yield.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. Since food industry makes use of bacteria, bacteria are produced industrially. 2. Both bacteria and fungi are used in vitamins manufacture. 3. Despite a good yield, there is an economic competition between the microbiological and strictly chemical synthesis. 4. Vitamins K (quinone), D (sterol), biotin and folic acid are produced by intestinal bacteria. 5. Bacteria must be isolated as well as purified. 6. Though molds contaminate food, many drugs are produced from them. 7. The investigation was long, however it resulted in discovery. 8. One method is as good as another.

X. Translate the sentences into English using the grammar of the test.

1. Вважають, що вітаміни необхідні в харчуванні. 2. Відбираються найбільш продуктивні штами бактерій, *Propionibacterium* and *Pseudomonas* використовуються у промисловості. 3. Для того, щоб бактерії збільшили вихід вітаміну B₁₂, до середовища культури додають кобальт. 4. Хоча рибофлавін отримують в достатній кількості, існує конкуренція між мікробіологічним та синтетичним синтезом. 5. Необхідно використовувати найбільш продуктивні

штами мікроорганізмів. 6. Слід розрізняти вітаміни, розчинні у воді і вітаміни, розчинні в оліях. 7. Якщо рибофлавін перетворили на нуклеотид до того, як він став активним, тоді він буде діяти як коензим. 8. Відомо, що вітаміни К та D також виробляються кишковими бактеріями.

Variant 9

I. Read, copy and translate the following text.

Amino Acids Manufacture

Amino acids are needed to fabricate the multitude of proteins required for an active and healthy human organism. Amino acids have extensive uses in the food industry, as food additives, in medicine, and as starting materials in the chemical industry. 8 essential amino acids out of a total of 20 are used. All but lysine and threonine are used in the transamination processes.

The most important commercial amino acid is glutamic acid, which is used as a flavor enhancer monosodium glutamate (MSG). Two other important amino acids, aspartic acid and phenylalanine, are the ingredients of the artificial sweetener aspartame, a non-nutritive sweetener of diet soft drinks and other foods sold as low-calorie or sugar-free products. Aspartame is a dipeptide of aspartate and the methyl ester of phenylalanine. Lysine, an essential amino acid for humans and certain farm animals, is commercially produced by the bacterium *Brevibacterium flavum* for use as a food additive.

Because amino acids are used by microorganisms as building blocks of enzymes and other proteins, strict cellular regulation of their production generally occurs. The production of lysine in *Brevibacterium flavum* is biochemically controlled at the level of the enzyme aspartokinase; excess lysine feedback inhibits activity of this enzyme. However, overproduction of lysine can be obtained by isolating mutants of *B. flavum* in which aspartokinase is no longer subject to feedback inhibition. This is done by isolating mutants resistant to the lysine analog S-aminoethylcysteine (AEC), which binds to the allosteric site of aspartokinase and shuts down activity of the enzyme. AEC-resistant mutants, which are easily obtained by positive selection, produce a modified form of aspartokinase with an allosteric site that no longer recognizes AEC or lysine, and thus feedback inhibition by lysine is greatly reduced. Such mutants of *B. flavum* can produce over 60 g of lysine per liter in industrial fermentors, a concentration sufficiently high to make the process commercially viable.

Vocabulary

| | |
|-----------------------|-------------------------|
| extensive use | широке вживання |
| essential amino acids | незамінні амінокислоти |
| in short supply | в недостатній кількості |
| flavour enhancer | підсилювач смаку |
| sweetener | підсолоджувач |
| food additive | харчова добавка |
| non-nutritional | нехарчовий |

| | |
|---------------------|-------------------------------|
| enzyme | фермент |
| obtain | отримувати |
| occur | зустрічатися |
| feedback inhibition | обмеження зворотнього зв'язку |
| reduce | зменшувати |
| commercially viable | комерційно вигідний |
| site | ділянка, центр |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

health, amine, enhance, art, sweeten, nutrition, calory, essence, act, product.

II. Match the synonyms.

1) supplement, employ, catalyst, nonalcohol, component, aroma, reduce, receive, separate, link.

2) additive, engage, enzyme, soft, part, flavour, sorten, obtain, select, join.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. Amino acids are needed to fabricate proteins. 2. Proteins are known to be the building blocks of our body. 3. Overproduction of lysine can be obtained by isolating mutants of *B. flavum*. 4. To isolate mutants of *B. flavum* they isolate mutants resistant to the lysine analog S-aminoethylcysteine (AEC). 5. Such mutants of *B. flavum* can produce over 60 g of lysine per liter in industrial fermentors. 6. Glutamic acid is used to enhance flavor. 7. It is necessary to consume 8 essential amino acids. 8. The bacterium to use for commercial production of lysine is *Brevibacterium flavum*.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. Then feedback inhibition by lysine ____ be greatly reduced. 2. As mutants of *B. flavum* can produce over 60 g of lysine per liter in industrial fermentors, it is possible that they ____ be produced commercially. 3. It was agreed that glutamic acid ____ be used as a flavor enhancer. 4. The production of lysine in *Brevibacterium flavum* ____ be biochemically controlled at the level of the enzyme aspartokinase. 5. If all amino acids were produced in the body, there ____ be no need to produce them commercially. 6. It was decided that the production of amino acids ____ be increased. 7. It is necessary that amino acids ____ be supplied from food. 8. ____ mutants resistant to the lysine analog binds to the allosteric site of aspartokinase it ____ shut down activity of the enzyme.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. ____ known that amino acids are found in food. 2. The most important commercial amino acid is glutamic acid. ____ is used as a flavor enhancer monosodium glutamate (MSG). 3. Aspartokinase is no longer subject to feedback inhibition. ____ is done by isolating mutants resistant to the lysine analog S-aminoethylcysteine (AEC).

4. ____ binds to the aliosteric site of aspartokinase. 5. ____ also shuts down activity of the enzyme. 6. ____ can be easily obtained by positive selection. 7. AEC-resistant mutants produce a modified form of aspartokinase with an aliosteric site ____ no longer recognizes AEC *or* lysine. 8. ____ of the amino acids – lysin is an essential amino acid for humans.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. Proteins always (require) for an active and healthy human organism. 2. Proteins (be) the building blocks of the human body and their structure (be) known long ago. 3. Amino acids (have) extensive uses in the food industry in the past century. 4. Amino acids deficit today (lead) to the body disfuntions tomorrow. 5. All but lysine and threonine (use) now in the transamination processes. 6. Strict cellular regulation of their production (occur). 7. Excess lysine feedback (inhibit) activity of this enzyme. 8. There (be) no amino acids deficite in diet if we prefere plant food.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. Amino acids having extensive uses in the food industry, they are produced commercially. 2. There existing 20 essential amino acids, 8 out of are used. 3. Food products are known to contain amino acids. 4. The most important commercial amino acid being glutamic acid, it is used as a flavor enhancer monosodium glutamate (MSG). 5. Aspartic acid and phenylalanine are found to be the ingredients of the artificial sweetener aspartame. 6. They know aspartame to be a non-nutritive sweetener of diet soft drinks. 7. Soft drinks and other foods with aspartame are known to be sold as low-calorie or sugar-free products. 8. Aspartame being a dipeptide of aspartate, it is also the methyl ester of phenylalanine.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. Amino acida are used as food additives, as well as in medicine. 2. Amino acida are also used as starting materials in the chemical industry. 3. Lysine is an essential amino acid for humans and certain farm animals. 4. It is commercially produced by the bacterium *Brevibacterium flavum*. 5. Lysine is *produced* for use as a food additive aspartokinase with an aliosteric site that no longer recognizes AEC *or* lysine. 6. Thus feedback inhibition by lysine is greatly reduced. 7. Such mutants of *B. flavum* can produce over 60 g of lysine per liter in industrial fermentors. 8. This concentration is sufficiently high to make the process commercially viable.

X. Translate the sentences into English using the grammar of the test.

1. Амінокислоти потрібні для вироблення протеїнів. 2. Як відомо, амінокислоти знаходяться в усякій їжі. 3. Хоча їснує 20 амінокислот, тільки 8 з них застосовується в промисловості. 4. Глутамінова кислота є одною з найважливіших, і вона застосовується як підсилювач смаку. 5. Для того, щоб бактерії були комерційно вигідні, вони повинні утворювати велику кількість амінокислоти. 6. Необхідно виробляти амінокислоти для медицини та хімічної

промисловості. 7. Оскільки багато людей потребують низькокалорійних продуктів без цукру, виробляється штучний підсолоджувач аспартам. 8. Було визначено, що, ізолюючи мутант *B. flavum*, отримують надлишок глютамінової кислоти.

Variant 10

I. Read, copy and translate the following text.

Microbial Polysaccharides

Polysaccharides of microorganisms occur as intracellular-storage amylosaccharides. They are lipid-associated substances in conjunction with cytoplasmic membranes, structural glycans that impart rigidity to cell walls, both discrete and diffuse capsular slimes that remain attached to the cells, and extracellular products in the media. Only the capsular and extracellular (exo-) polysaccharides can be produced in sufficiently high yields to merit commercial interest.

Xanthan gum, the extracellular polysaccharide of *Xantomonas campestris* B-1459 was the first biosynthetic product of a fermentation based on corn sugar that attained commercial interest due to the sufficient yield. Xanthan gum was approved by FDA for use as a food additive.

Dextrans are α -D-glucans in which (1 \rightarrow 6) linkages predominate, ie, 50% or more of the α -D-glucopyranosyl residues are linked as such. Dextrans are produced from sucrose by bacteria belonging to the genera *Leuconostoc*, *Streptococcus*, and *Lactobacillus*, all of which are in the family *Lactobacillaceae*. The majority of known dextrans is formed by strains of *Leuconostoc mesenteroides*. Because they interfere in the production of sucrose, dextrans were the first extracellular microbial polysaccharides to be investigated. Aside from impeding the filtration and handling of cane and beet-sugar juices, dextran causes sucrose to crystallize in the form of impure, elongated needles.

In industrial production of dextran, the extracellular enzyme dextransucrase is used. Initially, dextransucrase is produced. After adjustment of culture pH and removal of cells, the culture fluid is distributed into vessels containing sugar solutions (and, perhaps, low molecular weight dextran primers) where the polymerization reaction takes place. There is the possibility of recovering the coproduct D-fructose, which otherwise would be consumed by the cells metabolically with production of lactic acid.

Vocabulary

| | |
|-----------------|-------------------|
| impart rigidity | надавати міцності |
| intracellular | міжклітковий |
| capsular slime | капсулярна слизь |
| sufficiently | досить |
| impede | прискорювати |
| cause | спричиняти |
| attach | приєднувати |

| | |
|---------------|---------------|
| predominate | переважати |
| strain | штам культури |
| investigate | досліджувати |
| impure needle | нечиста голка |
| adjustment | регулювання |
| primer | затравка |
| vessel | місткість |

II. Find in the text the derivatives of the following words. Define these parts of speech and translate them into Ukrainian.

saccharide, cell, cytoplasm, rigid, major, interference, filter, crystal, adjust, solute.

III. Match the synonyms.

1) bacteria, environment, happen, quantity, contribute, connect, attract, supplement, species, enhance.

2) microorganism, occur, bring in, attach, yield, draw, media, additive, kind, stimulate.

IV. Copy and translate the following sentences. Define the form and function of the Infinitive.

1. Physical, chemical, and enzymatic means are required to free the capsular types from cells. 2. These types generally have not been considered to be of industrial importance. 3. Only the capsular and extracellular (exo-) polysaccharides can be produced in sufficiently high yields. 4. Otherwise they can not merit commercial interest. 5. Xanthan gum was the first biosynthetic product of fermentation to attain commercial interest. 6. Dextrans were found to interfere in the production of sucrose. 7. Dextrans were the first extracellular microbial polysaccharides to be investigated. 8. It is necessary to produce polysaccharides in sufficiently high yields.

V. Copy the following sentences using the verbs should, would and translate them into Ukrainian.

1. If another strain had been used much more product ____ have been obtained. 2. Otherwise the coproduct D-fructose ____ be consumed by the cells metabolically with concomitant production of lactic acid. 3. It is necessary that production ____ be profitable. 4. ____ culture pH be adjusted the cells are removed. 5. It was found that the strains of *Leuconostoc mesenteroides* ____ interfere in the production of sucrose. 6. It is important that polymerization ____ take place. 7. The coproduct D-fructose ____ be recovered. 8. It was approved by FDA that Xanthan gum ____ be used as a food additive.

VI. Fill in the gaps with the relative pronouns it, this, that, these, those, one. Copy and translate the sentences into Ukrainian.

1. ____ is structural glycans that impart rigidity to cell walls. 2. Structural glycans are both discrete and diffuse capsular slimes ____ remain attached to the

cells. 3. ____ substances include extracellular products in the media. 4. ____ can say that the reaction is biochemical. 5. ____ types were considered too expensive. 6. Dextran is ____ of the less expensive synthetic polysaccharides. 7. ____ dextrans are lipid-associated substances is a proved fact. 8. *Streptococcus*, *Lactobacillus*, *Leuconostoc mesenteroides* are ____ bacteria that produce dextran.

VII. Put the verbs in brackets in the correct tense form. Write down and translate the sentences.

1. These types generally (consider) for industrial production. 2. Xanthan gum (be) the extracellular polysaccharide of *Xantomonas campestris* B-1459. 3. Xanthan gum (be) the first biosynthetic product of fermentation based on corn sugar. 4. There already (be) the possibility of recovering the coproduct D-fructose. 5. The polymerization reaction (take) place in vessels containing sugar solutions. 6. Dextran (handle) cane and beet-sugar juices. 7. Low molecular weight dextran primers (be) the media for the culture. 8. Biochemical reactions always (provide) industry with necessary products.

VIII. Copy and translate the following sentences. Define the infinitival and participial complexes.

1. We know this substance to have high biological activity. 2. To obtain a broader-spectrum antibiotic synthesis was used. 3. For rifamycin O to give quinonimine derivatives it should react with a variety of aromatic amines. 4. The drug having been tested, it was used in medical practice. 5. In industrial production of dextran the extracellular enzyme dextransucrase is known to be used. 6. Dextransucrase is produced, this being the first stage in dextran production. 7. Culture pH having been adjusted, cells are removed. 8. For the polymerization reaction to take place the culture fluid is distributed into vessels with sugar solution.

IX. Copy and translate the sentences paying attention to the introductory and connective words.

1. Because physical, chemical, and enzymatic means are required to free the capsular types from cells, they are not produced industrially. 2. Due to the sufficient yield dextran was manufactured. 3. Aside from impeding the filtration, dextran causes sucrose to crystallize in the form of impure, elongated needles. 4. After adjustment of culture pH and removal of cells, the culture fluid is distributed into vessels containing sugar solutions. 5. Chemically, dextrans are α -D-glucans in which (1 \rightarrow 6) linkages predominate. 6. Since dextran is impeding the filtration and handling of cane and beet-sugar juices, it is important for sugar industry. 7. Polysaccharides of microorganisms occur as intracellular-storage amylosaccharides. 8. They are both discrete and diffuse capsular slimes that remain attached to the cells.

X. Translate the sentences into English using the grammar of the test.

Мікробні полісахариди відомі як ліпідоподібні речовини. 2. Було доведено, що вони будуть вироблятися в достатній кількості. 3. Ксантанова смола була першим продуктом мікробного синтезу, який привернув увагу. 4. Відомо, що ксантанова смола була погоджена FDA як харчова добавка.

5. Декстрини виробляються різними бактеріями, при цьому більшість їх утворюється штамами *Leuconostoc mesenteroides*. 6. Після того, як культура пристосувалася, клітини видаляються. 7. Ко-продукт фруктози слід відновлювати для того, щоб він не споживався клітинами метаболічно. 8. Для того, щоб полімеризація проходила, культурна рідина розподіляється по місткостях з розчином цукру.

TEST N 4

Variant 1

I. Read, copy and translate the following text.

Biotechnology Achievements

Biotechnology is known to be the science devoted to developing and improving those industrial and agricultural processes that make use of biological systems. The techniques used involve the selective breeding of plants, animals, and microorganisms, and the transfer of specific genes from one species to another. Biotechnology uses methods of chemistry and molecular biology. Although the field of biotechnology includes areas as diverse as food processing, waste disposal, and mining, some of its most significant contributions have been in food drugs production. Many processes associated with biotechnology center around the use of recombinant DNA.

Food production involves the quantity and quality of food produced. For example, when cells from the beetle repelling variety of potatoes from the Andes Mountains are grown in tissue culture along with cells from commercial potato plants, the cells from the two types of plants fuse and recreate in plants. In the case of animals, both the quantity and the uniform quality of the product (milk, meat, wool, and so forth) is important. The cells of an embryo are derived from a fertilized egg by mitotic cell k.D. division to produce genetically identical cells. Injecting each cell into a separate egg-forming cell (oocyte) with the nucleus removed will have produced the "genetically identical" fertilized eggs. Implantation of these embryos into the foster mothers will then produce "genetically identical" sheep, cattle, pigs, goats, for example.

A tremendous advance in medical treatment was achieved with the development of the technique for inserting and deleting specific genes in various organisms. In this fashion, human insulin, growth hormone, tissue plasminogen activator (TPA), vaccines against infectious diseases were produced.

With the advent of genetic engineering, research has concentrated on identifying those surface proteins (immunogenic proteins) that stimulate the immune reaction and transferring the genes of the immunogenic proteins into a harmless bacterium or virus. In this way vaccines from hepatitis B virus, herpes simplex virus, influenza virus, AIDS were developed.

Vocabulary

| | |
|-----------------------|--------------------|
| aim | мета, націлювати |
| improve | поліпшувати |
| develop | розвивати |
| plant breeding | вирощування рослин |
| treatment, processing | обробка, лікування |

| | |
|-----------------|-----------------------|
| waste disposal | використання відходів |
| diverse areas | різноманітні галузі |
| transfer | переносити |
| advance, advent | прогрес |
| surface | поверхня |
| harmless | нешкідливий |
| protect | захищати |
| disease | захворювання |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) microorganism, treat, drug, advance, science.
- 2) knowledge arranged in an orderly manner, especially knowledge obtained by observation and testing of facts; substance used for medical purposes either alone or in a mixture; tiny little creatures that can be seen only with the help of a microscope; give medical or surgical care to, put through a process; forward movement, progress.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. Having developed and improved industrial and agricultural processes made biotechnology a necessary science. 2. The techniques used involve the selective breeding of plants, animals, and microorganisms. 3. Having transferred specific genes from one species to another allowed to obtain productive breeds. 4. Transferring genes is a prospective biotechnology. 5. By using complex methods people change nature. 6. Each cell being injected into a separate egg-forming cell (oocyte) with the nucleus removed will have produced the "genetically identical" fertilized eggs. 7. Embryos being implanted into the foster mothers will then produce "genetically identical" sheep, cattle, pigs, goats. 8. A tremendous advance in medical treatment was achieved with the development of the technique for inserting and deleting specific genes.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. To have used biological systems made possible radical changes in methods. 2. Biotechnological methods are used to produce food and drugs. 3. With the advent of genetic engineering, research was carried out to identify surface proteins. 4. Surface proteins are known to stimulate the immune reaction. 5. To transfer the genes of the immunogenic proteins into a harmless bacterium or virus develop immunogenic substances. 6. Immunogenic proteins are known to be used in drugs. 7. To repel beetles is a problem in agriculture. 8. The cells of an embryo are derived from a fertilized egg by mitotic cell k.D. division to produce genetically identical cells.

VI. Copy and translate the conditional sentences.

1. If the scientists didn't develop gene technology, they wouldn't obtain so many necessary substances. 2. Should the modified foods prove unhealthy, they

would not be produced. 3. If they had developed a reliable anti-AIDS vaccin, they would have saved many lives. 4. It is necessary that we should obtain a sufficient quantity and quality of food products. 5. If it were not for biotechnology, we coludn't enlarge so the variety of foodstuffs. 6. It is likely that the medicines against all diseases should be produced by biotechnological methods. 7. If people knew how to produce a universal drug, it would have been developed. 8. If the experiments were safe, they would be made on people.

VII. Copy the sentences. Ask questions to the words in bold.

1. Biotechnology uses methods **of chemistry and molecular biology**.
 2. The field of biotechnology includes **areas as diverse as food processing, waste disposal, and mining**. 3. Some of its most significant contributions have been **in food and drugs production**. 4. Many processes associated with biotechnology **center around** the use of recombinant DNA. 5. In this fashion, **human insulin, growth hormone, tissue plasminogen activator (TPA), vaccines against infectious diseases** were produced. 6. Vaccines from hepatitis B virus, herpes simplex virus, influenza virus **were developed**. 7. The anti-AIDS vaccins **will be developed**. 8. Biotechnology **is contributing** much to health protection.

VIII. Transform the sentences into the participial and infinitival complexes. Write down and translate the transforms.

1. We know that biotechnology is devoted to developing and improving industrial and agricultural processes. 2. We can see that biotechnology has contributed to all branches of industry. 3. For example, when cells from the beetle repelling variety of potatoes from the Andes Mountains are grown in tissue culture along with cells from commercial potato plants, the cells from the two types of plants fuse and recreate in plants. 4. They consider that both the quantity and the uniform quality of the product (milk, meat, wool, and so forth) is important 5. The cells of an embryo are derived from a fertilized egg by mitotic cell k.D. division so that they should produce genetically identical cells. 6. When each cell is injected into a separate egg-forming cell with the nucleus removed the "genetically identical" fertilized eggs will have been produced. 7. When these embryos are implantated into the foster mothers "genetically identical" sheep, cattle, pigs, goats will be produced. 8. We believe that genetics is a prospective science.

IX. Copy and translate the following sentences using the missing connective words.

1. ____ my future speciality I will be a biotechnologist. 2. We study ____ organic and inorganic chemistry, biochemistry, molecular chemistry, and genetic engineering ____ the course ____ studies. 3. The field of biotechnology includes areas ____ diverse ____ food processing, waste disposal, and mining. 4. It involves the selective breeding ____ plants, animals and microorganisms. 5. It's task is obtaining microorganisms ____ products ____ their life activity. 6. Biotechnological methods involve the transfer of specific genes ____ one species ____ another. 6. Biotechnologists have made a great contribution ____ food production and

medicine. 7. I like my future speciality ____ it is useful ____ me and society.
8. ____ my studies I will be able to work ____ any food or pharmaceutical
enterprise.

X. Translate the sentences into English using the grammar of the test.

1. Як відомо, біотехнологія розвиває та поліпшує промислові та сільськогосподарські процеси. 2. Біотехнологія включає вирощування клітин рослин, тварин, мікроорганізмів та генну техніку. 3. Якби вакцини проти вірусів грипу, гепатиту, герпесу не були розроблені, лікарі не могли б спасати хворих. 4. Великі досягнення у медицині пов'язані із введенням та видаленням специфічних генів у різних організмах. 5. Коли гени імуногенних протеїнів переносять у нешкідливу бактерію, отримують вакцини проти захворювань. 6. Якби не біотехнологія, ми б не мали такого широкого асортименту товарів. 7. Необхідно, щоб люди мали безпечну їжу. 8. Сьогодні дослідження зосереджені на вивченні поверхневих протеїнів.

Variant 2

I. Read, copy and translate the following text.

In Vivo Genetic Engineering

Genetic engineering usually implies deliberate manipulation of genes of various organisms, procaryotic or eucaryotic, in order to achieve useful products of metabolism or to cause a permanent hereditary change in the organism. Although the techniques for engineering the genetic make-up of higher eucaryotes have not been developed very well, those for lower eucaryotes (eg, yeast (qv)) and procaryotes have been developed to an extent by which foreign DNA from any source can be introduced and stably maintained in bacteria such as *Escherichia coli*.

Two techniques usually are employed for manipulating the genes of microorganisms: *in vivo* genetic engineering in which the changes in genetic constitution are brought about in cells by processes analogous to those occurring in nature; and *in vitro* recombinant-DNA techniques in which foreign genes from entirely different sources can be ligated with stably replicating plasmid (or phage) DNA and introduced within the cells.

In vivo genetic engineering may involve simple mutational alteration of transfer of the genetic material leading to an enhanced yield of the product or an improvement in the quality of the product. Such techniques have led to the isolation of mutant *Actinomyces* or bacterial strains capable of producing antibiotics (qv), vitamins (qv), or amino acids (qv) in high yield. Another widely used technique employs plasmid transfer between different bacterial species or genera. Thus, entirely new genetic functions can be transferred from the chromosome of one bacterial genus to different genera in the form of plasmids.

In addition to plasmid-mediated transfer of chromosomal genes from one bacterium to another, plasmids themselves may specify functions that can be used for construction of novel strains. Eg, nitrogen fixation (qv), have been constructed

that allow the transfer of nitrogen fixation genes to root nodules and other bacteria.

Vocabulary

| | |
|---------------------|---------------------------|
| genetic engineering | генна техніка |
| deliberate | вільний |
| hereditary change | зміна спадковості |
| foreign gene | ген — донор |
| bacterial strain | штам бактерії |
| stably maintain | постійно підтримувати |
| employ | використовувати |
| <i>in vivo</i> | в природі |
| <i>in vitro</i> | в лабораторії |
| ligated with | пов'язаний з |
| alteration | зміна |
| facilitate | полегшувати |
| enhance yield | збільшити вихід |
| transfer | перенос |
| root nodules | клубеньки, вузлики кореня |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

1) *in vivo*, gene, mutational, *in vitro*, phagocyte.

2) one of the factors controlling heredity; occurring in nature; recombinant-DNA techniques in which foreign genes are used; a virus that infects cells of two or more identical linear acid molecules in tandem; causing hereditary change in the base sequence of the nucleic acid in the genome of an organism.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. Genes being manipulated allows to obtain different new properties of food products. 2. Hereditary changes in the organism having been caused yielded new species. 3. The techniques for engineering the genetic make-up of higher eucaryotes have not been developed very well. 4. Two techniques usually are employed for manipulating the genes of microorganisms: *in vivo* genetic engineering and *in vitro* recombinant-DNA techniques. 5. *In vivo* genetic engineering deals with changing genetic constitution in cells by processes analogous natural. 6. *In vitro* recombinant-DNA techniques involves ligating foreign genes from entirely different sources with stably replicating plasmid (or phage) DNA. 7. Foreign genes having been introduced within the cells changed the cells' genetic code. 8. They achieved the result after having employed the recombinant DNC technology.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. Genetic engineering implies deliberate manipulation of genes of various organisms, in order to achieve useful products of metabolism. 2. To have caused permanent hereditary changes in the organisms required genetic technology.

3. *In vivo* genetic engineering may be simply aimed to transfer the genetic material. 4. To enhance yield of the product or to improve the quality of the product they also use gene technique. 5. To have isolated mutant *Actinomyces* or bacterial strains made possible producing antibiotics (qv), vitamins (qv), or amino acids (qv) in high yield. 6. Another widely used technique aims to transfer plasmid between different bacterial species or genera. 7. Considerable progress is also being made to introduce nitrogen fixation and other desirable characteristics. 8. To be opening new horizons in human treatment and nutrition makes biotechnology a leading science.

VI. Copy and translate the conditional sentences.

1. If it were not for restrictions, there could be more experiments. 2. Should natural food have sufficed, there would have been no need in genetics. 3. If the results are positive, the idea will be proved. 4. If we could live on plant food only, we would have less problems with nutrition. 5. Should the genetically modified food have been forbidden, they would not have produced it. 6. It was necessary that gene technology should be developed. 7. If genetic food was not safe, it would be restricted. 8. It is possible that biotechnology should cure all diseases.

VII. Copy the sentences. Ask questions to the words in bold.

1. Foreign DNA from any source **can be introduced**. 2. Foreign DNA is stably maintained **in bacteria** such as *Escherichia coli*. 3. **Wide host-range plasmids** are harboring chromosomal genes. 4. Genes will be encoding useful functions, **eg, nitrogen fixation (qv)**. 5. Genes **have been constructed** that allow the transfer of nitrogen fixation genes. 6. Two techniques: ***in vivo* and *in vitro*** **complete** each other. 7. Gene technique **produces** hereditary changes in the body. 8. Altering the properties of the substances genetic engineering changes **nature**.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. Although the techniques for engineering the genetic make-up of higher eucaryotes have not been developed very well, those for lower eucaryotes and procaryotes have been developed. 2. It is considered that hereditary changes in animals and plants are unsafe. 3. People think that they lead to functional and mental disorders. 4. Scientists are of different opinions, and the research continue. 5. It is important that we should know the results. 6. Enzymes are the products of bacterial metabolism, both milk and alcohol drinks are based on it. 7. It is proved that genetically modified meats have enlarged cells. 8. People make the modified products so that they could improve their health.

IX. Copy and translate the following sentences using the missing connective words:

1. New plant properties are developed, _____ resistance against harmful pests or plant viruses, to the plants themselves. 2. _____, entirely new genetic functions can be transferred from the chromosome of one bacterial genus to different genera in the form of plasmids. 3. _____ plasmid-mediated transfer of chromosomal genes from one bacterium to another, plasmids themselves may specify functions.

4. Plasmids have different functions ____ can be used for construction of novel strains. 5. Considerable progress is being made ____ the aim to introduce desirable characteristics nitrogen fixation. 6. Other innovations are thought to be made ____ human well being. 7. Resistance against harmful pests ____ plant viruses is introduced into the plants themselves. 8. ____ there are difficulties in gene manipulation there is much success.

X. Translate the sentences into English using the grammar of the test.

1. Відомо, що генна техніка пов'язана з генетикою. 2. Вона застосовується для виробництва модифікованих продуктів харчування та ліків. 3. Хоча генна техніка недостатньо розроблена для вищих еукаріотів, вона достатньо розроблена для нижчих еукаріотів. 4. Маніпулювання генами мікроорганізмів можливе двома методами: *in vivo* та *in vitro*. 5. Перенос генів може призводити до підвищення якості та кількості продуктів. 6. Генна техніка буває необхідна для того, щоб викликати спадкові зміни в організмі. 7. Якби не генетика, не було б таких корисних ліків. 8. Необхідно, щоб генетичні дослідження продовжувалися.

Variant 3

I. Read, copy and translate the following text.

***In Vitro* Recombinant-DNA Technology**

The *in vitro* recombinant-DNA technique may involve production of entirely new substances (eg, substances of animal origin) in microorganisms and, therefore, may involve both qualitative and quantitative changes. *In vitro* recombinant-DNA technology is also known as molecular cloning or gene cloning. In its most widely used and simplest form, the technique allows the incorporation of any segment of a foreign DNA, procaryotic or eucaryotic, into a piece of phage or bacterial plasmid DNA and the recombinant-DNA segment then is reintroduced into the bacterial cell by transfection or transformation. Since the vector is the phage or bacterial plasmid DNA, it is not restricted within the cell and the foreign DNA segment replicates stably as part of the bacterial vector DNA.

The procedures used in combining a recombinant-DNA molecule *in vitro*, is using a plasmid as vector. The first step is to isolate and purify the desired phage or plasmid DNA to be used as a vector. Once the vector and foreign DNA are available, the DNA segments are cut in areas that should not interfere with the biological activities of the gene(s) to be cloned or of the replication, maintenance, or selectable characteristics of the vector. The specifically cut DNA fragments are mixed and joined using the enzyme DNA ligase. The recombinant molecules thus generated are introduced into the bacterial host cells. Several methods have been developed to facilitate scoring of transformants with a foreign DNA insert: insertional inactivation, direct scoring, indirect selection, radioactive RNA probes, and *in situ* immunoprecipitation reactions.

Industrial applications of *in vitro* genetic engineering include expression of

eucaryotic genes and production of eucaryotic proteins in bacteria; bacterial production of somatostatin; bacterial production of rat and human insulin; and bacterial production of interferon, human growth hormone, and vaccines against viruses such as hepatitis B and foot and mouth disease virus.

Vocabulary

| | |
|---------------------|-----------------------------|
| reintroduce | ЗНОВ ВВОДИТИ |
| restrict | обмежувати |
| replicate stably | стабільно копіювати |
| junction, join | з'єднання |
| purify | очищати |
| subsequent | наступний |
| desired phage | потрібний фаг |
| be available | бути в наявності, доступним |
| interfere with | втручатися у |
| maintenance | підтримка |
| selectable | вибрані |
| host cell | клітина — хазяїн |
| foreign, alien cell | клітина — донор |
| score | помічати, рахувати |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) cloning, reintroduce, interferon, replicate, qualitative.
- 2) changes in quality; make a copy; *in vitro* recombinant-DNA technology; introduce again; biologically functional protein.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. The *in vitro* recombinant-DNA technique being developed involves producing entirely new substances in microorganisms. 2. It may involve changing substances both qualitatively and quantitatively. 3. *In vitro* recombinant-DNA technology is also known as molecular cloning or gene cloning. 4. The technique is performed by incorporating any segment of a foreign DNA into a piece of phage or bacterial plasmid DNA. 5. By having reintroduced the recombinant-DNA segment into the bacterial cell by transfection or transformation gene cloning is made. 6. The foreign DNA segment replicating is possible as part of the bacterial vector DNA. 7. Scoring transformants with a foreign DNA insert is facilitated by several methods. 8. Insertional inactivation, direct scoring, indirect selection, and *in situ* immunoprecipitation reactions are cloning methods.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. The first step is to isolate and purify the desired phage or plasmid DNA to be used as a vector. 2. Genes information to be transferred defines the specific activity and other properties of the ferments. 3. Several methods have already

been developed in order to score transformants with a foreign DNA insert.

4. Genetic engineering is known to have always attracted public attention. 5. To have developed methods to restore human tissues allowed to cure burns. 6. They have developed materials to apply in bones reparation. 7. The characteristics to improve is human immunity. 8. To have been produced by cloning makes Sheep Dolly an unusual animal.

VI. Copy and translate the conditional sentences.

1. If people are to choose between modified and non-modified food, many of them will prefer the latter. 2. Should the genetic technique have not been so complex, we would have had cheaper genetically modified products. 3. If it were not for industrial applications of *in vitro* genetic engineering, we couldn't use such medicines as human growth hormone. 4. It is necessary that genetic experiments should be regulated. 5. Should human immunity be improved, people wouldn't fall ill with numerous infectious diseases. 6. People might have applied genetic technique to extinct species. 7. Rare animals and birds could be multiplied. 8. It is required that genetically modified food should be restricted.

VII. Copy the sentences. Ask questions to the words in bold.

1. The replication, maintenance, or selectable characteristics of the vector **should not be interfered with**. 2. The specifically cut DNA fragments were mixed and joined **using the enzyme DNA ligase**. 3. The recombinant molecules thus generated will be introduced **into the bacterial host cells**. 4. Among the methods of scoring of transformants with a foreign DNA insert are **insertional inactivation; direct scoring; indirect selection**, etc. 5. The recombinant-DNA segment **is reintroduced** into the bacterial cell by transfection or transformation. 6. They are using **the enzyme DNA ligase**. 7. **There are** different methods for producing these materials. 8. Cloning **will change** human heredity.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. The *in vitro* recombinant-DNA technique may involve production of entirely new substances in microorganisms and, therefore, may involve both qualitative and quantitative changes. 2. *In vitro* recombinant-DNA is most widely used, this technique allows the incorporation of any segment of a foreign DNA into a piece of phage or bacterial plasmid DNA. 3. It is known that the recombinant-DNA segments are reintroduced into the bacterial cell by transfection or transformation. 4. Though human being can not be cloned, there is constant need in restoring human tissues. 5. It is possible that the foreign DNA segment should replicate stably as part of the bacterial vector DNA. 6. 7. Once the vector and foreign DNA are available, the DNA segments are cut in areas that should not interfere with the biological activities of the gene(s). 8. People believe that the prospects of cloning are promising but rather risky.

IX. Copy and translate the following sentences using the missing connective words.

1. ____ the vector is the phage or bacterial plasmid DNA, it is not restricted

_____ the cell. 2. The foreign DNA segment replicates stably _____ part of the bacterial vector DNA. 3. _____ to their curative properties the bacterially produced medicines are very important. 4. The recombinant-DNA technique may involve both qualitative and quantitative changes. 5. Segments are cut in areas _____ should not interfere _____ the biological activities of the gene(s) to be cloned. 6. Selection _____ transformations are required in producing new properties of medicines. 7. Bacteria serves the material _____ microbiology. 8. Research _____ this field is bringing new discoveries every day.

X. Translate the sentences into English using the grammar of the test.

1. Без техніки рекомбінантної DNA *in vitro* не можливо було б виробити тваринні речовини у мікроорганізмах. 2. Застосування генної техніки призводить до кількісних та якісних змін у харчових продуктах. 3. Коли фрагмент ДНК ввели у фрагмент плазміда, утворилася рекомбінантна ДНК. 4. Якщо фрагмент рекомбінантної ДНК знов ввести у клітину бактерії, він буде розмножуватися як частина вектору ДНК. 5. Перша стадія у використанні плазміда як вектора — це очистка та ізоляція потрібного фага. 6. Є декілька методів розмноження привнесеної ДНК, один з них — пряме розмноження. 7. Необхідно, щоб були перенесені корисні ознаки. 8. Якби генетично модифіковані продукти були абсолютно безпечні, то їх вживали би всі.

Variant 4

I. Read, copy and translate the following text.

The Production of Human Proteins

The most economically robust area of biotechnology is the production of *human proteins*. Many proteins from mammalian cells have high pharmaceutical value. However, these proteins are typically present in very small amounts in normal tissue, and it is therefore extremely costly to purify them. Therefore, the biotechnology industry has genetically engineered microorganisms to produce these proteins. A classic example is *insulin*. Because the insulin protein is fairly small, the entire gene could be synthesized. So this approach was taken rather than cloning the gene from human DNA and having to deal with the preproinsulin-to-proinsulin processing step. There are only 63 bases (for 21 amino acids) encoding the A chain and 90 bases (for 30 amino acids) encoding the B chain. In proinsulin there are an additional 105 bases for the peptide connecting the A and B chains. When the polynucleotides were synthesized, suitable restriction enzyme sites were engineered at each end so the polynucleotides could be ligated into a plasmid vector.

To obtain effective expression, the synthesized insulin genes were inserted downstream from a suitable *Escherichia coli* promoter but in a manner such that the insulin fragment was synthesized as part of a fusion protein. An important advantage of making the fusion protein is that the fusion product was much more stable in *E. coli* than insulin itself. Finally, a codon for methionine was added at the junction joining the insulin gene to the upstream part of the fusion gene. This was done because a

chemical, *cyanogen bromide*, specifically cleaves polypeptide chains at methionine residues, permitting recovery of insulin from the fused protein. Insulin itself lacks methionine and hence, is unaffected by cyanogen bromide treatment.

Proinsulin, isolated from the cells following cyanogen bromide treatment of n protein, is converted to insulin by disulfide boration, followed by enzymatic removal of the cat peptide of proinsulin. Proinsulin naturally folds so that the cysteine residues involved in disulfide bond for an insulin are opposite each other. A special treatment is used to catalyze the formation of cross-links.

Vocabulary

| | |
|---------------------|-------------------------|
| robust area | сильна галузь |
| human protein | людський протеїн |
| take an approach | вибрати підхід |
| base | снова |
| restriction | обмеження |
| engineer | розробити |
| ligate, connect | зв'язувати |
| expression | відображення |
| inserted downstream | введений вниз за течією |
| promoter | промотор |
| fusion | сплав, злиття |
| add | додавати |
| cat peptide | каталітичний пептид |
| cleave | розщепляти |
| residue | залишок |
| permit recovery | дозволяти відновлення |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) technology, insert, develop, synthesize, fusion.
- 2) cause to grow larger, mixing or uniting of different things into one; fuller or complete; science of industrial arts; put, set something in, into, between etc.; combine separate substances, chemicals, etc. into a whole.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. Producing *human* proteins is the most economically robust area of biotechnology. 2. So this approach was taken rather than cloning the gene from human DNA. 3. Having dealt with the preproinsulin-to-proinsulin processing step was also complex. 4. There is an important advantage of making the fusion protein. 5. Joining the insulin gene to the upstream part of the fusion gene is made by a codon for methionine. 6. Having added a codon for methionine at the junction was necessary. 7. This was done due to *cyanogen bromide* cleaving polypeptide chains at methionine residues. 8. Proinsulin having converted to insulin was realized by disulfide boration.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. To obtain effective expression, the synthesized insulin genes were inserted downstream from a suitable *Escherichia coli* promoter. 2. A special treatment is used to catalyze the formation of cross-links. 3. To permit a recovery of insulin from the fused protein *cyanogen bromide* is used. 4. To have isolated proinsulin from the cells requires cyanogen bromide treatment of *n* protein. 5. To convert proinsulin to insulin by disulfide boration it is necessary to remove the cat peptide of proinsulin. 6. To have synthesized the polynucleotides, suitable restriction enzyme sites were engineered at each end. 7. It was possible to ligate the polynucleotides into a plasmid vector. 8. They aimed to develop curative properties in proteins.

VI. Copy and translate the conditional sentences.

1. Moreover, even if the protein could be produced in cell cultures this would be a much more expensive and difficult method of obtaining it. 2. Growing microbial cultures could produce protein in high yield. 3. The producer strongly insisted that the technology should be improved. 4. Suitable restriction enzyme sites were engineered at each end so that polynucleotides could be ligated into a plasmid vector. 5. Could the scientists have developed physiological methods, diabetes would be curable. 6. It is doubtful that the microorganisms should yield this product. 7. You might have noticed it before you checked the samples. 8. The job could have been done if it had not been limited in time.

VII. Copy the sentences. Ask questions to the words in bold.

1. Many proteins from mammalian cells **have** high pharmaceutical value. 2. A classic example **is** *insulin*. 3. The fusion product was much more stable in *E. coli* than insulin itself. 4. Insulin itself lacks **methionine**. 5. They have created insulin for **diabetes cases**. 6. **Psychotherapy** is demonstrating wonderful results in treating various diseases. 7. Injecting insuline the ailing people **lowered** sugar level. 8. Many people depending on insulin will then be treated by **physiotherapeutical methods**.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. Because the insulin protein is fairly small, the entire gene could be synthesized. 2. They found only 63 bases that encode the A chain. 3. It is known that DNA is not a matrix for synthesising polypeptids. 4. People need that antidiabetes medicines should be improved. 5. Microbiological sources are used so that microbiologists should produce a sufficient quantity of preparations. 6. As there are many people with functional disorders, so there should be remedies against them. 7. We know that genetically produced preparations are in demand. 8. It is desirable that the preparations did not have post-effects.

IX. Copy and translate the following sentences using the missing connective words.

1. _____, these proteins are typically present in very small amounts in normal tissue. 2. It is _____ extremely costly to purify them. 3. _____, the biotechnology industry has genetically engineered microorganisms to produce these proteins.

4. The insulin fragment was synthesized ____ part of a fusion protein. 5. Insulin itself lacks methionine and ____, is unaffected ____ cyanogen bromide treatment. 6. Proinsulin naturally folds ____ that the cysteine residues involved in disulfide bond for an insulin are opposite each other. 7. Finally, a codon for methionine was added ____ the junction joining the insulin gene ____ the upstream part of the fusion gene. 8. Proinsulin naturally folds ____ that the cysteine residues involved ____ disulfide bond for an insulin are opposite each other.

X. Translate the sentences into English using the grammar of the test.

1. Виробництво людських протеїнів є складним. 2. Оскільки вони присутні у невеликій кількості у тканинах, їх виробництво дороге. 3. Якби не методи генної мікробіології, отримання достатньої кількості людських протеїнів було б неможливим. 4. Синтезування всього гену є можливим. 5. Цей метод кращий, ніж клонування гену людської ДНК. 6. Вважають, що фузійний протеїн є більш стабільним в *E. coli*, ніж сам інсулін. 7. Відомо, що *cyanogen bromide* відновлює інсулін з фузійного протеїну. 8. Необхідно, щоб щоб був належний промотор.

Variant 5

I. Read, copy and translate the following text.

Gene Cloning Technique

One approach to isolating a functional eukaryotic gene is to clone it through its mature mRNA. A major advantage of using mature mRNA is that any introns originally present have been removed. The isolated mRNA is used to make complementary DNA (cDNA) by means of reverse transcription. Most often a tissue expressing the gene of interest contains large amounts of the desired mRNA, although other mRNAs are present as well. In certain situations, however, a single mRNA dominates in a tissue type, and extraction of bulk mRNA from that tissue provides a useful starting point for gene cloning.

Once mRNA has been isolated, it is necessary to convert the information to DNA. This is accomplished by use of the enzyme *reverse transcriptase*. This enzyme, an essential component of retrovirus replication, copies information from RNA into DNA, a process called *reverse transcription*. Reverse transcriptase requires a primer in order for it to begin working (in retrovirus infection the primer is a tRNA). In cloning from messenger RNA, an oligo-dT primer is used that is complementary to the poly-A tail of the mRNA. The oligo-dT primer is hybridized with the mRNA, and to this mixture, reverse transcriptase is added.

The newly synthesized complementary DNA (cDNA) has a hairpin loop at its end that is synthesized because after the enzyme completes copying the mRNA, it starts to copy the newly synthesized DNA. This hairpin loop provides a convenient primer for synthesis of the complementary strand of DNA. The resultant double-stranded DNA, with the hairpin loop intact, is then cleaved by a single-strand specific nuclease to produce the desired double-stranded DNA, one strand of which is complementary to the mRNA. This double-stranded DNA encodes the gene of

interest and can be inserted into a plasmid or other vector for cloning.

The cDNA obtained in this way encodes the protein of interest and contains no introns. Although there is a start codon, there are no promoters because these are not transcribed, and therefore their sequence will not be in the mRNA

Vocabulary

| | |
|-----------------------|--|
| approach | наближатися |
| clone | клонувати |
| mature | зрілий |
| intron | ділянка ДНК між двома екзонами, міжгенна послідовність |
| provide | забезпечувати |
| convert | перетворювати |
| accomplish | завершувати |
| reverse transcription | зворотнє переписування |
| retrovirus | вірус, чия РНА містить проміжну ДНК як частину циклу копіювання |
| complementary DNA | додаткова ДНК |
| hairpin loop | шпильовидна петля |
| convenient primer | підходящий |
| strand | ланцюг |
| cleave | розщепляти |
| promoter | активатор |
| sequence | послідовність |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) strand , reverse transcriptase, cloning, reverse transcription, complementary.
- 2) the method of isolating a functional eukaryotic gene; DNA molecule that, on being replicated in a cell, brings about the replication of other genes inserted into the DNA molecule; an essential component of retrovirus replication; the process of copying genetic information found in RNA into DNA; thread-like matter twisted together.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. One approach to isolating a functional eukaryotic gene is to clone it through its mature mRNA. 2. A major advantage of using mature mRNA is that any introns originally present have been removed. 3. Containing a large amounts of the desired mRNA is typical of a tissue expressing the gene of interest. 4. Extracting bulk mRNA from that tissue provides a useful starting point for gene cloning. 5. In cloning from messenger RNA, an oligo-dT primer is used. 6. The enzyme completes copying the mRNA. 7. This double-stranded DNA can be inserted into a plasmid or other vector for cloning. 8. Encoding gene of interest takes place.

V. Replace the Infinitive with the Gerund. Write down and translate the

transforms.

1. The isolated mRNA is used to make complementary DNA (cDNA) by means of reverse transcription. 2. Reverse transcriptase requires a primer in order for it to begin working. 3. Once mRNA has been isolated, it is necessary to convert the information to DNA. 4. It starts to copy the newly synthesized DNA. 5. The resultant double-stranded DNA, with the hairpin loop intact, is then cleaved by a single-strand specific nuclease to produce the desired double-stranded DNA. 6. One RNA is known to be complementary to the poly-A tail of the mRNA. 7. To have produced synthetic proteins enriched pharmacology. 8. In retrovirus infection the primer is found to be a tRNA.

VI. Copy and translate the conditional sentences.

1. It is necessary that primer should be hybridized. 2. Should introns have been removed, the isolated mRNA would have been used to make complementary DNA (cDNA). 3. If it were not for a primer, *reverse transcription* could not begin working. 4. If they had extracted the bulk mRNA from that tissue, they would have provided a useful starting point for gene cloning. 5. If promoters were transcribed, their sequence would be in the mRNA. 6. It is desirable that eukaryotic gene should be cloned through its mature mRNA. 7. There might be some other approaches to the problems. 8. If they penetrate deeper into the interrelations of the nerve cells, they will find answers to all questions about human body.

VII. Copy the sentences. Ask questions to the words in bold.

1. Other mRNAs **are** present as well. 2. In certain situations, however, a single mRNA dominates in **a tissue type**. 3. This is accomplished by **use of the enzyme reverse transcriptase**. 4. This enzyme, an essential component of retrovirus replication, **copies** information from RNA into DNA. 5. The oligo-dT primer **has been** hybridized with the mRNA. 6. The newly synthesized complementary DNA (cDNA) **has** a hairpin loop at its end. 7. **This hairpin loop** is synthesized. 8. This hairpin loop provides a convenient primer for synthesis **of the complementary strand of DNA**.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. The resultant double-stranded DNA has the hairpin loop intact, and is then cleaved by a single-strand specific nuclease. 2. The desired double-stranded DNA is produced, one strand of which is complementary to the mRNA. 3. It is known that the cDNA obtained in this way encodes the protein of interest. 4. Although there is a start codon, there are no promoters. 5. The promoters are not transcribed, and therefore their sequence will not be in the mRNA. 6. They used the fragments of proteins and developed a vaccine against AIDS. 7. The anti-AIDS vaccine is under study, though it is tried on mice. 8. The biotechnologists need this vaccine so that they should cure AIDS cases.

IX. Copy and translate the following sentences using the missing introductory and connective words.

1. In certain situations, ____ a single mRNA dominates ____ a tissue type.

2. ____ extraction of bulk mRNA from that tissue provides a useful starting point ____ gene cloning. 3. ____ mRNA has been isolated, it is necessary to convert the information to DNA. 4. This is accomplished by use ____ the enzyme *reverse transcriptase*. This enzyme is an essential component ____ retrovirus replication. 5. It copies information ____ RNA ____ DNA. 6. Copying information is going on ____ the process called *reverse transcription*. 7. There are no promoters ____ these are not transcribed. 8. ____ their sequence will not be in the mRNA

X. Translate the sentences into English using the grammar of the test.

1. Клонування функційного гена через зрілу ДНК має свої переваги. 2. Відомо, що комплементарна ДНК утворюється засобом зворотної транскрипції. 3. Якби кДНК мала активатори, то її послідовність існувала б у мРНК. 4. Необхідно, щоб інформація з РНК була переведена до ДНК. 5. Якби не затравка, то процес зворотної транскрипції не відбувся б. 6. Оскільки в інфекції ретровіруса затравкою є тРНК, то вона бере участь у зворотній транскрипції. 7. Тому, що фермент копіює мРНК, нова ДНК має шпильовидну петлю на кінці. 8. Для того, щоб дволанцюгова ДНК могла бути введена в плазмід для клонування, вона повинна кодувати потрібний ген.

Variant 6

I. Read, copy and translate the following text.

Viral Genetics

Plant cell walls are extremely thick and strong. Yet there are a number of plant viruses that infect plants. The great majority of plant viruses known are *positive-strand RNA viruses*.

Positive-strand RNA animal viruses cause disease, including the *polioviruses*, the *rhinoviruses* that cause the common cold, *coronaviruses* that cause respiratory syndromes including SARS, and the *hepatitis A virus*. Viruses consist of either DNA or RNA enclosed in a protein coat. Incapable of reproducing independently, a viral particle (virion) will, on entering a cell, assume control of the host's machinery, using it to synthesize more virions. The particles subsequently leave the cell by utilizing an enzyme that causes the host cell to break apart or by escaping in a pinched-off section of cell membrane, enabling the virus to spread to other cells.

RNA- and DNA-based viruses commonly reproduce by transcribing mRNA directly from their own nucleic-acid molecules and using it to replace the host's mRNA in the ribosomes. However, one viral group, the retroviruses, uses an enzyme called RNA-directed DNA polymerase to synthesize DNA from RNA. The viral DNA is then spliced into the host's genome, allowing the foreign material to direct the production of more virions. The worldwide spread of AIDS has sparked global interest, both public and scientific, in retroviral disease mechanisms.

The RNA-containing viruses are the exception to the general use of DNA as the hereditary material. The RNA genomes (sets of genes) of these viruses are

several thousands of nucleotides in length. Upon entry into a cell, the genomes are to serve as the messenger RNA's in cell. Among the proteins for which these messengers code are replicating enzymes. These finally recognize the viral RNA. Using it as template, they proceed through a complement-mechanism to synthesize numerous copies of the viral RNA. These in turn serve as additional messengers to make more enzyme and more protein and so on to produce numerous progeny particles.

Vocabulary

| | |
|-------------------|--------------------|
| host cell | клітина — хазяїн |
| leave, escape | покидати |
| pinched-off | відщипнута |
| spread | розповсюджуватися |
| transcribe | переписувати |
| replace | замінити |
| splice | розщеплювати |
| direct | спрямовувати |
| exception to | вийняток з |
| hereditary | спадковий |
| additional | додатковий |
| messenger RNA | інформаційна РНК |
| replicate | копіювати |
| recognize | впізнавати |
| template | матриця |
| complement | доповнюючий |
| progeny particles | покоління частинок |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) hereditary, virion, template, genome, virus.
- 2) a genetic element containing either RNA or DNA; pattern or gauge used as a guide; passed on from parent to child, from one generation to the following generations; set of genes; the complete extracellular virus particle.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. Being enclosed in a protein coat protects viruses. 2. Having entered a cell allows a viral particle to assume control of the host's machinery. 3. Viruses are incapable of reproducing independently. 4. The particles subsequently leave the cell by utilizing an enzyme. 5. The enzyme causes breaking the host cell apart. 6. Enzyme's escaping requires pinching-off a section of cell membrane. 7. RNA- and DNA-based viruses commonly reproduce by transcribing mRNA directly from their own nucleic-acid molecules. 8. mRNA being used is necessary to replace the host's mRNA in the ribosomes.

V. Replace the Infinitive with the Gerund. Write down and translate the

transforms.

1. The host's machinery is known to be used to synthesize more virions. 2. An enzyme causes the host cell to break apart, so the particles subsequently leave the cell. 3. It enables the virus to spread to other cells. 4. The retroviruses use RNA-directed DNA polymerase to synthesize DNA from RNA. 5. The viral DNA is then spliced into the host's genome, thus it allows the foreign material to direct the production of more virions. 6. They proceed through a complement-mechanism to synthesize numerous copies of the viral RNA. 7. These are aimed to serve as additional messengers. 8. They are known to make more enzyme and more protein and so on to produce numerous progeny particles.

VI. Copy and translate the conditional sentences.

1. If it had not been for genetics, the anti-viral preparations would not have been discovered. 2. It is necessary that people should protect themselves against infection. 3. If a viral particle could reproduce independently, it would be easier to suppress it. 4. Should people take precautions, they would not develop diseases. 5. Virus might not reproduce if its coat was destroyed. 6. It is important that the diseases of the century should be cured. 7. If virion enters the host's cell, it will use it to synthesize more virions. 8. They could be able to fight AIDS using proteins.

VII. Copy the sentences. Ask questions to the words in bold.

1. Plant cell walls **are** extremely thick and strong. 2. Yet there are a number of plant viruses that **infect** plants. 3. In multicellular plants viruses are spreading from the infected cell to **neighboring cells**. 4. They have found **a great majority of positive-strand RNA plant viruses**. 5. Positive-strand RNA animal viruses **cause** disease. 6. **At one time**, polio was a major infectious disease of humans. 7. The development of an effective vaccine **has brought** the disease almost completely under control. 8. **The worldwide spread of AIDS** had sparked global interest in retroviral disease mechanisms.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. There are RNA-containing viruses, and these are the exception to the general use of DNA as the hereditary material. 2. The RNA genomes of these viruses are several thousands of nucleotides in length, the RNA genomes are sets of genes. 3. The genomes serve as the messenger RNA's when they enter into a cell. 4. Among the proteins, for which these messengers code, there are replicating enzymes. 5. It is considered that genomes finally recognize the viral RNA because they facilitate transfer from cell to cell within the plant. 6. There are many viral diseases, these include the *polioviruses*, the *rhinoviruses*. 7. A virus infects somebody when it penetrates into healthy cells. 8. It is known that *coronaviruses* cause respiratory syndromes.

IX. Copy and translate the following sentences using the missing connective words.

1. Young people ____ our country have every opportunity to study ____ to get a higher education. 2. Students ____ the day department get scholarships.

3. Students can find all the books necessary ____ their studies ____ the libraries and reading rooms ____ their institutes. 4. They can make experiments, carry out research work and different kinds of practical work ____ the laboratories and workshops of. 5. To enter an institute you have to take entrance examinations ____ are rather difficult. 6. Students are able to study ____ ____ the evening ____ day departments. 7. There are full-time students, part-time student, extramural students ____ study ____ correspondence. 8. The training of specialists ____ our institutes combines theoretical studies ____ practical work industrial training.

X. Translate the sentences into English using the grammar of the test.

1. Хоча стінки клітин рослин товсті, деякі віруси заражають рослини.
2. Зараження відбувається переносом вірусу з однієї клітини до іншої.
3. Коли вірус увійшов до клітини хазяїна, він використовує її для синтезу віріонів.
4. Якби не ефективні вакцини, полімієліт не був би поставлений під контроль.
5. Як тільки вірус покидає клітину, він розповсюджується по інших клітинах.
6. Для того, щоб вірус не розповсюджувався, необхідно зупинити його.
7. Необхідно, щоб проводилися безпечні антивірусні щеплення.
8. Якщо механізм захворювання ретровірусом буде вивчений, можна буде розробити профілактичні та лікувальні препарати.

Variant 7

I. Read, copy and translate the following text.

Genetically Engineered Vaccines

A tremendous advance in medical treatment was achieved with the development of the technique for inserting and deleting specific genes in various organisms. By inserting human genes into the bacterium *Escherichia coli* human insulin was produced for the control of blood-sugar levels in diabetics. Human growth hormone and tissue plasminogen activator (TPA) were produced in the same way.

Vaccines are suspensions of killed or modified pathogenic microorganisms (or specific fractions isolated from the microorganisms) that, when injected into an animal, they induce immunity to a particular disease. Often the substance that elicits the immune response is a surface protein, for instance, a virus coat protein. Recombinant DNA techniques can be used to model a pathogen. For instance, in some cases one can delete genes involved in virulence but leave those products elicit an immune response. This yields a recombinant live attenuated vaccine. Using recombinant technology one can also add genes to a virus that will specifically confer immunity to a viral disease. For example, a recombinant virus vaccine is used against both fowlpox (a disease that reduces fowl weight and egg production) and Newcastle disease (a viral disease that is often fatal). To do this, the fowlpox virus of a typical pox virus, was first modelled to delete genes that cause disease (but not those that create immunity). Then immunity-inducing genes from the Newcastle virus were added. This resulted in a *vaccine*, a single virus that can confer immunity

to fight different diseases.

A vector widely used to prepare live recombinant vaccines for potential human use is *vaccinia virus*. Such vaccines have been called *vector vaccines*. Vaccinia virus itself is generally not pathogenic in humans (vaccinia virus was originally used as a vaccine against the related virus smallpox). Owing to vaccinia virus is done using an *Escherichia coli* containing a fragment of the vaccinia virus.

Vocabulary

| | |
|-----------------|--------------------|
| insert | вводити |
| delete | видаляти |
| advance | прогрес |
| tissue | тканина |
| identify | пізнавати |
| surface protein | поверхневий білок |
| elicit | виявляти |
| immune response | імунна реакція |
| coat protein | протеїн оболонки |
| apply | застосовувати |
| confer immunity | надавати імунітету |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) delete, vaccine, immunity, surface protein, vector vaccine.
- 2) suspensions of killed or modified pathogenic microorganisms, inducing immunity to a particular disease; recombinant vaccine; safety, security from disease; take out; the substance that elicits the immune response is a surface protein

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. A tremendous advance in medical treatment was achieved with the development of the technique for inserting and deleting specific genes in various organisms. 2. Deleting genes involved in virulence requires leaving those products elicit an immune response. 3. Having yielded a recombinant live attenuated vaccine was the result. 4. Recombinant technology being used makes possible adding genes to a virus that will specifically confer immunity to a viral disease. 5. Owing vaccinia virus is done using an *Escherichia coli*. 6. Being effective against formerly incurable diseases is an advantage of vector vaccines. 7. Having treated patients with recombinant vaccines proved a success. 8. Being safe is an essential property of a good vaccine.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. Scientists at one biotechnology company tried to take certain human genes and insert them into the bacterium *Escherichia coli*. 2. Human growth hormone was produced in the same way to be used by children suffering from retarded physical development. 3. Recombinant DNA techniques can be used to

model a pathogen. 4. To do this, the fowlpox virus of a typical pox virus, was first modelled to delete genes that cause disease. 5. This resulted in a *vaccine*, a single virus that can confer immunity to fight different diseases. 6. Insulin is known to have been obtained from *Escherichia coli*. 7. It is necessary for heart stroke cases to use tissue plasminogen activator. 8. We know antiviral vaccines to be widely used.

VI. Copy and translate the conditional sentences.

1. If Newcastle disease had not been fought, there would have been more fatal issues. 2. It was necessary that the immunity-inducing genes from the Newcastle virus were added. 3. If it had not been for the experiments in microbiology, there would have been no recombinant vaccines. 4. Should the pathogenic microorganisms be killed or modified, they could be used as a vaccine. 5. If a vaccine is injected into an animal, it will induce immunity to a particular disease. 6. But for the selective adaptability, everyone would use vaccines. 7. It is important that food contained antiviral additives. 8. A recombinant virus vaccine is used against fowlpox lest it should reduce fowl weight and egg production

VII. Copy the following sentences. Ask questions to the words in bold.

1. Human insulin was produced **for the control of blood-sugar levels in diabetics**. 2. Tissue plasminogen activator (TPA) **has become** available for patients who had suffered heart attacks. 3. (TPA) is an enzyme which **is naturally occurring**. 4. (TPA) **dissolves** blood clots. 5. **When injected into an animal** vaccines will induce immunity to a particular disease. 6. Often the substance **that elicits the immune response** is a surface protein. 7. Genetic engineering can be applied **in many different ways** in the production of vaccines. 8. For example, a recombinant virus vaccine **was used** against fowlpox.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. A vector is widely used to prepare live recombinant vaccines for potential human use, it is *vaccinia virus*. 2. It is known that such vaccines have been called *vector vaccines*. 3. Vaccinia virus itself is generally not pathogenic in humans, it was proved by testing. 4. Vaccinia virus was originally used as a vaccine against the related virus smallpox, and it proved efficient. 5. A fragment of the vaccinia virus in *Escherichia coli* makes it possible that the microbiologists should realise owning. 6. An appropriate foreign DNA is inserted into the plasmid so that owning should take place. 7. It was believed that the drug testing would be a success. 8. Pharmacological industry produces vaccines so that we could fight various diseases.

IX. Copy and translate the following sentences using missing connective words.

1. Extramural students do their best to have jobs connected ____ their future speciality. 2. Many full-time students combine work ____ studies too. 3. Students ____ extramural department have payed leaves ____ their credits and examinations. 4. ____ the end ____ each term students have to take their examinations ____ credit tests. 5. The universities train students ____ the bachelor's and master's degree. 6. The graduates have practical training ____ the enterprises and establishments ____ Ukraine. 7. ____ their practice they defend their diploma

thesis. 8. The main task _____ higher school is to give profound theoretical knowledge and practical skills _____ students.

X. Translate the sentences into English using the grammar of the test.

1. Техніка введення та виведення специфічних генів у різних організмах є великим досягненням біотехнології. 2. Відомо, що вакцини є суспензіями вбитих і модифікованих мікроорганізмів. 3. Якби не був вироблений інсулін для контролю цукру у крові, не можна б було допомогти діабетикам. 4. Якщо ввести рекомбінантну вакцину хворому, вона підвищить імунітет до захворювання. 5. Необхідно, щоб антивірусні вакцини були безпечними. 6. Використання рекомбінантної технології дозволяє додавати гени до вірусів, щоб розробити імуногенні препарати. 7. Оскільки сам вірус не патогенний в людях, вживання вакцини вважається безпечним. 8. Використання рекомбінантних вакцин у лікування хворих довело їхню ефективність.

Variant 8

I. Read, copy and translate the following text.

Antiviral Drugs

Genetic engineering, allowed to identify those surface immunogenic proteins, which can then serve as the vaccinating agent, and transferring genes producing them into a harmless bacterium or virus. Using this technique, three different genes – one from hepatitis B virus, one from herpes simplex virus, and one from influenza virus – were inserted into a harmless cowpox (vaccinia) virus. A similar effort has been mounted to produce a vaccine against the human immunodeficiency virus (HIV), which causes AIDS (acquired immune deficiency syndrome of fluids of the body).

The first successful and commonly used chemotherapeutic agents for antiviral chemotherapy are the *nucleoside analogs*. The first compound to gain universal acceptance was zidovudine, or azidothymidine (AZT). AZT inhibits retroviruses such as HIV. Azidothymidine is chemically related to thymidine but is a dideoxy derivative, lacking the 3'-hydroxyl group. AZT inhibits multiplication of retroviruses by blocking reverse transcription and production of the virally encoded DNA intermediate. Several other antiviral agents target reverse transcriptase. Nevirapine, a non-nucleoside reverse transcriptase inhibitor (NNRTI), binds directly to reverse transcriptase and inhibits reverse transcription. Phosphonoformic acid is an analog of inorganic pyrophosphate that inhibits normal internucleotide linkages, preventing synthesis of viral nucleic acids. As with the NRTIs, the NNRTIs their action also affects normal host cell nucleic acid synthesis.

A newer class of antiviral drugs is the *protease inhibitors* (PI). These drugs are particularly effective for treatment of HIV. They prevent viral replication by binding the active site of HIV protease, inhibiting processing of viral polypeptides and virus maturation. Enfuvirtide is a fusion inhibitor composed of a 36-amino acid synthetic peptide that binds to the gp 41 membrane protein of HIV.

The adamantane derivatives amantadine and rimantadine are synthetic amines that interfere with an influenza A ion transport protein, inhibiting virus uncoating and subsequent replication.

Vocabulary

| | |
|------------------------------|--------------------------------|
| antiviral agent | протівірусний засіб |
| nucleoside analog | нуклеотидний аналог |
| gain universal acceptance | бути загальноприйнятим |
| inhibit multiplication | стримувати розмноження |
| HIV — human immunity virus | вірус людського імунodefіциту |
| derivative | похідний |
| lack | бути відсутнім |
| intermediate | посередник |
| target reverse transcriptase | цільова зворотня транскриптаза |
| bind, link | зв'язувати |
| prevent | випереджувати |
| host cell | клітина — хазяїн |
| treatment | лікування |
| replication | копіювання |
| maturation | дозрівання |
| influenza | грип |
| release | вивільняти |
| interact | взаємодіяти |
| promote | сприяти |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) derivative, release, prevent, inhibit, nucleus.
- 2) bind, restrain from; central part round which other parts are grouped; stop or hinder; substance derived from another; set free.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. Genetic engineering allowed identifying surface immunogenic proteins.
2. Having transferred genes into a harmless bacterium or virus could use them as the vaccinating agent.
3. Three different genes having been inserted into a harmless cowpox virus illustrated this technique.
4. AZT inhibits multiplication of retroviruses by blocking reverse transcription.
5. The result is producing the virally encoded DNA intermediate.
6. *The protease inhibitors* (PI) are particularly effective for treating HIV.
7. They prevent viral replication by binding the active site of HIV protease, inhibiting processing of viral polypeptides and virus maturation.
8. Interferons are used for preventing viral multiplication in the virus-infected cells.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. An effort has been mounted to produce a vaccine against the human immunodeficiency virus (HIV). 2. Some vaccines proved to be effective against hepatitis B virus. 3. The first successful chemotherapeutic agents to be used in antiviral chemotherapy were the *nucleoside analogs*. 4. To be the first compounds universally accepted makes zidovudine, or azidothymidine (AZT) effective drugs. 5. Enfuvirtide was developed to inhibit the HIV. 6. To block the active site of neuraminidase in influenza A and B viruses is the function of oseltamivir and zanamivir. 7. They know synthetic amines to interfere with an influenza A ion transport protein. 8. A special broth is prepared to cultivate the bacteria.

VI. Copy and translate the conditional sentences.

1. If they have developed protein-based vaccines against so many diseases, there is hope that HIV will also be conquered. 2. It is necessary that HIV spreading should be halted. 3. Should the safe anti-HIV remedy be found, the population vaccination would be possible. 4. If it had not been for the preventive measures, HIV would have endangered every family. 5. If morals were high, there would have been no HIV. 6. But for the drug suppressing red blood cells production, it might be used as cure. 7. If children are cared for, they will not fall victim of bad diseases. 8. If the scientists could produce saliva tests for HIV, it would be possible to test everyone.

VII. Copy the following sentences. Ask questions to the words in bold.

1. AZT inhibits retroviruses **such as HIV**. 2. Azidothymidine is **chemically** related to thymidine. 3. Azidothymidine is lacking **the 3'-hydroxyl group**. 4. Anti-HIV company is being carried out **worldwide**. 5. Nevirapine, a non-nucleoside reverse transcriptase inhibitor (NNRTI), **binds** directly to reverse transcriptase. 6. Nevirapine **inhibited** reverse transcription. 7. **Several other antiviral agents** target reverse transcriptase. 8. Healthy life style propaganda seems to have proved the people **the real danger of HIV**.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. The adamantane derivatives amantadine and rimantadine are synthetic amines, they inhibit virus uncoating and subsequent replication. 2. It is known that they inhibit virus release from infected cells. 3. Interferons are low-molecular-weight proteins (17,000 MW), they prevent viral multiplication in the virus-infected cells. 4. They found that these proteins interact with receptors on noninfected cells. 5. It is proved that inorganic pyrophosphate inhibits normal internucleotide linkages. 6. This acid does not allow that the viral nucleic acids should be synthesized. 7. It seems that the NNRTIs affect normal host cell nucleic acid synthesis. 8. Azidothymidine is chemically related to thymidine, but is a dideoxy derivative.

IX. Copy and translate the following sentences using the missing

connective words.

1. It is HIV ____ causes AIDS. 2. AIDS is an abbreviation ____ acquired immune deficiency syndrome and fluids of the body. 3. ____ human immunity virus requires immediate treatment, constant research are carried on. 4. ____ medical and social approach is necessary to fight the disease. 5. ____ this virus multiplies quickly, there are

diets and physiotherapeutic methods to stop it. 6. Many vaccines have already been developed ____ inhibit multiplication ____ the virus. 7. ____ the Russian antiviral vaccine proves a success, it will gain universal acceptance. 8. Achievements made ____ biotechnologists are great.

X. Translate the sentences into English using the grammar of the test.

1. Протівірусні вакцини створюються переносом генів у нешкідливу бактерію. 2. Необхідно, щоб антивірусний препарат пригнічував розмноження ретровірусу. 3. Бактерія, як відомо, служить антивірусним агентом. 4. Якби були винайдені надійні ліки протівірусу імунodefіциту, то було б можливо його лікування. 5. Виробництво вакцини проти імунodefіциту є проблемою сьогодення. 6. Якщо пригнічуються нормальні міжнуклеотидні зв'язки, то випереджується синтез нуклеїнових кислот вірусу. 7. Якби не дієти і профілактика вірусних захворювань, то від них загинуло б набагато більше людей. 8. Оскільки NNRTI зв'язується із зворотною транскриптазою, він пригнічує зворотню транскрипцію.

Variant 9

I. Read, copy and translate the following text.

Transgenic or Genetically Modified (GM) Plants.

Recombinant DNA technology has led to revolutionary changes in genetic improvement of plants. It is possible to use genetic engineering to modify plant DNA and then transform plant cells with the DNA by either electroporation or particle gun methods. Alternatively, we can use vectors from the bacterium *Agrobacterium Tumefaciens*, which can transfer DNA directly into certain plants. It is possible to use plant tissue culture techniques to select clones of plant cells that have been genetically altered using *in vitro* techniques; then, with proper treatments, induce these cell cultures to make whole plants that can be propagated vegetatively or by seeds.

Genetically engineered plants are called *transgenic* or *genetically modified* (GM) *plants*. Although the techniques to generate transgenic plants or transgenic animals are virtually identical to those used to generate microorganisms expressing foreign genes, the use of the term *transgenic* is confined to multicellular organisms.

With the use of *Agrobacterium tumefaciens*, a number of transgenic plants have been produced. Most successes have come with broadleaf crop plants (dicots) such as tomato, potato, tobacco, soybean, alfalfa, and cotton. *A. tumefaciens* has also been used to produce transgenic trees, such as walnut and apple. Transgenic crop plants from the grass family (monocots) have been more difficult to generate using *A. tumefaciens*.

Herbicide resistance is genetically engineered into a crop plant so that it will not be killed by the toxic chemical. A gene encoding a resistant enzyme from *Agrobacterium* has been cloned, modified for expression in plants, and transferred into important crop plants, such as soybeans. Genetic engineering has also been used to protect plants from virus infection; expressing the coat protein gene of a virus,

interfering with the uncoating of viral particles, and thus interrupting the virus replication cycle. *Insect resistance* has also been genetically introduced in plants.

Vocabulary

| | |
|------------------------|-----------------------------|
| improve | поліпшувати |
| electroporation, | |
| particle gun method | метод молекулярної пушки |
| transfer | перенос(ити) |
| alter, change | змінювати |
| treat | обробляти |
| induce | примушувати |
| propagate | розмножувати |
| seed | насіння |
| express foreign genes | відображувати гени — донори |
| the use is confined to | використання зводиться до |
| broadleaf crop plants | ряснолисті зернові |
| alfalfa | люцерна |
| walnut | волоський горіх |
| generate | виробляти |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

- 1) modify, transgenic, improve, treatment, transfer.
- 2) make or become better; change position (from...to); make changes in, make different; way of dealing with something; genetically engineered plants.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. Using *in vitro* techniques allows selecting clones of plant cells that have been genetically altered. 2. Treating clones of plant cells properly makes it possible inducing these cell cultures to make whole plants expressing foreign genes. 3. They interfere with the uncoating of viral particles. 4. Having interrupted the virus replication cycle will inhibit that virus. 5. The cloned gene being transferred into the plants introduces *insect resistance*. 6. *Herbicide resistance* is necessary for being not killed by the toxic chemicals. 7. Protecting plants from virus infection is also the merit of genetic engineering. 8. Herbicide resistance is effected by cloning a gene encoding a resistant enzyme from *Agrobacterium*.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. An effective approach to achieve transgene expression and stability is to transfer the gene directly into plant genome. 2. It is possible to use genetic engineering to modify plant DNA. 3. To have used either electroporation or particle gun methods made also possible to transform plant cells. 4. Alternatively, we can use vectors from the bacterium *Agrobacterium Tumefaciens*, to transfer DNA directly into certain plants. 5. It was possible to use plant tissue culture techniques to select clones of plant cells that have been genetically altered using *in vitro* techniques.

6. The cell cultures were induced to make whole plants. 7. *A. tumefaciens* has also been used to produce transgenic trees, such as walnut and apple. 8. Transgenic crop plants from the grass family (monocots) have been more difficult to generate.

VI. Copy and translate the conditional sentences.

1. If only plants had not been altered, they would have not received new properties. 2. But for recombinant DNA technology, we would have not had revolutionary changes in agriculture. 3. It is necessary that herbicide resistance should be developed in plants. 4. If other methods of introducing DNA are used, transgenic crop plants from the grass family (monocots) will be generated. 5. Herbicide resistance should be introduced in plants so that they would not be killed by the toxic chemicals. 6. It is necessary that genetic engineering should develop. 7. If they could generate monocots using *A. tumefaciens*, they would not use other methods. 8. If it were not for genetic engineering, crop plants would perish from insects and diseases.

VII. Copy the sentences. Ask questions to the words in bold.

1. Genetic improvement of plants by traditional methods **is** a long history. 2. Recombinant DNA technology had led to **revolutionary changes**. 3. **With the use of *Agrobacterium tumefaciens***, a number of transgenic plants have been produced. 4. Most successes **have come** with broadleaf crop plants (dicots) such as tomato, potato, tobacco, soybean, alfalfa, and cotton. 5. Genetic engineering is also being used **to protect plants from virus infection**. 6. *A. tumefaciens* **serves** as the basis for making transgenic plants. 7. The further application of genetic engineering in agriculture will lead to **new discoveries**. 8. Crops were increased **with the aid of transgenic plants**.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. In contrast to plants whose properties have been improved by traditional plant genetics, genetically engineered plants are *transgenic* or *genetically modified* (GM) *plants*. 2. Although the techniques to generate transgenic plants or animals are identical to those used to generate microorganisms, the use of the term *transgenic* is confined to multicellular organisms. 3. It is known that genetic engineering is directed toward making plants disease resistant. 4. They want that plants could have consumer-oriented characteristics. 5. Plants are genetically altered so that their products should have longer shelf life. 6. It is possible that some immunological properties might be introduced in plants. 7. Major areas targeted for genetic improvement in plants include herbicide, insect, and microbial disease resistance, improved product quality is also one of them. 8. More than a thousand different field trials on plant species have been carried out in recent years, the first genetically modified (GM) crop was tobacco grown in China in 1992.

IX. Copy and translate the following sentences using the missing connective words.

1. Encoding the toxic protein of *Bacillus thuringiensis* produces a crystalline protein called *Bt-toxin* toxic ____ moth and butterfly larvae. 2. Many herbicides inhibit a key plant enzyme or protein necessary ____ growth. 3. For example, the herbicide

glyphosate kills plants _____ inhibiting the activity of an enzyme necessary _____ making aromatic amino acids. 4. _____ a herbicide kills both weeds and crop plants and _____ must be used as a "preemergence herbicide" 5. "Preemergence herbicide" means before the crop plants emerge _____ the ground. 6. However, some bacteria contain a form of the enzyme _____ is naturally resistant to glyphosate. 7. A gene encoding a resistant enzyme from *Agrobacterium* has been cloned, modified _____ expression in plants, and transferred into important crop plants, such as soybeans. 8. When sprayed _____ glyphosate, plants containing the bacterial gene grow as well _____ unsprayed control plants.

X. Translate the sentences into English using the grammar of the test.

1. Використання генної техніки зробило великий внесок у розвиток сільського господарства. 2. Як відомо, рослини потребують захисту від комах та хвороб. 3. Введення *Agrobacterium Tumefaciens* дозволило поліпшити ряснолисті зернові культури. 4. Необхідно, щоб рослини мали опірність проти токсичних хімікатів. 5. Якби генна техніка була б дешева, то вона б застосовувалася скрізь. 6. Якщо генетично змінені клітини застосувати *in vitro*, тоді виведена рослина буде розмножувати собі подібних. 7. Якби не існувало так багато проблем з вирощуванням сільськогосподарських рослин, то генна техніка була б непотрібна. 8. Оскільки генна техніка втручається у вихід вірусу з оболонки, то вона перериває цикл його розмноження.

Variant 10

I. Read, copy and translate the following text.

The Ti Plasmid and Transgenic Plants

The gram-negative plant pathogen *Agrobacterium tumefaciens* contains a large plasmid, called the Ti plasmid, which is responsible for its virulence. The plasmid contains genes that mobilize DNA for transfer to the plant and genetic events. The segment of the Ti plasmid DNA that is actually transferred to the plant is called T-DNA. The sequences at the ends of the T-DNA are essential for transfer, and the DNA to be transferred must be between these ends.

One common Ti-vector system that has been constructed and used for the transfer of genes to plants is a two plasmid system called a *binary vector*. It contains the two ends of the T-DNA on either side of the site used for cloning and an antibiotic resistance marker that can be used in plants. It also contains an origin of replication so that it can replicate in both *A. tumefaciens* and *Escherichia coli*, and another antibiotic resistance marker that is expressed in bacteria. The

DNA to be cloned is inserted into the vector, which is then transformed into *E. coli*. It is then transferred to *A. tumefaciens* by conjugation.

This cloning vector lacks the genes necessary for transfer of T-DNA to a plant, so the *Agrobacterium* into which it is transferred must contain the other member of the binary vector system. This other plasmid contains the virulence (*vir*) region of a Ti plasmid but lacks disease-causing genes. Although it can direct the transfer of DNA

into a plant, it no longer has genes that cause disease. This so-called "disarmed" plasmid, called *D-Ti*, supplies all the genes needed to transfer the T-DNA from the cloning vector. The cloned DNA and the kanamycin resistance marker of the vector can be mobilized by D-Ti and transferred into a plant cell. Following recombination with a host chromosome, the foreign DNA can be expressed and can confer new properties on the plant.

Transgenic plants can be genetically engineered to produce commercial or pharmaceutical products such as human antibodies, "plantibodies," or a vaccine in an edible plant product, *edible vaccines*, which could immunize humans against diseases caused by enteric bacteria.

Vocabulary

| | |
|-------------------|-----------------|
| responsible | відповідальний |
| virulence | сила, небезпека |
| mobilize | приводити в дію |
| transfer | переносити |
| sequence | послідовність |
| essential | важливий |
| site | дільниця |
| resistance marker | маркер опору |
| origin | походження |
| replication | копіювання |
| host | хазяїн |
| express | виявляти |
| insert | вводити |
| confer | надавати |

II. Give titles to paragraphs.

III. Match the notions and their definitions.

1) disarmed; mobilize; resist; sequence; foreign.

2) oppose, use force against in order to prevent the advance of; connected line of events, ideas, etc.; not one's own; plasmid that no longer has genes that cause disease; collect together for service or use.

IV. Copy and translate the following sentences. Define the form and function of the Gerund.

1. One common Ti-vector system that has been constructed and used for transferring genes to plants is a two plasmid system called a *binary vector*. 2. It contains the two ends of the T-DNA on either side of the site used for cloning. 3. *Escherichia coli* serves as a host for cloning. 4. Enhancing the use of Bt-

toxin for pest control in plants is developing a single Bt-toxin. 5. Having encoded the toxic protein of *Bacillus thuringiensis* produced insect-resistant plants. 6. Developing a single Bt-toxin effective against many different insects can be done. 7. The recombinant virus could be used in producing a malaria vaccine. 8. Preventing diseases is easier than treating them.

V. Replace the Infinitive with the Gerund. Write down and translate the transforms.

1. The DNA to be cloned is inserted into the vector, which is then transformed into *E. coli*. 2. This so-called "disarmed" plasmid supplies all the genes needed to transfer the T-DNA from the cloning vector. 3. The DNA to be transferred must be between these ends. 4. To generate transgenic crop plants from the grass family (monocots) using *A. tumefaciens* have been more difficult. 5. Other methods to introduce DNA, such as the particle gun, have been used successfully applied. 6. *A. tumefaciens* has also been used to produce transgenic trees, such as walnut and apple. 7. Genetic engineering has also been used to protect plants from virus infection. 8. To become resistant to infection by a virus transgenic plants must express the coat protein gene of the virus.

VI. Copy and translate the conditional sentences.

1. It is necessary that DNA should be mobilized. 2. If *edible vaccines* proved a success, they could immunize humans against diseases caused by enteric bacteria. 3. If it had not been for economic problems, there would have been more useful food products. 4. But for toxicity, herbicides could save crops. 5. Should crop protectors, "preemergence herbicide," have been spread, rich crops would have been gathered. 6. If human antibodies, plantibodies are produced, there will be new reliable and cheap modified drugs. 7. It is important that plants should grow healthy. 8. If only protecting plants were introduced in the fields, there might be no need in chemical protectors.

VII. Copy the sentences. Ask questions to the words in bold.

1. The gram-negative plant pathogen *Agrobacterium tumefaciens* contains **a large plasmid, called the Ti plasmid**. 2. They **will**, possibly, **make** agriculture free from toxins. 3. The plasmid contains genes **that mobilize DNA for transfer to the plant and genetic events**. 4. The segment of the Ti plasmid DNA that is actually transferred to the plant is called **T-DNA**. 5. A century ago people **did not know** the chemicals to use in the fields. 6. With the use of *Agrobacterium tumefaciens*, **a number of transgenic plants** have been produced. 7. Plant protectors **have been introduced** in agriculture. 8. *A. tumefaciens* is transferred to *A. tumefaciens* **by conjugation**.

VIII. Transform the subordinate clauses into the participial and infinitival complexes. Write down and translate the sentences.

1. A *binary vector* contains an origin of replication, so that it can replicate in both *A. tumefaciens* and *Escherichia coli*. 2. It is known that Ti plasmid is responsible for the virulence of *Agrobacterium tumefaciens*. 3. This cloning vector lacks the genes necessary that T-DNA should be transferred to a plant. 4. It is

proved that the *Agrobacterium* is suitable for cloning. 5. The other plasmid contains the virulence (*vir*) region of a Ti plasmid but lacks disease-causing genes. 6. Although it can direct the transfer of DNA into a plant, it no longer has genes that cause disease. 7. The cloned DNA and the kanamycin resistance marker of the vector can be mobilized by D-Ti so that they could be transferred into a plant cell. 8. The foreign DNA should be recombined with a host chromosome so that it could be expressed.

IX. Copy and translate the following sentences using the missing connective words

1. Transgenic plants can be genetically engineered to produce commercial ____ pharmaceutical products as it is with microorganisms and animals. 2. For example, crop plants ____ as tobacco and tomatoes have been engineered to produce a number of different products, such ____ the human proinsulin interferon. 3. Transgenic crop plants can ____ be used to produce human antibodies efficiently and inexpensively. 4. These antibodies, coined "plantibodies," have potential as anticancer or antiviral drugs, ____ some are undergoing clinical trials. 5. Plants are useful ____ producing these types of products. 6. Plants are important in producing drugs ____ they typically modify proteins correctly. 7. Crop plants are also being developed ____ the production of vaccines. 8. Another interesting approach is to produce a vaccine ____ an edible plant product.

X. Translate the sentences into English using the grammar of the test.

1. Використання плазміда патогенної бактерії *Agrobacterium tumefaciens* дозволяє створити захисні речовини для сільськогосподарських рослин. 2. Як відомо, Ti-плазмід може керувати переносом DNA у рослину, але не має генів, які викликають хворобу. 3. Біотехнологи розробляють декілька токсинів для того, щоб застосовувати для певних рослин у випадках чуми (in pest situations). 4. Необхідно, щоб ДНК – донор відображалася і переносила нові властивості на рослину. 5. Якби були вироблені “їстівні вакцини,” то не потрібні б були щеплення проти хвороб. 6. Якщо рослинні антитела зможуть замінити тваринні, то їхнє виробництво буде дешевшим. 7. Якби не хвороби тварин та рослин, то біотехнологія не посідала б таке важливе місце у промисловості. 8. Вектор *D-Ti* називають беззбройним, і він постачає всі гени, необхідні для переносу T-ДНК з клонуючого вектора .

Додаток 1

The Table of the English Prefixes and Suffixes

| Prefixes | | | |
|---------------------|-----------------|----------------------|------------------|
| attach | приєднувати | derivative | похідний |
| believe | вважати, вірити | overestimate | переоцінити |
| engage | зв'язувати | prepare | підготувати |
| destroy | (роз) руйнувати | restore | відновлювати |
| determine | визначати | undercook | недоготувати |
| include | включати | monocellular | одноклітинний |
| incomplete | неповний | multicellular | багатоклітинний |
| intermediate | проміжний | polivitamin | багатовітамінний |
| dissolve | розчиняти | provitamin | похідний |

| Suffixes | | | |
|------------------|--------------|-------------------|--------------|
| Nouns | | Adjectives | |
| antivirus | протівірус | subsystem | підсистема |
| compound | сполука | prewar | довоєний |
| contain | містити | immiscible | незмішуваний |
| exclude | виключити | transfere | переносити |
| tonight | увечорі | underlie | підлягати |
| postwar | післявоєнний | arise | вставати |
| elect | обирати | obtain | отримувати |
| | | | |

Продовження

| | | | |
|---------------------|----------|------------------|------------|
| engineer | інженер | useless | некорисний |
| linkage | зв'язок | different | різний |
| treatment | обробка | easy | легкий |
| measure | міра | important | важливий |
| reaction | реакція | positive | позитивний |
| substance | речовина | capable | здатний |
| diffusion | дифузія | soluble | розчинний |
| technologist | технолог | chemical | хімічний |

| | | | |
|--------------|---------------|----------|-------------|
| softness | м'якість | liquid | рідкий |
| mechanism | механізм | dangeous | небезпечний |
| property | властивість | organic | органічний |
| leadership | керівництво | cellular | клітинний |
| Verbs | | | |
| awaken | будити | liberate | вивільняти |
| differ | відрізнятися | supply | постачати |
| establish | встановлювати | utilize | використати |

Додаток 2

The Verbs of Motion and Doing
Tense Forms. Active Voice

| Aspect | Tense | Affirmative Sentence (Statement) | Question | Negative Sentence |
|------------------------|---------|--|--|--|
| Indefinite (Simple) | Present | I, we, you, they + V ₁ he, she, it + V ₁ + (e) s | do + S+ V ₁ does+ S + V ₁ | S + do, does not + + V ₁ |
| | Past | S+ V ₂ | did + S + V ₁ | S + did not + V ₁ |
| | Future | will + V ₁ | will + S + V ₁ | S + shall, will not + + V ₁ |
| Continuo | Present | I am / he, she, it, is / you, we, they are + + will + V _{ing} | be ₁ + S + V _{ing} | S + be ₁ not + V _{ing} |

| | | | | |
|---------------------------------|----------------|---|--|---|
| | Past | S + was (однина) were (множина) + + V _{ing} | be ₂ + S + V _{ing} | S + be ₂ not + V _{ing} |
| | Future | S + will be + V _{ing} | will + S + be + V _{ing} | S + will be not + + V _{ing} |
| Perfect | Present | I, you, we, they have + V ₃ he, she, it has + V ₃ | have / has + S | S + have / has not + |
| | Past | S + had + V ₃ | had + S + V ₃ | S + had not + V ₃ |
| | Future | S + will have + V ₃ | will + S + have + V ₃ | S + will have not + + V ₃ |
| Perfect Continuous Tense | Present | S + have / has been + + V _{ing} | have / has + S | S + have / has not been + V _{ing} |
| | Past | S + had been + V _{ing} | had + S + been + V _{ing} | S + had not been + + V _{ing} |
| | Future | S + will have been + + V _{ing} | will + S + have | S + will not have been + V _{ing} |

The Verbs of Motion and Doing

Tense Forms. Passive Voice

| Aspect | Tense | Affirmative Sentence (Statement) | Question | Negative Sentence |
|-------------------|----------------|---|--------------------------------------|--|
| Indefinite | Present | S + be ₁ + V ₃ | be ₁ + S + V ₃ | S + be ₁ not + V ₃ |
| | Past | S + be ₂ + V ₃ | be ₂ + S + V ₃ | S + be ₂ not + V ₃ |
| | Future | S + will be + V ₃ | will + S + be + V ₃ | S + will not be + V ₃ |

| | | | | |
|-------------------|----------------|--|--|--|
| Continuous | Present | S + be ₁ + being + V ₃ | be ₁ + S + being + + V ₃ | S + be ₁ not being + + V ₃ |
| | Past | S + be ₂ + being + V ₃ | be ₂ + S + being + V ₃ | S + be ₂ not being + + V ₃ |
| Perfect | Present | S + have / has been + V ₃ | have / has + S + + been + V ₃ | S + have / has not been + V ₃ |
| | Past | S + had been + V ₃ | had + S + been + V ₃ | S + had not been + + V ₃ |
| | Future | S + will have been + V ₃ | will + S + have been + + V ₃ | S + will not have been + V ₃ |

S – subject – підмет;

V_{1, 2, 3} – дієслово у 1-й, 2-й, 3-й формі;

be₁, – am, is, are;

be₂ – was, were

Продовження

Verbals. Віддієслівні форми

The Infinitive. Інфінітив The Infinitive Forms

| Tense | Voice | |
|----------------------------|---------------------|-------------------|
| | Active | Passive |
| Indefinite (Simple) | to make | to be made |
| Continuous | to be making | — |
| Perfect | to have made | to have been made |
| Perfect Continuous | to have been making | — |

The Infinitive Functions

| Function | Example |
|---|---|
| Subject | To work is necessary. |
| Object | We told them to come. |
| Attribute | The experiment to make is easy. |
| Adverbial Modifier | They used the acid to start the reaction. |
| Part of the Compound Nominal Predicate | Our job was to analyze the products. |

The Complex Subject with the Infinitive

Our health is said to depend on ourselves.

Продовження

The Complex Object with the Infinitive

We know the compound to consist of two substances.

The Participle. Дієприкметник

The Participle Forms

| Tense | Voice | |
|----------------|---------------|------------------|
| | Active | Passive |
| Present | making | being made |
| Perfect | having made | having been made |
| Past | — | made |

The Participle Functions

| Function | Example |
|---|--|
| Attribute | The researcher studying proteins made a discovery. |
| Adverbial Modifier | Be careful using poisonous substances. |
| Part of the Compound Nominal Predicate | The students are doing a laboratory work. |

The Absolute Nominal Participle Construction

| |
|--|
| 1. Carbon and oxygen combining, chlorophyll is developing. |
| 2. They prepared the reagents the water boiling. |

Продовження

The Gerund. Герундій

The Gerund Forms

| Tense | Voice | |
|-------------------|-------------|------------------|
| | Active | Passive |
| Indefinite | making | being made |
| Perfect | having made | having been made |

The Gerund Functions

| Function | Example |
|----------------|---|
| Subject | Learning rules without examples is useless. |

| | |
|---|--|
| Object | The facts need testing. |
| Attribute | We all know the joy of learning interesting things. |
| Adverbial Modifier | They came to the conclusion after having solved several problems.. |
| Part of the Compound Nominal Predicate | Our dream is becoming good specialists. |

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Навчальне видання

АНГЛІЙСЬКА МОВА

МЕТОДИЧНІ ВКАЗІВКИ

до вивчення дисципліни та виконання
контрольних робіт
для студентів напрямку 6.051.401
”Біотехнологія”
заочної форми навчання

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