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*Затверджено на засіданні Центральної методичної ради ЗДМУ та  
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English for Pharmacists = Англійська для фармацевтів: практикум для студентів I та II курсу заочного відділення спеціальностей «Фармація», «Технологія парфумерно-косметичних засобів» / А.В. Олексієнко, О.Л. Соляненко. – Запоріжжя: ЗДМУ, 2021. – 156 с.

Практикум рекомендовано для студентів I та II курсу заочного відділення спеціальностей «Фармація», «Технологія парфумерно-косметичних засобів». Практикум містить завдання для самостійної роботи, що відповідають навчальній програмі дисципліни «Іноземна мова». Метою практикуму є надання студентам завдань та вправ на теми відповідно до навчальної програми.

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## ПЕРЕДМОВА

У сучасних умовах модернізації та реформування системи освіти, відповідно до завдань іншомовної підготовки спеціалістів, постає питання щодо підготовки висококваліфікованих різнопрофільних фахівців, здатних за допомогою іноземної мови вирішувати різноманітні завдання професійного характеру, використовуючи при цьому іншомовні джерела інформації з метою самоосвіти та самовдосконалення. У зв'язку з цим, курс іноземної мови в різнопрофільних навчальних закладах, в тому числі й в медичних ВНЗ, має сприяти підготовці фахівців належного професійного та інтелектуального рівня, для яких мовна освіта повинна стати обов'язковим компонентом фахової підготовки.

Навчальний посібник ставить за мету підготувати студентів до іншомовної комунікації, читання та реферування оригінальних фахових текстів, сприйняття спеціалізованої інформації на слух та призначено для студентів першого курсу фармацевтичних факультетів заочного відділення, спеціальностей 7.12020101 «Фармація», 7.12020104 «Технологія парфумерно-косметичних засобів», що цікавляться механізмами функціонування сучасної наукової мови та прагнуть сформулювати й вдосконалити індивідуальну програму пізнавальної діяльності через самостійну роботу.

Посібник складено з урахуванням вимог навчальної дисципліни «Англійська мова (за професійним спрямуванням): затверджено МОЗ України 08.07.2010 р., відповідно до ОКХ та ОПП підготовки фахівців, затверджених наказом МОН України від 29.07.2004р. та навчальних планів, затверджених наказами МОЗ України від 08.07.2010 р. за № 542, 543, підготовки фахівців освітньо-кваліфікаційного рівня «спеціаліст», кваліфікації «фармацевт» у вищих навчальних закладах III-IV рівня акредитації за спеціальностями 7.12020101 «Фармація», 7.12020104 «Технологія парфумерно-косметичних засобів», відповідно до наказу МОЗ

України від 12.10.2004 р. №492 «Рекомендацій щодо розроблення навчальних програм навчальних дисциплін».

**Матеріал** посібника містить зразки автентичних англомовних текстів загально фармацевтичної тематики для перекладу та реферування англійською мовою.

Головна увага приділена у посібнику організації самостійної роботи, що забезпечується запропонованою системою дотекстових та післятекстових вправ, які сприяють осмисленому та ефективному розумінню текстів без допомоги словника, а також закріпленню вивченого лексичного та граматичного матеріалу. Граматика представлена у стислому викладі граматичного матеріалу з використанням таблиць та схем. За такого підходу суттєво підвищується ефективність самостійної інтелектуальної праці та забезпечуються перспективи самоосвіти у подальшому професійному зростанні.

Зміст практикуму складають Передмова, 8 юнітів, що відповідають змістовим модулям навчальної програми з дисципліни, 2 тести для перевірки засвоєння юнітів, Перелік літератури, 1 додаток. Загальний обсяг практикуму складає 152 сторінки.

Всі завдання в юнітах розділені за видами комунікативної діяльності, а саме: Vocabulary and Pronunciation, Reading, Grammar, Listening та Speaking. Тести для перевірки засвоєння юнітів містять тексти, що відповідають тематиці юнітів, та тестові завдання до них. У Переліку літератури вказано інформаційні джерела використані під час роботи над практикумом. В додатку надається інформація, план та тематичний словник для реферування фахових текстів англійською мовою, а також вправи для опанування даного виду комунікативної діяльності.

**Методичні рекомендації.** Посібник розраховано на студентів I курсу заочного відділення, як завдання для самостійної роботи за розділами «Фармацевтична освіта» та «Фармацевтична термінологія».

# Unit 1. Pharmaceutical education in Ukraine

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів системи Indefinite Active;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «I am a Pharmaceutical Student», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Pharmaceutical education in Ukraine» та вправами до нього);
- граматики: навчитись утворювати форми часів Indefinite Active та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Zaporizhzhia State Medical University»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «The Working Day of a Medical Student».

**Норма часу:** 10 годин.

## VOCABULARY AND PRONUNCIATION

### *1.1. How do you spell it? Check out the pronunciation of the following words!*

Student, university, rector, faculty, pharmaceutical, medical, dean, campus, qualification, lecture, class, subject, science, chemistry, laboratory, course, institution, department, profession, specialist, medicine, examination, exam,

perfumery, biochemistry, pharmacist, routine, diploma, internship, scientific, ministry.

**1.2. Memorize the new words.**

|                           |  |
|---------------------------|--|
| applicant                 | абітурієнт, вступник до ВНЗ  |
| to enter                  | вступати   |
| to last                   | тривати  |
| establishment             | заклад, установа   |
| curriculum                | навчальний план  |
| term                      | семестр  |
| extramural                | заочний  |
| to deliver a lecture (in) | читати лекцію (з якогось предмету)   |
| to attend classes         | відвідувати практичні заняття  |
| to graduate               | закінчити вищий навчальний заклад; отримати ступінь бакалавра                |
| postgraduate              | аспірант   |
| degree                    | ступінь  |
| alumnus (Pl. alumni)      | випускник (коледжу або університету)   |
| facility                  | 1. зручності, сприятливі умови, пільги; 2. обладнання, засоби обслуговування |
| thesis (Pl. theses)       | 1. теза, положення; 2. дисертація  |
| to complete               | завершувати  |
| effort                    | зусилля  |
| achievement               | досягнення   |
| foreign                   | іноземний  |
| Deputy Dean               | заступник декана   |

**1.3. Which of the variants is the best option? Fill in the gaps with appropriate word.**

1. To enter the university ... should take different exams.
  - a) students
  - b) applicants
  - c) graduates
  - d) alumni
  
2. The course of study at the pharmaceutical faculty ... for 5 years.
  - a) consists
  - b) enters

- c) lasts
  - d) completes
3. More than 100 ... gathered to the reunion 10 years after graduation.
- a) alumni
  - b) doctors
  - c) students
  - d) postgraduates
4. Foreign languages are the essential part of a university ... .
- a) life
  - b) curriculum
  - c) research
  - d) term
5. Postgraduate students do research for their ... .
- a) internship
  - b) courses
  - c) exams
  - d) theses
6. The academic year consists of two ... .
- a) terms
  - b) hours
  - c) curriculum
  - d) departments
7. After ... the course of study at the pharmaceutical faculty, graduates can work at chemist's shops or chemical laboratories.
- a) entering
  - b) graduating
  - c) completing
  - d) starting
8. There are modern and all the necessary research ... at this laboratory.
- a) books



- b) staff
  - c) departments
  - d) facilities
9. To work as a dispensing pharmacist, you need to get Master's ... .
- a) degree
  - b) internship
  - c) thesis
  - d) achievement
10. There is an ... department at our university.
- a) evening
  - b) extramural
  - c) chemical
  - d) extraordinary

**1.4. Replace the words with the synonyms.**

1. Chair of Organic Chemistry – ..... of Organic Chemistry
2. to enroll into the university – ..... the university
3. academic year extends to June – academic year ..... to June
4. to accomplish the course of study – ..... the course of study
5. educational institution – educational .....

**1.5. Complete the word combination with appropriate preposition.**

1. to graduate ..... the university
2. to get a degree ..... Pharmacy
3. to last ..... one year
4. written examination ..... Chemistry
5. to study ..... the pharmaceutical faculty

**READING**

**Pharmaceutical education in Ukraine**

Pharmaceutical education in Ukraine is a system of training and improvement of pharmacists. An applicant can obtain this level of professional qualification in higher educational institutions of III-IV level of accreditation on the basis of complete secondary education. After graduating from the pharmaceutical faculty, a person gets a degree, which allows engagement in activities related to drugs (manufacturing, storage, dispensing, etc.).

Specialists in pharmacy are trained by National University of Pharmacy (NUPh) and pharmaceutical faculties of medical universities and academies that operate in many cities of Ukraine by specialties "Pharmacy", "Drug technology", "Clinical pharmacy", "Technology of perfumes and cosmetics".

To enter a pharmaceutical faculty, applicants take written examinations in Chemistry, Biology and Ukrainian. It usually takes five years to get a Pharmacy degree. Each academic year consists of two terms. The first two academic years are focused on giving students a basis in the fundamentals of pharmaceutical sciences, which includes medicine, chemistry, biology, ethics and training in professionalism. In later years, the focus of the study shifts from its theoretical foundations to practical study, including such special sciences as pharmacology, pharmacognosy, pharmaceutical chemistry, etc. During the study, students acquire extensive knowledge of medicines, including their design, manufacture and effects, as well as knowing how to operate pharmaceutical instrumentation.

Today, approximately two thousand of applicants from abroad enter Ukrainian medical universities and academies each year. In the 1980s, students mainly came from Africa and the Middle East, but in the 1990s the geography of students' enrolment significantly extended. Over the recent years, new body of foreign students is citizens of the former USSR republics. Enrolment of students from the Commonwealth countries is actual and promising.

Considerable attention is paid by the Ministry of Health of Ukraine to postgraduate education, which is carried out in NUPh, at the Faculty of Pharmacy of Zaporizhia State Medical University, Danylo Halytsky Lviv National Medical University, and in National Medical Academy of Postgraduate Education named

after P.L. Shupik. Further study is relatively unusual among Pharmacy graduates, though those wishing to move into research areas may choose to study for a further Master's degree or a PhD (Doctor of Philosophy) degree.

After completing the course of study, most of the Pharmacy graduates are employed as pharmacists. Other options include research, either at universities or in industry.

## COMPREHENSION CHECK

### *1.6. Find in the text English equivalents to the following expressions.*

- 1) повна середня освіта - .....
- 2) складати письмові екзамени - .....
- 3) значна увага приділяється аспірантській освіті - .....  
.....
- 4) основа в принципах фармацевтичних наук - .....  
.....
- 5) вступ студентів з інших країн - .....
- 6) широкі знання в лікарських засобах - .....
- 7) навчання та удосконалення фармацевтів - .....  
.....
- 8) рухатись до дослідницьких галузей - .....
- 9) діяти в багатьох містах - .....
- 10) конструювання та виробництво ліків - .....

### *1.7. Decide whether the following statements are true or false according to the text.*

1. Pharmaceutical education in Ukraine is a system of improvement of healthcare facilities.
2. You need to complete study at a secondary school to get into the university.
3. Pharmaceutical faculties operate in few cities of Ukraine.
4. The course of study usually includes five academic years.

5. Considerable attention in the first two academic years is paid to theoretical basis of pharmacy.
6. Students obtain practical skills only in the last term.
7. The amount of foreign students' countries gets less each year.
8. Today the Ministry of Health of Ukraine neglects postgraduate education.
9. All the senior students continue their study as postgraduates.
10. People with a Pharmacy degree work mostly as pharmacists.

## GRAMMAR

→ LEARN THIS!

| <b>ГРАМАТИЧНА ДОВІДКА</b>  |  |  |   |
|--|--|--|---|
| <b>Часи системи Indefinite (Simple)</b>  |  |  |   |
| виражають дію, що відбувається в теперішньому, минулому або майбутньому часах, без зазначення характеру цієї дії, її тривалості та співвіднесеності з іншою дією |  |  |   |
| <b>Утворення</b>   |  |  |   |
| (в залежності від типу речення)  |  |  |   |
| Present  | <b>Стверджувальне</b>  | <b>Питальне</b>  | <b>Заперечне</b>  |
|  | I <b>work/watch/go</b><br>you <b>work/watch/go</b><br>he, she, it<br><b>works/watches/goes*</b><br>we <b>work/watch/go</b><br>they <b>work/watch/go</b>  | <b>Do I work/watch/go ...?</b><br><b>Do you work/watch/go ...?</b><br><b>Does he, she, it work/watch/go ...?</b><br><b>Do we work/watch/go ...?</b><br><b>Do they work/watch/go ...?</b> | <b>I do not (don't) work/watch/go</b><br><b>you do not (don't) work/watch/go</b><br><b>he, she, it does not (doesn't)</b><br><b>work/watch/go</b><br><b>we do not (don't) work/watch/go</b><br><b>they do not (don't) work/watch/go</b> |
|  | *1. Закінчення <b>-es</b> додається після <b>-s, -sh, -ss, -ch, -tch, -x</b> та вимовляється як [ɪz]: <b>to watch – he watches</b> ;<br>2. У дієсловах, що закінчуються на <b>-y</b> з попереднім приголосним, перед закінченням <b>-es</b> буква <b>-y</b> змінюється на <b>i</b> : <b>to cry — he cries</b> ;<br>3. Дієслова <b>to go</b> і <b>to do</b> мають у третій особі однини закінчення <b>-es</b> . |  |   |
|  | <b>Слова-маркери:</b> <i>sometimes, seldom, regularly, always, usually, often, every ... (every day/week/month)</i>  |  |   |
| Past   | <b>Стверджувальне</b>  | <b>Питальне</b>  | <b>Заперечне</b>  |
|  | I<br>you<br>he, she, it<br>we<br>they  | <b>DID</b> { I<br>you<br>he, she, it<br>we<br>they }   | I<br>you<br>he, she, it<br>we<br>they   |
|  | <b>WORKED/<br/>WATCHED/<br/>WENT*</b>  | <b>WORK/<br/>WATCH/<br/>GO?</b>  | <b>DID NOT (DIDN'T)<br/>WORK/WATCH/<br/>GO</b>  |
| * До правильних дієслів додається закінчення <b>-ed</b> . Неправильні дієслова необхідно дивитись в таблиці неправильних дієслів ( <b>друга колонка</b> ).       |  |  |   |
| <b>Слова-маркери:</b> <i>yesterday, the day before, last ... (last week/month/year), ... ago (a week/three days/ two years ago), in + рік (in 1988)</i>          |  |  |   |

|   | Стверджувальне  | Питальне                                      | Заперечне  |
|---|---|---|--|
| <b>Future</b>   | I<br>you<br>he, she, it<br>we<br>they                 | WILL<br>I<br>you<br>he, she, it<br>we<br>they | I<br>you<br>he, she, it<br>we<br>they                      |
|   | <b>WILL ('LL)</b><br><b>WORK/</b><br><b>WATCH/ GO</b> | <b>WORK/</b><br><b>WATCH/</b><br><b>GO?</b>   | <b>WILL NOT (WON'T)</b><br><b>WORK/WATCH/</b><br><b>GO</b> |
| <b>Слова-маркери:</b> <i>tomorrow, the day after tomorrow, next ... (next week/month/year), soon, in + вказання проміжку часу (in 10 minutes/one hour/a year)</i> |   |   |  |

## GRAMMAR CHECK

### 1.8. Complete the sentences with the suitable form of a verb.

1. I ..... Pharmacy.
  - a) studies
  - b) study
  - c) studyies
2. .... Chemistry an interesting subject?
  - a) be
  - b) are
  - c) is
3. Our library ..... many books on medicine.
  - a) has
  - b) have
  - c) haven't
4. ... pharmaceutical students ... human anatomy?
  - a) Do ... study
  - b) Does ... study
  - c) Do ... studies
5. He ..... classes regularly.
  - a) don't attend
  - b) don't attends
  - c) doesn't attend
6. An academic year ..... from September to June.

- a) last
  - b) lasts
  - c) do lasts
7. ... you ... your university campus?
- a) Does ... like
  - b) Do ... like
  - c) Do ... likes
8. Pharmacists ..... a vital role in healthcare provision.
- a) play
  - b) plays
  - c) playies
9. My friend and I ..... to become pharmacists.
- a) wants
  - b) doesn't want
  - c) want
10. Students ... classes on Sundays.
- a) don't have
  - b) doesn't have
  - c) hasn't

***1.9. Complete the sentences using the verbs in brackets in Present Indefinite:***

1. The National University of Pharmacy ... (train) pharmacists.
2. Applicants ... (take) written examinations to enter the university.
3. ... all medical universities ... (have) pharmaceutical faculties?
4. The course of internship ... (not/last) for five years.
5. ... you often ... (go) to the library?
6. I ... (not/speak) English well.
7. Extensive knowledge of medicines ... (include) their design, manufacture and effects.
8. After graduation, Kate ... (work) as a pharmacist.

9. Many alumni ... (visit) their “alma mater” after graduation.
10. ... Tom ... (take) courses in Biology this term?

### LISTENING

***1.10. Follow the link and watch the video about Zaporizhzhia State Medical University. Then, write an annotation using the given phrases.***

***(Link: <https://www.youtube.com/watch?v=OWKzKVKjuI4>).***

The video is about ...

This video was posted on ...

At the beginning of the video it is showed that...

Then the video goes on by informing about ...

In the video it is underlined/discussed ...

In conclusion, it is said ...

I find this video ...

In my opinion, it is useful to note that ...

### SPEAKING

***1.11. Talk about the working day of a pharmaceutical student. Use the following question as the plan of your topic.***

- 1) Where do you study?
- 2) What time do you usually wake up on weekdays?
- 3) What is your morning routine?
- 4) What time do you usually leave home?
- 5) How long does it take you to get to the university?
- 6) How many lectures a day do you usually have?
- 7) What do you do when you come home from university?
- 8) Does it take much time and effort to do your homework?
- 9) What do you like doing in your free time?

# Unit 2. Pharmaceutical education in Great Britain and the USA

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів системи Indefinite Future Active;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «Pharmaceutical education abroad», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Pharmacy Education in the USA» та вправами до нього);
- граматика: навчитись утворювати форми часів Indefinite Future Active та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Study pharmacy in Liverpool»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «My future profession».

**Норма часу:** 14 годин.

## VOCABULARY AND PRONUNCIATION

### *2.1. How do you spell it? Check out the pronunciation of the following words!*

Bachelor, degree, to mandate, association, college, admission, curriculum, toxicology, pathophysiology, biology, pharmacologic agents, ethics, to enhance,



advocacy, throughout, a preceptor, entirely, practice experience, supervision, a preceptor, completion, a graduate, directly, successful, board examination, course.

## ***2.2. Memorize the new words.***

|                         |                           |
|-------------------------|---------------------------|
| to become               | становитися, ставати      |
| undergraduate program   | програма бакалаврата      |
| to consist              | складатися (з)            |
| coursework              | курсозна робота           |
| advanced sciences       | поглибленні науки         |
| proficient              | досвідчений               |
| opportunity             | можливість                |
| to assess               | оцінювати                 |
| to yield                | отримати, отримувати      |
| requirement             | вимога                    |
| internship              | стажування                |
| permission              | дозвіл                    |
| therapeutic application | терапевтичне застосування |
| interaction             | взаємодія                 |
| under the supervision   | під наглядом              |
| environment             | середовище                |

## ***2.3. Which of the variants is the best option? Fill in the gaps with appropriate words or word combinations.***

1. My cousin studies ... in this college.
  - a) advanced sciences
  - b) board examination
  - c) professional degree
  - d) practical work
2. Pharmacists can find work in a number of different ... .
  - a) opportunity
  - b) supervision
  - c) admission
  - d) environment
3. Entry ... for pharmacy degrees vary between different institutions.
  - a) permissions

- b) requirements
  - c) associations
  - d) interaction
4. The entry to pharmacy ... is often very competitive.
- a) agents
  - b) coursework
  - c) degrees
  - d) opportunity
5. Pharmacy ... are typically taught using a combination of lectures, seminars and practical exercises.
- a) permissions
  - b) internships
  - c) interactions
  - d) degrees
6. ... a proficient pharmacist you must know chemistry at a high level.
- a) To become
  - b) To mandate
  - c) To assess
  - d) To consist
7. Our college uses video technology to re-watch lectures ... .
- a) on advanced sciences
  - b) under the supervision
  - c) throughout the world
  - d) between different institutions
8. Any pharmacy education ...practice experiences.
- a) assesses
  - b) yields
  - c) includes
  - d) becomes
9. These students may become very ... in pharmacy.

- a) undergraduate
- b) therapeutic
- c) practical
- d) proficient

10. My classmate started his ... in a local pharmacy last week.

- a) requirement
- b) internship
- c) permission
- d) completion

**2.4. Replace the words with the synonyms.**

- 1. Course of study in university – university’s .....
- 2. to increase the chances – ..... the chances;
- 3. during studying – ..... studying;
- 4. a license to practice – .....to practice;
- 5. to finish the education program – .....the education program .

**2.5. Complete the word combination with appropriate preposition.**

- 1. The degree of Bachelor ... Pharmacy
- 2. legal sell ... narcotics and poisonous substances
- 3. to standardize drugs ....the world
- 4. to begin ... basic courses
- 5. training requirements ...pharmacists

**READING**

**Pharmacy Education in the USA**

Traditionally in the United States, the Bachelor of Science in Pharmacy was the first professional degree for pharmacy practice. However, in 1990, the American Association of Colleges of Pharmacy (AACCP) mandated that a Doctor of

Pharmacy would be the new first professional degree beginning with the class of 2006.

There are more than seventy accredited colleges of pharmacy in the United States. Today, young Americans seeking to become pharmacists must first complete a pre-pharmacy undergraduate program. This program consists of a minimum of 60-90 semester credit hours of undergraduate coursework in basic and advanced sciences; moreover, completing this program enhances the chances of many students to admission into a pharmacy college.

After admission, a student will typically complete a four-year pharmacy program. The curriculum typically begins with courses in Physiology and Pathophysiology, Medicinal Chemistry, Pharmacognosy, Pharmacology and Toxicology. Once a student is proficient in these core pharmaceutical sciences, instruction in evidence-based therapeutic application of pharmacologic agents begins. Aside from usage of agents, students are taught to recognize and assess risk factors for disease, interpret clinical data and recognize interactions of drugs and disease states.

Augmenting the pharmaceutical sciences, courses in ethics, management, pharmacy law, communications, public health and advocacy are taught throughout the professional program.

In addition to didactic work, pharmacy education includes practice experiences. These experiences are generally directed by the school, conducted under the supervision of a preceptor and are intended to complement work done in the classroom.

There is a course of introductory pharmacy practice experiences, which prepares students to the practice in pharmaceutical field. The final year of the curriculum generally consists entirely of the advanced pharmacy practice experiences. It allows the student the opportunity to practice in multiple environments under the supervision of a licensed pharmacist. Successful completion of the practice experience objectives may yield academic credit and satisfy state pharmacy board requirements for internship. A new pharmacy

graduate may choose to complete an optional post-graduate residency (one to three years) rather than entering directly into pharmacy practice.

### COMPREHENSION CHECK

#### **2.6. Find in the text English equivalents to the following expressions.**

1. бакалавр наук з фармації – .....
2. успішне завершення практики – .....
3. завершити програму бакалаврату – .....
4. розпізнавати взаємодію лікарських засобів – .....
5. програма складається з ... – .....
6. навчальна програма починається з ... – .....
7. вимоги державної фармацевтичної ради – .....
8. практика у фармацевтичній галузі – .....
9. поглиблений досвід практики в аптеці – .....
10. проводиться під наглядом наставника – .....

#### **2.7. Decide whether the following statements are true or false according to the text.**

1. To become a pharmacist in the USA, an applicant must finish a secondary school only.
2. Any American student usually completes a five-year pharmacy program.
3. Pharmacy students are taught to recognize and assess risk factors for disease and interactions of drugs.
4. Pharmacy students are taught therapeutic application of pharmacologic agents.
5. Pharmacy education in the USA includes practice experiences.
6. A course of pharmacy practice is generally directed by the Deputy Dean.
7. There are only seven accredited colleges of pharmacy in the USA.
8. The final year of the curriculum generally consists entirely of studying specialized subjects.
9. Senior students have an opportunity to practice in various environments.

10. Graduates have to pass a state board examination to get a license to practice.

## GRAMMAR

### → LEARN THIS!

**Future Simple** або майбутній простий час вказує на те, що якась певна дія буде відбуватися в майбутньому. Майбутній простий час (активний стан) в англійській мові утворюється за допомогою дієслова **will** з додаванням дієслова у першій формі. (Раніше для першої особи однини та множини використовували дієслово “shall”, але зараз воно вважається застарілим та майже не використовується)

**Приклади утворення часу для стверджувального речення:**

**I will speak with you next Monday.**

Я поговорю з тобою наступного понеділка.

**They will receive Bachelor degree.**

Вони отримають ступень бакалавра.

**He'll become a professional pharmacist.**

Він стане професійним фармацевтом.

**I'll (I will) do my homework.**

Я зроблю свою домашню роботу.

В Future Simple, як і в інших часових формах, є свої **слова-маркери**, які вказують, що дія відбуватиметься саме в майбутньому. Наприклад:

- tomorrow – завтра;
- next week (year, day, summer) – наступного тижня (року, дня, літа);
- in three (five, ten) days/months – через три (п'ять, десять) днів/місяців;
- in 2028 (2053) – у 2028 (2053) році.

Для побудови заперечного речення також використовується **will**, але з додаванням частки **not**. Скорочена форма виглядає так: **won't**.

|                               |                                 |
|-------------------------------|---------------------------------|
| <b>I'll not buy</b> that car. | Я не буду купувати ту машину.   |
| <b>She won't call</b> you.    | Вона не буде телефонувати тобі. |
| <b>He won't come.</b>         | Він не приїде.                  |

Для утворення питального речення в *Future Simple* дієслово **will** вживається перед підметом. Наприклад:

|  |   |
|--|---|
| <b>Will he go</b> with her?                | Він піде з нею?                         |
| <b>What will you do</b> tomorrow?          | Що ти будеш завтра робити?              |
| <b>Will they go</b> to church next Sunday? | Вони підуть до церкви наступної неділі? |

Для відповіді на запитання використовуються такі вирази:

| Питання                           | Позитивна відповідь    | Негативна відповідь       |
|-----------------------------------|------------------------|---------------------------|
| <b>Will you see him</b> tomorrow? | Yes, I will.           | No, I won't.              |
| <b>Will she call</b> you?         | Yes, she will call me. | No, she will not call me. |
| <b>Will she make</b> breakfast?   | Yes, she will.         | No, she will not.         |

## GRAMMAR CHECK

### 2.8. Choose the right variant.

- I .....advanced sciences during the next year.
  - study
  - will study
  - studied
- ...your elder sister ... a pharmacist in 2 years?

- a) Will ... become
  - b) Does... become
  - c) Did ... become
3. Today I ... not ... to the University.
- a) will ...go
  - b) ---...go
  - c) go...---
4. Our preceptor ... us next week.
- a) call
  - b) calls
  - c) will call
5. This patient ..... the medicine tomorrow.
- a) will not to buy
  - b) not buy
  - c) will not buy
6. Коли робочі закінчать будувати нову аптеку в нашому районі?
- a) When the workers will finish to build a new pharmacy in our district?
  - b) When will finish to build the workers a new pharmacy in our district?
  - c) When will the workers finish to build a new pharmacy in our district?
7. He will study pharmacology at an accredited college in Great Britain.
- a) Він вивчатиме фармакологію в акредитованій школі у Великобританії.
  - b) Він вивчатиме фармакологію в акредитованому коледжі у Великобританії.
  - c) Він вивчає фармакологію в акредитованому коледжі у Великобританії.
8. Pharmaceutical education will change greatly in 10-15 years.
- a) Фармацевтична освіта сильно зміниться за 10-15 років.
  - b) Фармацевтична освіта сильно змінилася за останні 10-15 років.
  - c) Фармацевтична галузь сильно зміниться впродовж 10-15 років.
9. Modern employers will look for pharmacists with verbal and written communication skills.



- a) Сучасні фармацевти шукатимуть асистентів із навичками словесного та письмового спілкування.
  - b) Сучасні роботодавці постійно шукають фармацевтів із навичками словесного та письмового спілкування.
  - c) Сучасні роботодавці шукатимуть фармацевтів із навичками словесного та письмового спілкування.
10. ... pharmacists ... direct patient care in the location that is most convenient for the patient?
- a) Will ... provide
  - b) Will ... to provide
  - c) Do ... provide

**2.9. Complete the sentences using the verbs in brackets in Future Indefinite:**

1. She (not/work) ..... for a pharmaceutical laboratory in 10 years.
2. The pharmacy of the future (focus) almost exclusively on personalized patient care.
3. In future, online prescription services (continue) likely to grow in popularity.
4. How (support) state strategy future pharmaceutical field?
5. In a not-so-distant future, robots (not/dispense) medications to patients.
6. Consumers (use) the internet to research a medication or medical device?
7. Students (discuss) the importance of technology for the future of the pharmacy profession.
8. When pharmacists (discuss) the importance of access to information?
9. Fiction literary (not/help) students to improve their knowlegde in pharmaceutical field.
10. Numbers of pharmacists (continue) to increase throughout the world.

## LISTENING

**2.10. Follow the link and watch the video about the study of pharmacy in Liverpool. Then, write an annotation using the given phrases.**

**(Link: <https://youtu.be/i5cxXNhjbc>)**

The video is about ...

This video was posted on ...

At the beginning of the video it is showed that...

Then the video goes on by informing about ...

In the video it is underlined/discussed ...

In conclusion it is said ...

I find this video ...

In my opinion, it is useful to note that ...

## SPEAKING

**2.11. Talk about your future profession. Use the following question as the plan of your topic.**

1. What is a pharmacist?
2. Why do you want to become a pharmacist? Name your personal reason, please.
3. What does pharmacy study?
4. What are the major skills for a pharmacist?
5. Do you know your future job duties?
6. Do you want to be a professional expert in medication?
7. Are pharmacists responsible for dispensing drugs?
8. What are the different types of pharmacy jobs?
8. How will your future profession be concerned with your patients' health and wellness? Explain, please.

# Unit 3. Botany.

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів системи Indefinite Passive;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «Botany», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Botany» та вправами до нього);
- граматика: навчитись утворювати форми часів Indefinite Passive та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Interesting facts about Plants»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «Some interesting facts about history of Botany».

**Норма часу:** 10 годин.

## VOCABULARY AND PRONUNCIATION

### *3.1. How do you spell it? Check out the pronunciation of the following words!*

Biology, phytology, botanist, ancient, mycologist, sphere, phycologist, approximately, forerunner, to include, herbalism, to affect, strict, human, to derive, medicinal, vascular, poisonous, medieval, nowadays, microscopy, remain, to use,

collection, number, sequences, subject, century, research, modification, agriculture, mechanism, metabolism.

### 3.2. Memorize the new words.

|                             |                                   |
|-----------------------------|-----------------------------------|
| scientist                   | вчений, науковець                 |
| branch                      | галузь (науки, знань)             |
| field                       | поле, область, сфера (діяльності) |
| fungus ( <i>pl. fungi</i> ) | гриб                              |
| to identify                 | ідентифікувати                    |
| to attach                   | приєднуватись, прикріплюватись    |
| technique                   | метод, спосіб                     |
| analysis                    | аналіз                            |
| to facilitate               | полегшувати                       |
| to develop                  | розвиватися                       |
| area                        | область                           |
| to catalogue                | вносити в каталог, підмічати      |
| to describe                 | описувати                         |
| structure                   | структура, склад                  |
| chemistry                   | хімія                             |
| to classify                 | класифікувати                     |
| disease                     | хвороба                           |
| synthesis                   | синтез                            |
| genetics                    | генетика                          |

### 3.3. Which of the variants is the best option? Fill in the gaps with appropriate word.

1. Dmitri Ivanovich Mendeleev is a ... of world-wide reputation.

- a) worker
- b) scientist
- c) doctor
- d) pharmacist

2. He is a leading specialist in the ... of Botany.

- a) technique
- b) human
- c) field
- d) structure

3. Penicillin was produced from a mold, which is ... .
- a) an animal
  - b) a fungus
  - c) a plant
  - d) a mechanism
4. How does the COVID-19 ... spread?
- a) disease
  - b) structure
  - c) phytology
  - d) subject
5. The study of pharmacognosy and the use of medicinal plants is called herbal medicine or ... .
- a) mycology
  - b) microscopy
  - c) agriculture
  - d) herbalism
6. This report ... the results of each test.
- a) facilitates
  - b) attaches
  - c) enters
  - d) catalogues
7. Nowadays we need ... greener pharmaceutical products.
- a) to classify
  - b) to describe
  - c) to develop
  - d) to attach
8. Microscopy is a ... for studying the structure of cells.
- a) technique
  - b) field
  - c) forerunner

- d) disease
9. The pharmacist ... the annotation to each medicine.
- a) classifies
  - b) derives
  - c) consists
  - d) attaches
10. Carbon monoxide is a ... gas.
- a) medieval
  - b) poisonous
  - c) vascular
  - d) medicinal

**3.4. Replace the underlined words with the synonyms.**

1. Botany is the study of plants.
2. Botany is a field of biology that studies plants.
3. A plant scientist specialises in the field of botany.
4. A lot of plants can treat different diseases.
5. A pharmacist identifies plants according to their medical properties.

**3.5. Complete the word combination with appropriate preposition.**

1. Botany is one of the two main areas ... biology.
2. Fungi do not possess chloroplasts and generally obtain carbon ... breaking down and absorbing surrounding materials.
3. Plant growth is determined by environmental factors, such as temperature, available water, available light, carbon dioxide and available nutrients ... the soil.
4. Plants use photosynthesis to create energy directly ... sunlight.
5. The principles and findings of botany have provided the base ... such applied sciences as agriculture, horticulture, and forestry.

## READING

### Botany

Botany, also called plant science(s), plant biology or phytology, is the science of plant life and a branch of biology. A botanist, plant scientist or phytologist is a scientist who specialises in this field. The term "botany" comes from the Ancient Greek word «βοτάνη (botanē)» meaning "pasture", "grass", or "fodder"; «βοτάνη» is, in turn, derived from «βόσκειν (boskein)», "to feed" or "to graze". Traditionally, botany also includes the study of fungi and algae by mycologists and phycologists respectively, with the study of these three groups of organisms remaining within the sphere of interest of the International Botanical Congress. Nowadays, botanists (in the strict sense) study approximately 410,000 species of land plants of which some 391,000 species are vascular plants (including approximately 369,000 species of flowering plants), and approximately 20,000 are bryophytes.

Botany originated in prehistory as herbalism with the efforts of early humans to identify – and later cultivate – edible, medicinal and poisonous plants, making it one of the oldest branches of science. Medieval physic gardens, often attached to monasteries, contained plants of medical importance. They were forerunners of the first botanical gardens attached to universities, founded from the 1540s onwards. One of the earliest was the Padua botanical garden. These gardens facilitated the academic study of plants. Efforts to catalogue and describe their collections were the beginnings of plant taxonomy, and led in 1753 to the binomial system of Carl Linnaeus that remains in use to this day.

In the 19th and 20th centuries, new techniques were developed for the study of plants, including methods of optical microscopy and live cell imaging, electron microscopy, analysis of chromosome number, plant chemistry and the structure and function of enzymes and other proteins. Since last two decades of the 20th century, botanists have exploited the techniques of molecular genetic analysis, including genomics and proteomics and DNA sequences to classify plants more accurately.

Modern botany is a broad, multidisciplinary subject with inputs from most other areas of science and technology. Research topics include the study of plant structure, growth and differentiation, reproduction, biochemistry and primary metabolism, chemical products, development, diseases, evolutionary relationships, systematics, and plant taxonomy. Dominant themes in the 21st century plant science are molecular genetics and epigenetics, which are the mechanisms and control of gene expression during differentiation of plant cells and tissues. Botanical research has diverse applications in providing staple foods, materials such as timber, oil, rubber, fibre and drugs, in modern horticulture, agriculture and forestry, plant propagation, breeding and genetic modification, in the synthesis of chemicals and raw materials for construction and energy production, in environmental management, and the maintenance of biodiversity.

#### COMPREHENSION CHECK

##### ***3.6. Find in the text English equivalents to the following expressions.***

- 1) найдавніші галузі науки галузь біології – .....
- 2) вивчення грибів та водоростей – .....
- 3) залишатися в сфері інтересів – .....
- 4) зародитися в доісторичний період як – .....
- 5) включати методи оптичної мікроскопії – .....
- 6) лікарські та отруйні рослини – .....
- 7) будова та функція ферментів – .....
- 8) містити рослини медичного значення – .....
- 9) полегшувати вивчення рослин – .....
- 10) клітини і тканини рослин – .....

##### ***3.7. Decide whether the following statements are true or false according to the text.***

1. Botany is the science of plant life and a branch of biology.



2. Botany is the scientific study of plants such as algae, fungi, lichens, mosses, ferns, conifers and flowering plants.
3. In the Middle Ages in Europe, only pharmacists could own gardens with plants of medical importance.
4. The term "botany" comes from a Latin word.
5. Efforts to describe the form and structure of plants were the beginnings of plant taxonomy.
6. Some new techniques such as methods of optical microscopy and live cell imaging were developed for the study of plants in the middle of the XVIII century.
7. In the XXI century, botanists deal with the techniques of molecular genetic analysis for plant classification.
8. The most important branches of plant science in 21st century are molecular genetics and epigenetics.
9. Medieval gardens, which contained plants of medical importance, were predecessors of the first botanical gardens attached to universities.
10. The latest research in the field of botany is applied in various areas of modern life.

## GRAMMAR

### → LEARN THIS!

Англійське дієслово має два стани: **активний/дійсний** (the Active voice) і **пасивний** (the Passive voice). За допомогою них можна описати будь-яку дію. Стан дієслова показує відношення між дією і виконавцем цієї дії.

→ **The Active Voice** (Дієслово позначає дію, яку виконує підмет):

*A pharmacist usually makes a lot of medicines.* - *Фармацевт зазвичай готує ліки.*

→ **The Passive Voice** (Дієслово позначає дію, яка спрямована на підмет):

*A lot of medicines are usually made by a pharmacist.* - *Багато ліків зазвичай готується фармацевтом.*

*Пасивний стан вживається, коли нам більш важливий об'єкт дії, а не її виконавець.  
При цьому об'єкт чи предмет, над яким виконувалась дія, стає на місце підмета.*

### ФОРМИ ДІЄСЛОВА Indefinite (Simple) У ПАСИВНОМУ СТАНІ

| To BE+V3/ed |   |  |
|-------------|---|--|
| PRESENT     | am<br>is + <b>V<sub>3</sub>/ed</b><br>are | <i>Plants <b>are</b> often <b>used</b> in medicine. – Рослини часто <b>використовуються</b> в медицині.</i>        |
| PAST        | was<br>+ <b>V<sub>3</sub>/ed</b><br>were  | <i>Plants <b>were used</b> as drugs in ancient times. – Рослини <b>використовувались</b> як луки в давні часи.</i> |
| FUTURE      | will be + <b>V<sub>3</sub>/ed</b>         | <i>Plants <b>will be used</b> as medicines. – Рослини <b>будуть використовуватись</b> як ліки.</i>                 |

#### GRAMMAR CHECK

#### 3.8. Complete the sentences with the suitable form of a verb.

- Plants for medicine ... by prehistoric people.
  - are used
  - were used
  - was used
- The first scientific study of plants ... by ancient Greeks and Romans.
  - will be made
  - is made
  - was made
- This process ... called metabolism.
  - am
  - is
  - are
- These plants ... by botanists for treatment next summer.
  - will be gathered

- b) are gathered
  - c) were gathered
5. This plant disease ... often ... by weather conditions.
- a) was caused
  - b) is caused
  - c) will be caused
6. Some plants ... in cooking for flavoring food.
- a) is used
  - b) are used
  - c) am used
7. Tremendous advantages of plant morphology ... during the XVI century.
- a) were made
  - b) was made
  - c) will be made
8. In XVI century microscopic structures of plants ... by Italian botanists in the XVI century.
- a) were observed
  - b) are observed
  - c) will be observed
9. New important properties of herbs ...by botanists in future.
- a) are discovered
  - b) were discovered
  - c) will be discovered
10. The living environment... maintained by plants.
- a) am
  - b) were
  - c) is

**3.9. Complete the sentences using the verbs in brackets in Indefinite (Active or Passive):**

1. Chemistry ... (to concern) with the utilization of natural substances and the creation of artificial ones.
2. Plant pathologist ... (to study) normal plants to find out how they function.
3. A lot of various kinds of cells ... (to make up) large plants.
4. Belladonna extract ... (to use) medicinally to treat different ailments.
5. Some herbs ... (to gather) with their roots.
6. Theophrastus ... (to call) a father of Botany.
7. All plants ... (to develop) from a tiny form called embryo.
8. Prehistoric people ... (to use) plants for medicine.
9. Different kinds of cells ... (to study) by botanists.
10. The development of modern botany ... (to begin) from the Renaissance.

### LISTENING

***3.10. Follow the link and watch the video about plants. Then, give answers to the following questions.***

(***Link:*** <https://www.youtube.com/watch?v=iRYPQATQVMY&feature=youtu.be> )

1. What did Henry Wadsworth say about flowers?
2. What techniques do flowers use to attract potential pollinators?
3. What goddesses in ancient Greece and Rome were responsible for the beauty and protection of flowers? (Give goddesses' names)
4. Is beautiful purple foxglove poisonous?
5. Can flowers be a delicious compliment to a dish?
6. What kind of health problems may an oleander cause?

### SPEAKING

***3.11. Talk about some interesting facts about the history of Botany. In your topic answer the following questions:***

1. Who's the founder of Botany?
2. When was botany discovered?
3. What does the term "botany" mean in the Greek language?

4. When did plants become medicine?
5. When were plants first used for medicinal purposes?
6. Who is called Father of Genetics?
7. Who discovered cell?
8. Did human's curiosity on plants lead to many discoveries in Botany which shaped our current lives in many ways?
9. When was the progress in the study of plant fossils made?
10. Name some of the most important discoveries in Botany of all times.

# Unit 4. Phytopharmacy. Homeopathic Medicine

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів системи Continuous Tenses Active;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «Phytopharmacy. Homeopathic medicine», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Phytopharmacy» та вправами до нього);
- граматики: навчитись утворювати форми часів Continuous Tenses Active та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Does Homeopathy work?»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «Phytopharmacy».

**Норма часу:** 10 годин.

## VOCABULARY AND PRONUNCIATION

**4.1. How do you spell it? Check out the pronunciation of the following words!**

Phytopharmacy, phytopharmaceuticals, to discover, compounds, diseases, phytochemicals, the folk knowledge, to involve, acceptability, compatibility, adaptability, to attain, therapeutic, advancement, to prescribe, important, technology, claim, remedy, chemist's shop.

**4.2. Memorize the new words.**

|                                    |                                     |
|------------------------------------|-------------------------------------|
| medicinal plants (medicinal herbs) | лікарські рослини (лікарські трави) |
| traditional medicine               | традиційна медицина                 |
| defence against                    | захист проти                        |
| constituent                        | складова частина                    |
| side effects                       | побічний ефект                      |
| health benefits                    | користь для здоров'я                |
| source                             | джерело                             |
| available                          | доступний                           |
| to maintain                        | підтримувати                        |
| health condition                   | стан здоров'я                       |
| herbal medicine                    | фітотерапія                         |
| to contain                         | містити, включати                   |
| substance                          | речовина                            |
| a plant-derived drug               | препарат рослинного походження      |
| safe usage                         | безпечне використання               |
| to administer                      | приписувати (ліки)                  |
| compound                           | сполука                             |
| plant extract                      | екстракт рослини                    |
| to provide (with)                  | забезпечувати                       |
| biological function                | біологічна дія                      |
| prevalent                          | поширений                           |
| curative                           | лікувальний                         |

**4.3. Which of the variants is the best option? Fill in the gaps with appropriate word.**

1. Plants produce an incredible variety of... .
  - a) health conditions
  - b) medicinal herbs
  - c) natural compounds
2. Medicinal plant are ... for many reasons.
  - a) herbal

- b) important
  - c) traditional
3. Medicinal plants ... people with natural drugs.
- a) provide
  - b) administer
  - c) discover
4. Scientists often discuss the ... of medicinal plants.
- a) health conditions
  - b) ecological conditions
  - c) biological function
5. Sodium is one of the ... of salt.
- a) constituents
  - b) herbs
  - c) drugs
6. Herbal medicines ... a large number of phytochemicals.
- a) contain
  - b) attain
  - c) maintain
7. A lot of ... are also used as foods or in cosmetic preparations.
- a) important sources
  - b) medicinal plants
  - c) biological functions
8. The use of ... is prevalent in patients with chronic diseases.
- a) chemical compounds
  - b) herbal medicines
  - c) biological activity
9. Valerian was used as a ... in ancient Greece and Rome.
- a) constituent
  - b) folk knowledge
  - c) medicinal herb



10. Many plants produce chemical compounds for ... of herbivores.
- a) safe usage
  - b) defence against
  - c) plant extract

**4.4. Replace the words with the synonyms.**

- 1. Medicinal plants – Medicinal .....
- 2. Chronic illness – Chronic .....
- 3. To prescribe the medicine – to ... the medicine;
- 4. Curative aid – ... aid;
- 5. Garlic consists of 10-20 'cloves'. – Garlic...10-20 'cloves'.

**4.5. Complete the word combination with appropriate preposition.**

- 1. Homeopathy is a medical system based ... the belief that the body can cure itself.
- 2. Homeopathy was developed ... the late 1700s in Germany.
- 3. Don't use homeopathic medicine... life-threatening illnesses, like asthma, cancer, and heart disease, or in emergencies.
- 4. Scientists argue that a medicine ... no active ingredient shouldn't have an effect on the body.
- 5. Homeopathic medicines are often prepared... natural source materials.

**READING**

**Phytopharmacy**

Phytopharmacy is the study of the plants that are used as drugs. First medicinal plants (medicinal herbs) were discovered and used in traditional medicine practices in prehistoric times.

Plants synthesise hundreds of chemical compounds for functions including defence against insects, fungi, diseases, and herbivorous mammals. There are numerous phytochemicals with potential biological activity.

Medicinal plants are widely used in a lot of countries, mainly because they are readily available and cheaper than modern medicines. The World Health Organization coordinates a network to encourage safe and rational usage of traditional medicine.

Plant is an important source of medicine and it plays a key role in the world health. Medicinal herbs or plants are known as an important potential source of therapeutics or curative aids. The use of medicinal plants attains a commanding role in health system all over the world. This involves the use of medicinal plants not only for the treatment of diseases but also as potential material for maintaining good health and conditions. Two-third of the world's population depends on herbal medicine for primary health care. The reasons for this is because of their better cultural acceptability, better compatibility and adaptability with the human body and less side effects. From records, most of the used drugs contain plant extracts. Some contain active ingredients (bioactive components or substances) obtained from plants. Through recent researches, plant-derived drugs were discovered from the study of curative, therapeutic, traditional cures and most especially the folk knowledge of indigenous people and some of these claims and believe of people are irreplaceable despite the recent advancement in science and technology. Some of the drugs obtained from plants are aspirin, atropine, artimesinin, colchicine, digoxin, ephedrine, morphine, physostigmine, pilocarpine, quinine, quinidine, reserpine, taxol, tubocurarine, vincristine and vinblastine. The importance of medicinal plants cannot be taken lightly.

A medicinal plant is a plant that is used for maintaining health and administered for a specific condition, or both, whether in modern medicine or in traditional medicine. Over 50,000 medicinal plants are used across the world. In modern medicine, around a quarter of the drugs prescribed to patients are derived from medicinal plants, and they are rigorously tested. Medicinal plants may

provide three main kinds of benefit: health benefits to the people who consume them as medicines; financial benefits to people who harvest, process, and distribute them for sale; and society-wide benefits, such as job opportunities, taxation income, and a healthier labour force. However, development of plants or extracts having potential medicinal uses is blunted by weak scientific evidence, poor practices in the process of drug development, and insufficient financing.

#### COMPREHENSION CHECK

##### ***4.6. Find in the text English equivalents to the following expressions.***

- 1) сотні хімічних сполук – .....
- 2) потенційна біологічна активність – .....
- 3) широко використовуються – .....
- 4) мережа безпечногo використання – .....
- 5) важливе джерело для медицини – .....
- 6) терапевтичні та лікувальні засоби – .....
- 7) лікування захворювань – .....
- 8) містити активні компоненти – .....
- 9) первинна медична допомога – .....
- 10) розповсюджувати ліки – .....

##### ***4.7. Decide whether the following statements are true or false according to the text.***

1. The healing properties of plants became known to people only in the 12th century.
2. Chemical components of plants protect the human body from insects, fungi, diseases and herbivorous mammals.
3. The World Health Organization controls traditional medicine.
4. Plant-derived drugs contain active ingredients for the treatment of diseases.
5. Medicinal herbs are used only for maintaining good health and conditions of the human body.

6. The usage of medicinal plants plays the dominant role in health system of European countries.
7. In total, about 10 thousand plants with medicinal properties are known in the world.
8. Nowadays today half of all drugs prescribed to patients worldwide are extracts of medicinal plants.
9. The use of natural product is as old as human civilization and the main sources of drugs are mineral, plant and animal.
10. Medicinal plants are used to treat effectively any disease in modern medicine.

## GRAMMAR

→ LEARN THIS!

### ЧАСИ СИСТЕМИ CONTINUOUS

*Часи Continuous будуються за допомогою потрібної форми дієслова "to be" плюс форми -ing основного (змістового) дієслова. Найчастіше вони вказують на тривалість дії в якийсь момент, на її тимчасовий, а не постійний, характер.*

| PAST CONTINUOUS   | PRESENT CONTINUOUS  | FUTURE CONTINUOUS   |
|---|---|---|
| використовується для вираження дій, щовідбувалися в конкретний, точно відомий момент або проміжок часу в минулому | використовується для вираження певної дії, щовідбувається прямо зараз, в момент говоріння | використовується для опису дій, щобудуть відбуватися в конкретний, точно відомий момент або ж проміжок часу в майбутньому |
| <p><b>He was working at six o'clock.</b></p> <p><i>Він працював о шостій годині.</i></p>                          | <p><b>He is working now.</b></p> <p><i>Він працює в даний момент</i></p>                  | <p><b>He will be working at eight o'clock.</b></p> <p><i>Він буде працювати о восьмій годині.</i></p>                     |
| <p><b>He wasn't working at six o'clock.</b></p> <p><i>Він не працював о шостій годині.</i></p>                    | <p><b>He's not working now.</b></p> <p><i>Він не працює зараз (в даний момент).</i></p>   | <p><b>He won't be working at eight o'clock.</b></p> <p><i>Він не буде працювати о восьмій годині.</i></p>                 |

| <p><b>Was he working at six o'clock?</b><br/><i>Він працював о шостій годині?</i></p>  | <p><b>Is he working now?</b><br/><i>Він зараз працює?</i></p>   | <p><b>Will he be working at eight o'clock?</b><br/><i>Він буде працювати о восьмій годині?</i></p>  |
|--|---|---|
| <ul style="list-style-type: none"> <li>• <i>at that moment</i> – в той момент</li> <li>• <i>at the same time</i> – в цей же час (у минулому)</li> <li>• <i>while</i> – в той час, як; поки</li> <li>• <i>when</i> – коли</li> <li>• <i>as</i> – так як</li> <li>• <i>all morning / the whole morning</i> – протягом всього ранку, весь ранок</li> <li>• <i>all night (long) / the whole night</i> – протягом всієї ночі, всю ніч</li> <li>• <i>all evening / the whole evening</i> – протягом всього вечора, весь вечір</li> <li>• <i>all day (long) / the whole day</i> – протягом всього дня, весь день</li> </ul> | <ul style="list-style-type: none"> <li>• <i>now</i> – зараз</li> <li>• <i>right now</i> – прямо зараз</li> <li>• <i>still</i> – все ще</li> <li>• <i>currently</i> – тепер, в цей час</li> <li>• <i>at the moment</i> – в цей момент</li> <li>• <i>at present</i> – в теперішній час</li> <li>• <i>this morning</i> – цього ранку, цимранком</li> <li>• <i>this evening</i> – цьоговечора</li> <li>• <i>this afternoon</i> – сьогодні після обіду</li> <li>• <i>today</i> – сьогодні (удень)</li> <li>• <i>tonight</i> – сьогодні (ввечері)</li> <li>• <i>these days</i> – на днях</li> </ul> | <ul style="list-style-type: none"> <li>• <i>at 5 o'clock</i> – о 5-ій годині</li> <li>• <i>at that moment</i> – в той момент</li> <li>• <i>this time tomorrow</i> – в цей час завтра</li> <li>• <i>the same time next week</i> – в цей самий час наступного тижня</li> <li>• <i>meanwhile</i> – тим часом, в той час, коли</li> <li>• <i>meantime</i> – тим часом, між тим</li> <li>• <i>from 10 a.m. to 11 a.m. tomorrow</i> – з 10-ї до 11-ї ранку завтра</li> <li>• <i>during this time</i> – протягом цього часу</li> <li>• <i>during the morning</i> – вранці, весь ранок</li> <li>• <i>during the day</i> – протягом дня</li> <li>• <i>all day long</i> – цілий день, весь день</li> <li>• <i>all night</i> – всюніч, цілуніч</li> <li>• <i>all the time</i> – весь час</li> <li>• <i>the whole evening</i> – весь вечір</li> </ul> |

## GRAMMAR CHECK

### 4.8. Complete the sentences with the suitable form of a verb.

1. He ... in a pharmaceutical lab during his last vacation.

- a) was working
- b) will be working
- c) is working

2. ... plants constantly ...?

- a) Is ...metabolizing

- b) Are ...metabolizing  
c) Am ... metabolizing
3. ... you ... Botany now?  
a) Were ... learning  
b) Will... be learning  
c) Are...learning
4. What ..... ? I'm looking for my medicines.  
a) are you doing  
b) you are doing  
c) do you do
5. The doctor was administering the medicine when the patient came in.  
a) Лікар призначав ліки, коли пацієнт зайшов.  
b) Лікар завжди призначає ліки, коли заходять пацієнти.  
c) Лікар призначає ліки коли пацієнт зайде.
6. ... he... you at the chemist's shop at 8 o'clock tomorrow?  
a) Was ... meeting  
b) Will ...be meeting  
c) Is ... meeting
7. More and more people ... medicinal plants for treatment.  
a) were using  
b) are using  
c) is using
8. He ... not ... the whole day before yesterday.  
a) was ... experiment  
b) was ...experimenting  
c) was ... experimented
9. Don't prescribe other remedies while your patients ... homeopathic medicine.  
a) are taking  
b) are take  
c) are taken

10. Nowadays they ... not ... the method of homeopathy in their practice.
- a) are ... using
  - b) were ... using
  - c) will ... be using

**4.9. Complete the sentences using the verbs in brackets in Continuous (Past, Present or Future):**

1. ... nature ... (produce) many important phytoconstitutions of healing agents?
2. At present, Ukrainian pharmacists ... (conduct) experiments on plants.
3. These days the pharmaceutical company ... (not receive) any benefits.
4. The pharmacist ... (sell) herbal medicines, when I came to the chemist's shop.
5. ... they ... (take) special remedies at 5 o'clock tomorrow?
6. During next week we ... (work) in the pharmaceutical laboratory.
7. ... Dr. Brown ... (examine) this herb the whole morning yesterday?
8. Nurses ... (not take) care of this patient all night long 2 days ago.
9. They ... not ... (collect) medicinal plants this time next summer.
10. ... this buyer ... (look) for herbal medicines now?

## LISTENING

**4.10. Follow the link and watch the video about homeopathy. Then, give answers to the following questions.**

**(Link:**

<https://www.youtube.com/watch?v=Lq29f14X1t0https://youtu.be/i5cxXNhjbc>)

1. What is homeopathy?
2. Who founded homeopathy?
3. Is homeopathy very popular?
4. How does homeopathy work?
5. What is homeopathic treatment?
6. What conditions does homeopathy treat?

7. What are the risks of homeopathy?
8. What is an example of homeopathic medicine?
9. What are homeopathic medicines made of?
10. What are the side effects of homeopathic medicine?

### **SPEAKING**

***4.11. Talk about phytopharmacy. Use the following questions as the plan of your topic.***

1. What is phytopharmacy?
2. What is phytopharmaceutical product?
3. Why are plant extracts important as the basis for ointments, tablets and teas?
4. Are phytotherapy and homeopathy the same thing?
5. Are active plant substances used for treating heart failure? Why?
6. What plants with medicinal properties do you know? Name them, please.
7. Are phytopharmaceuticals homeopathic products?
8. Describe the future of phytopharmacy.



# Revision Tests to Units 1-4

***Task 1. Read and translate.***

## ***Life of a Pharmacy Student***

The life of a typical pharmacy student isn't easy. The educational activities at the Faculty of Pharmacy are different from everyday ones. There are a lot of Maths and Chemistry classes every day. Pharmacy students use their maths skills on a daily basis to make sure they have the correct dosage and measurements of medications. Knowledge of chemistry is essential to ensure proper mixing of medicinal compounds for patients. With knowledge of pharmaceutical botany, the pharmacist will be able to distinguish medicinal plants from species that are not used in therapy. Students also need to learn Latin in order to understand the instructions in a prescription. In addition to perfect knowledge of the specialties, excellent communication skills are vital for future pharmacists.

Studying at the Faculty of Pharmacy will be an amazing and fantastic challenge in the life of any young person.

***Task 2. Choose the right variant:***

1. Chemistry is not one of the most fundamental subjects of pharmaceutical education.
  - a) True
  - b) False
2. Deep knowledge of mathematics is essential for every student of Pharmacy faculty.
  - a) True
  - b) False
3. Pharmacy students are usually very busy with their educational activity.
  - a) True

- b) False
4. The important subjects for the first-year students of Pharmacy Faculty are:
- a) Chemistry, Mathematics, Botany and Latin
  - b) Chemistry, Geography, Ecology and Latin
  - c) Mathematics, Chemistry, Geography and Latin
  - d) Botany, History, Ecology and Latin
5. Maths skills are necessary for...
- a) making the correct dosage of medications.
  - b) making proper measurements of medications.
  - c) determining how much of one substance you need to add to another.
  - d) all of the above
6. She's *вивчає* studying pharmacy at the university.
- a) studying
  - b) taking
  - c) teaching
  - d) creating
7. Mike is ... a chemistry course this semester.
- a) making
  - b) taking
  - c) entering
  - d) including
8. The work of pharmacists requires a lot of ... skill.
- a) diagnostic
  - b) creative
  - c) communication
  - d) culinary
9. Люди бажають залишатися здоровими та активними, тому зростає попит на фармацевтів.
- a) People want to get quality medicine, so they ask a professional pharmacist for advice.

- b) People want to stay healthy and active, therefore, there is a lot of work for pharmacists.
  - c) People always want to be fit and healthy, so the healthcare industry is constantly developed.
  - d) People want to stay healthy and active, therefore, there is increased demand for pharmacists.
10. Абiтуриєнти складають iспити для вступу на фармацевтичнi факультети.
- a) Applicants must take exams to enter pharmaceutical faculties.
  - b) Applicants don't take any exams to enter pharmaceutical faculties.
  - c) Applicants take exams to enter pharmaceutical faculties.
  - d) Applicants take exams to enter medical and pharmaceutical faculties.

***Task 3. Read and translate:***

Pharmacy is the health profession. It is charged with ensuring the safe use of medication. The scope of pharmacy practice includes compounding and dispensing medications on the orders of physicians, and modern services related to patient care, including clinical services, reviewing medications for safety and efficacy and so on. Pharmacists are experts in drug therapy.

As a rule, pharmacists work in a retail drugstore or in a hospital. They also advise patients about general health topics, such as diet, exercise, etc.

Pharmacists provide information on products, such as durable medical equipment or home healthcare supplies. Pharmacists are responsible for the accuracy of every prescription that is filled. Pharmacists also frequently supervise pharmacy students serving as interns.

***Task 4. Choose the right variant:***

1. A pharmacist is responsible for ensuring the safe use of medicines.
  - a) True
  - b) False
2. Pharmacists distribute prescription drugs to individuals.

- a) True
  - b) False
3. Pharmacists communicate directly with patients in order to correctly deliver medications.
- a) True
  - b) False
4. Pharmacists concern about the safety and ... of the vaccine.
- a) efficacy
  - b) work
  - c) practice
  - d) prescription
5. Pharmacy ... to change with new medications developed, new ways to take care of chronic illness and prevent disease.
- a) stops
  - b) finishes
  - c) continues
  - d) provides
6. Pharmacist *зотують* labels for medicines.
- a) recognize
  - b) prepare
  - c) enter
  - d) include
7. Фармація є однією з основних і старих галузей медицини.
- a) Pharmacy is one of the most important branches of medicine.
  - b) Pharmacy is one of the fundamental and old branches of medicine.
  - c) Pharmacy is one of the key and the most modern field of medicine.
  - d) Pharmacy is one of the fastest growing branches of medicine.
8. Сьогодні ліки можуть радикально змінити життя людини.
- a) Nowadays, modern medicines can radically change a person's life.
  - b) Nowadays, modern medicines can lead to human death.

- c) Today, drugs can radically change the doctors' approach to treatment.
  - d) Today, modern medicines have a strong impact on a person's life.
9. Pharmacist is one of the most demanded ... in the world.
- a) institutions
  - b) medications
  - c) services
  - d) professions
10. Pharmacists ...
- a) are professionals in medications.
  - b) distribute prescription drugs to individuals.
  - c) dispense medications, counsel patients on the use of medications, and advise physicians about medication therapy.
  - d) all of the above

***Task 5. Read and translate:***

The pharmaceutical botany is one of the main subject for future pharmacists. The students learn to observe important characteristics of medicinal plants. By this knowledge, pharmacist will be capable of distinguishing medicinal plants from species which are not used in therapy.

Plants produce a lot of chemicals that are biologically active. There are hundreds of plants that contain substances that make them ideal for treating illnesses. The history of herbal medicine stretches back to the beginning of human history, and there is written evidence of the use and cultivation of medicinal herbs that can be traced back to ancient times.

Medicinal properties derived from plants can come from many different parts of a plant including leaves, roots, bark, fruit, seeds, flowers. The different parts of plants can contain different active ingredients within one plant. Thus, one part of the plant could be toxic while another portion of the same plant could be harmless.

**Task 6. Choose the right variant:**

1. The humans have a long history of using plants to treat diseases.
  - a) True
  - b) False
2. Absolutely all types of plants have medicinal properties and can be used to treat diseases.
  - a) True
  - b) False
3. Today, in pharmacy, the most attention is given to drugs of biological origin-healing herbs.
  - a) True
  - b) False
4. There is no any evidence that ancient people collected various *лікарські трави* and tried to alleviate their health problems, pain and suffering.
  - a) active chemicals
  - b) medicinal herbs
  - c) medicinal substances
  - d) herbal medicine
5. A lot of herbs offer harmless ways *поліпшувати* human health.
  - a) to produce
  - b) to learn
  - c) to improve
  - d) to contain
6. In the 17th century, botanists were interested in ... primarily as in remedy.
  - a) water
  - b) silver
  - c) soil
  - d) a plant
7. Many plant-based substances can be used for ... purposes.
  - a) religious

- b) herbal
- c) medicinal
- d) official

8. Learning Pharmaceutical Botany, students should be ...

- a) able to describe accurately the characteristics of the various medicinal plants.
- b) able to identify common medicinal plants.
- c) familiar with the general methods and principles on the harvesting, processing and storage of crude drugs.
- d) all of the above

9. Споживання рослинних ліків неухильно зростає у всьому світі.

- a) The production of herbal medicines is growing steadily around the world.
- b) The consumption of herbal medicines is forbidden throughout the world.
- c) The consumption of herbal medicines is increasing steadily throughout the world.
- d) The consumption of synthetic drugs is steadily declining around the world.

10. Фітопрепарати мають здатність лікувати та покращувати фізичне та психічне здоров'я.

- a) Herbal remedies help people to prevent or cure physical and mental diseases.
- b) Herbal remedies have the ability to heal and boost physical and mental health.
- c) Herbal drugs are considered as an alternative treatment for health problems.
- d) Herbal remedies are used to improve physical and mental health.

***Task 7. Read and translate:***

Homeopathy is a medical system based on the belief that the body can cure itself. Those who practice it use tiny amounts of natural substances, like plants and

minerals. They believe these stimulate the healing process. Homeopathy was developed in the late 1700s in Germany by the physician Samuel Hahnemann.

A basic belief behind homeopathy is "like cures like". In other words, something that brings on symptoms in a healthy person can - in a very small dose - treat an illness with similar symptoms. This is meant to trigger the body's natural defenses.

Homeopathic doctors (who also are called "homeopaths") weaken ingredients by adding water or alcohol. Homeopaths believe that the lower the dose, the more powerful the medicine. In fact, many of these remedies no longer contain any molecules of the original substance. They come in a variety of forms, like sugar pellets, liquid drops, creams, gels, and tablets.

***Task 8. Choose the right variant:***

1. Homeopathy is based on the usage of substances in dilute form.
  - a) True
  - b) False
2. Homeopathy was created in the seventeenth century by the Dutch physician Susan Henkelman.
  - a) True
  - b) False
3. Homeopathic remedies are made from plant extracts, mineral compounds, animal substances and appropriate solvents: alcohol, water, glycerin or lactose.
  - a) True
  - b) False
4. Homeopathic medicines may be mixed with *невеликою кількістю* of clean water.
  - a) a small number
  - b) a small amount
  - c) a large amount
  - d) a huge amount



5. Homeopathic medicines are produced by ...
- a) purification
  - b) concentration
  - c) dilution
  - d) vapping
6. Homeopathic remedies ... in such a way that they are non-toxic and do not cause side effects.
- a) are prepared
  - b) are operated
  - c) are expanded
  - d) are distributed
7. Чи допомагає гомеопатія людям поліпшити своє здоров'я?
- a) Does homeopathy help people to improve their health?
  - b) Does homeopathy treat people for many years?
  - c) Is homeopathy the only system improving peoples' health?
  - d) Has homeopathy already helped people to improve their health?
8. Homeopathy is a natural method of treatment that triggers or intensifies ....
- a) the healing mechanism of medicinal plants.
  - b) the body's own healing mechanisms.
  - c) the effect of medicines in the human body.
  - d) the detection of organ pathologies.
9. What sources are homeopathic medicines made from?
- a) They are made from plant, chemical, mineral or animal sources.
  - b) They are made from plant sources only.
  - c) They are made from plant and animal sources.
  - d) They are made from chemical sources only.
10. Гомеопатія - це система медицини, яка використовується у всьому світі вже більше 200 років.
- a) Homeopaths have already developed and successfully use more than 200 thousand drugs around the world.

b) Homeopathy is a system of medicine that has been used across the world for more than 200 years.

c) Homeopaths have already cured more than 200 thousand patients around the world.

d) Homeopathy is a system of medicine that treats patients throughout the world more than 200 years.

**Task 9. Grammar test. Choose the right variant:**

1. Pharmaceutical faculties ... in few cities of Ukraine.
  - a) are operate
  - b) operate
  - c) operates
  - d) operating
2. ... your groupmates ... as pharmacists in 4 years?
  - a) Do ... work
  - b) Does ... work
  - c) Are ... work
  - d) Will ... work
3. Our students ... on Saturdays and Sundays.
  - a) don't study
  - b) not study
  - c) are not study
  - d) won't study
4. The word "pharmacy" also ... to a place where medicines are prepared or sold.
  - a) refer
  - b) is refer
  - c) refers
  - d) refering
5. The first pharmaceutical colleges in Great Britain ... in the beginning of the XIX century.

- a) founded
  - b) did founded
  - c) were found
  - d) were founded
6. The history of pharmaceutical education ... closely ... with medical education.
- a) does ... connected
  - b) is ... connected
  - c) are ... connected
  - d) will ... connect
7. Some of the students ... preparations from herbs now.
- a) are made
  - b) makes
  - c) are making
  - d) make
8. ... plants constantly ... ?
- a) Do ... metabolize
  - b) Are ... metabolizing
  - c) Are ... metabolize
  - d) Are ...metabolized
9. Homeopathy ... last century. It ... several centuries ago.
- a) was not discovered / was created
  - b) not discovered / did create
  - c) is not discovered / is created
  - d) was discovered / was not created
10. ... you ... pharmacy at school?
- a) Was ... learn
  - b) Learn ... ---
  - c) Did ... learn
  - d) Were... learn

# Unit 5. Chemistry.

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів системи Continuous Tenses Passive;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «Chemistry. Chemical analysis», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Chemistry» та вправами до нього);
- граматики: навчитись утворювати форми часів Continuous Tenses Passive та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Methods of chemical analysis»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «The beginnings of modern chemistry».

**Норма часу:** 10 годин.

## VOCABULARY AND PRONUNCIATION

### *5.1. How do you spell it? Check out the pronunciation of the following words!*

Carbon, bromine, copper, helium, hydrogen, iodine, iron, magnesium, mercury, nitrogen, oxygen, silver, sodium, sulphur, isotope, carbohydrate, analysis, electrolysis, chromatography, colorimetry, spectroscopy, synthesis, conductometry, gravimetry.

### 5.2. Memorize the new words.

|                    |   |
|--------------------|---|
| substance          | речовина, субстанція                                      |
| to investigate     | досліджувати  |
| property           | властивість   |
| composition        | склад   |
| to alter           | змінювати, вносити зміни                                  |
| alteration         | зміна, перебудова   |
| to undergo         | піддаватися, переносити                                   |
| to occur           | відбуватися   |
| to differ          | відрізнятися  |
| chemical bond/link | хімічний зв'язок  |
| chemical chain     | хімічний ланцюг   |
| compound           | сполука   |
| matter             | матеріал, речовина  |
| particle           | частка  |
| solid              | 1. тверда речовина, тверде тіло; 2. твердий, щільний      |
| liquid             | 1. рідина, рідкий стан; 2. рідкий, текучий                |
| ratio              | співвідношення, коефіцієнт, пропорція                     |
| volume             | 1. том, книга; 2. об'єм; 3. ємність, місткість            |
| quantitative       | кількісний  |
| qualitative        | якісний   |
| assay              | проба, аналіз   |
| precipitation      | осад  |
| combustion         | 1. горіння, згоряння; 2. окиснювання (органічних речовин) |

### 5.3. Which of the variants is the best option? Fill in the gaps with appropriate word.

1. To discolor means to ... the hue or color of the substance.
  - a) add
  - b) alter
  - c) create
  - d) determine
2. All the chemical elements differ by their physical and chemical ... .
  - a) names
  - b) position

- c) precipitation
  - d) properties
3. Sugars are complex ... that contain atoms of oxygen, hydrogen and carbon.
- a) compounds
  - b) connections
  - c) combustions
  - d) collaborations
4. Chemistry is concerned with atoms and their ... with other atoms.
- a) bridges
  - b) position
  - c) changes
  - d) bonds
5. All the ... consists of atoms.
- a) movements
  - b) humans
  - c) matter
  - d) everything
6. This substance is a mixture of solid and liquid ... .
- a) bonds
  - b) particles
  - c) links
  - d) compositions
7. Chemists ... the properties of matter at the level of atoms and molecules.
- a) investigate
  - b) occur
  - c) differ
  - d) concern
8. Chemical ... can be defined as the arrangement, ratio, and type of atoms in molecules of chemical substances.
- a) collaboration

- b) combustion
- c) connection
- d) composition

9. This technique measures the ... of the substance.

- a) violence
- b) variety
- c) volume
- d) value

10. The creation of a solid from a solution is called ... .

- a) premonition
- b) precipitation
- c) pressure
- d) permission

**5.4. Replace the words with the synonyms.**

1. burning of carbon – ..... of carbon;
2. changes in the molecular structure – ..... in the molecular structure;
3. chemical analysis – chemical ..... ;
4. chemical properties of the matter – chemical properties of the ..... ;
5. the process of precipitation happens – the process of precipitation .....

**5.5. Complete the word combination with appropriate preposition.**

1. to be composed ... atoms
2. to differ ... properties
3. to be present ... a substance
4. to build a compound ... simpler elements
5. to be applied ... the analysis

## READING

### What is chemistry?

*By Alane Lim*

#### *Chemistry is involved in everything we do.*

You might think of chemistry only in the context of lab tests, food additives or dangerous substances, but the field of chemistry involves everything around us.

"Everything you hear, see, smell, taste, and touch involves chemistry and chemicals (matter)," according to the American Chemical Society (ACS), a non-profit science organization for the advancement of chemistry, chartered by the U.S. Congress. "And hearing, seeing, tasting, and touching all involve intricate series of chemical reactions and interactions in your body."

So, even if you don't work as a chemist, you're doing chemistry, or something that involves chemistry, with pretty much everything you do. In everyday life, you do chemistry when you cook, when you use cleaning detergents to wipe off your counter, when you take medicine or when you dilute concentrated juice so that the taste isn't as intense.

According to the ACS, chemistry is the study of matter, defined as anything that has mass and takes up space, and the changes that matter can undergo when it is subject to different environments and conditions. Chemistry seeks to understand not only the properties of matter, like the mass or composition of a chemical element, but also how and why matter undergoes certain changes — whether something transformed because it combined with another substance, froze because it was left for two weeks in a freezer, or changed colors because it was exposed to too much sunlight.

#### *Chemistry basics*

The reason why chemistry touches everything we do is because almost everything in existence can be broken down into chemical building blocks.

The main building blocks in chemistry are chemical elements, which are substances made of a single atom. Each chemical is unique, composed of a set



number of protons, neutrons and electrons, and is identified by a name and a chemical symbol, such as "C" for carbon. The elements that scientists have discovered so far are listed in the periodic table of elements, and include both elements that are found in nature like carbon, hydrogen and oxygen, as well as those that are manmade, like Lawrencium.

Chemical elements can bond together to form chemical compounds, which are substances made up of multiple elements, like carbon dioxide (which is made of one carbon atom connected to two oxygen atoms), or multiple atoms of a single element, like oxygen gas (which is made of two oxygen atoms connected together). These chemical compounds can then bond with other compounds or elements to form countless other substances and materials.

### *The five main branches of chemistry*

Traditionally, chemistry is broken into five main branches. There are also more specialized fields, such as food chemistry, environmental chemistry and nuclear chemistry, but this section focuses on chemistry's five major subdisciplines.

**Analytical chemistry** involves the analysis of chemicals, and includes qualitative methods like looking at color changes, as well as quantitative methods like examining the exact wavelength(s) of light that a chemical absorbed to result in that color change.

These methods enable scientists to characterize many different properties of chemicals, and can benefit society in a number of ways. For example, analytical chemistry helps food companies make tastier frozen dinners by detecting how chemicals in food change when they are frozen over time. Analytical chemistry is also used to monitor the health of the environment by measuring chemicals in water or soil, for example.

**Biochemistry**, as mentioned above, uses chemistry techniques to understand how biological systems work at a chemical level. Thanks to biochemistry, researchers have been able to map out the human genome, understand what different proteins do in the body and develop cures for many diseases.

**Inorganic chemistry** studies the chemical compounds in inorganic, or non-living things such as minerals and metals. Traditionally, inorganic chemistry considers compounds that do *not* contain carbon (which are covered by organic chemistry), but this definition is not completely accurate, according to the ACS.

Some compounds studied in inorganic chemistry, like "organometallic compounds," contain metals, which are metals that are attached to carbon — the main element that's studied in organic chemistry. As such, compounds such as these are considered part of both fields.

Inorganic chemistry is used to create a variety of products, including paints, fertilizers and sunscreens.

**Organic chemistry** deals with chemical compounds that contain carbon, an element considered essential to life. Organic chemists study the composition, structure, properties and reactions of such compounds, which along with carbon, contain other non-carbon elements such as hydrogen, sulfur and silicon. Organic chemistry is used in many applications, such as biotechnology, the petroleum industry, pharmaceuticals and plastics.

**Physical chemistry** uses concepts from physics to understand how chemistry works. For example, figuring out how atoms move and interact with each other, or why some liquids, including water, turn into vapor at high temperatures. Physical chemists try to understand these phenomena at a very small scale — on the level of atoms and molecules — to derive conclusions about how chemical reactions work and what gives specific materials their own unique properties.

This type of research helps inform other branches of chemistry and is important for product development. For example, physical chemists may study how certain materials, such as plastic, may react with chemicals the material is designed to come in contact with.

(Джерело: <https://www.livescience.com/45986-what-is-chemistry.html>)

## COMPREHENSION CHECK

### 5.6. Find in the text English equivalents to the following expressions.

1. перетворюватися на пар - .....
2. приносити користь багатьма шляхами - .....
3. штучні елементи - .....
4. отримувати висновки - .....
5. дослідження точної довжини хвилі світла - .....
6. розбивати на частини людський геном - .....
7. прогрес хімії - .....
8. бути розбитим на будівні блоки - .....
9. встановлена кількість - .....
10. контролювати життєздатність навколишнього середовища - .....

### 5.7. Choose the right variant according to the text:

1. Chemistry is the study of ...
  - a) the substances that make up the universe
  - b) the compounds of living things
  - c) simplification of chemical problems
2. In general, chemists investigate ...
  - a) isolating new chemical elements
  - b) electric forces at the atomic level
  - c) the behavior of chemical substances under different conditions
3. The most basic chemical substances are ...
  - a) the chemical elements
  - b) the chemical bonds
  - c) the chemical compounds
4. The periodic table of elements contains ...
  - a) only elements known to exist on Earth
  - b) both natural and artificial elements

- c) either natural or manmade elements
5. Chemistry embraces ...
    - a) five branches in particular
    - b) five main branches and many subdisciplines
    - c) only five specialized fields
  6. The identity and quantity of each element present in a substance is studied by ...
    - a) analytical chemistry
    - b) colloid chemistry
    - c) nuclear chemistry
  7. Biochemistry is particularly important in ...
    - a) the development of application of radioactive isotopes in medicine
    - b) the improvement of industrial processes
    - c) pharmacology, medicine and dentistry
  8. Inorganic chemistry also includes study of ...
    - a) radioactivity and nuclear reactions
    - b) metals, silicates and sulfur compounds
    - c) plastics, proteins and non-metals
  9. Carbohydrates, proteins, polymers are studied by ...
    - a) organic chemistry
    - b) inorganic chemistry
    - c) food chemistry
  10. The application of physical methods to the study of chemical problems is ...
    - a) biochemistry
    - b) analytical chemistry
    - c) physical chemistry

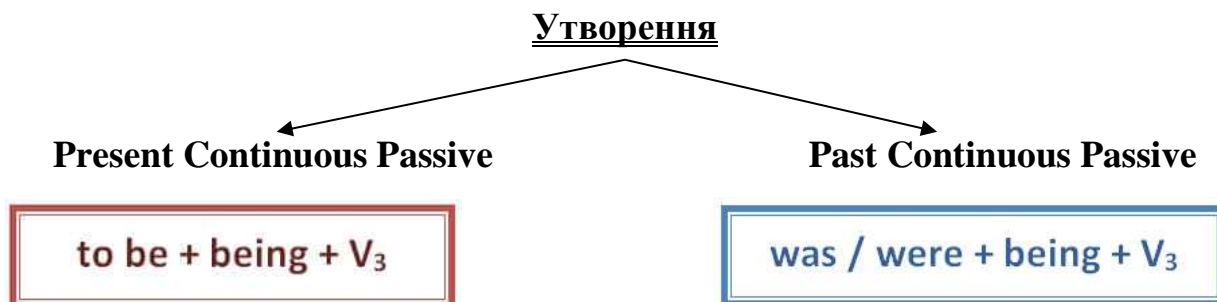
**5.8. Write an annotation to the text “What is Chemistry”.**

## GRAMMAR

→ LEARN THIS!

### Continuous Passive

В англійській мові існує тільки дві форми – **Present Continuous Passive** та **Past Continuous Passive**, тоді як Future Continuous Passive не вживається, замість нього вживають Future Indefinite.



### Вживання

Вживання пасивного стану співпадає з вживанням відповідних часів активного стану, отже слова-маркери відповідають часам системи Continuous активного стану, наприклад:

*My report is being printed at the moment.* – Моя доповідь зараз друкується.

*The room was being cleaned when I arrived.* – Коли я приїхав, в кімнаті саме прибирали.

### GRAMMAR CHECK

#### 5.9. Complete the sentences with the suitable form of a verb.

1. Chromatography ... as separation technique in this chemical laboratory.
  - a) is been used
  - b) is being used
  - c) is being use
  - d) is been use
2. Solute molecules ... continuously between the two phases.
  - a) were being exchanged

- b) are been exchanged
  - c) were been exchange
  - d) are being exchange
3. When I came into the laboratory, the solutions ... .
- a) are being analyzed
  - b) were analyzing
  - c) are been analyzing
  - d) were being analyzed
4. Chromatography ... in numerous biological and chemical fields.
- a) is using
  - b) is being used
  - c) is been used
  - d) is be use
5. In the petroleum industry the technique of chromatography ... to analyze complex mixtures of hydrocarbons.
- a) is being employed
  - b) was been employed
  - c) is being employ
  - d) was being employ
6. Today all the components of a multicomponent chemical mixture ... without requiring an extensive foreknowledge of the identity, number, or relative amounts of the substances present.
- a) were been separated
  - b) are separating
  - c) are being separated
  - d) were separating
7. At the end of XX century, the discovery of chromatography generally ... to the Russian botanist Mikhail S. Tsvet.
- a) is been attributed
  - b) was being attribute

- c) is being attribute
  - d) was being attributed
8. During last year, the solubility of solids in gases at high pressure . . . .
- a) was being observed
  - b) is being observed
  - c) was been observe
  - d) is being observe
9. A technique exhibiting great selectivity, affinity chromatography, . . . first by Pedro Cuatrecasas and his coworkers in 1968.
- a) was being described
  - b) is described
  - c) was described
  - d) is being described
10. During last decade, chromatographic methods . . . according to the following criteria.
- a) is to classify
  - b) was been classified
  - c) is being classify
  - d) was being classified**

**5.10. Transform sentences in Active into Passive:**

1. Nowadays chemists are applying many laboratory investigations.
2. When the process started, the scientist was dissolving a mixture in another substance.
3. During the 18<sup>th</sup> century, only artists and color theorists were applying chromatography to perfect industrial dyes for textiles.
4. At present, scientists are using an inert gas, usually nitrogen or helium, to carry a mixture of interest through a stationary phase.
5. Yesterday at this time, the apparatus for thin-layer chromatography was finishing the stationary phase.

6. Now the scientists are using chromatography not only as an analytical, but also as a purifying tool.

## LISTENING

**5.11. Follow the link and watch the video about the methods of chemical analysis. Decide whether the following statements are true or false according to the information from the video.**

(**Link:** <https://www.youtube.com/watch?v=st6P8DhPORw>)

1. Analysis means building a compound from simpler substances or elements.
2. Qualitative analysis gives us a description of the content or components present in the substance.
3. Qualitative analysis is much more important than quantitative one.
4. Precipitation test is an example of quantitative analysis.
5. Titration is a particular type of quantitative analysis.
6. Quantitative analysis determines the amount of substances present in a mixture.
7. Gravimetric method determines the concentration of substances present in a mixture.
8. The results of quantitative analysis are expressed in standard units.
9. All the quantitative measures are absolute.
10. Indirect measurement refers to measuring exactly the thing that you are looking to measure.

## SPEAKING

**5.12. Talk about the beginnings of modern Chemistry. Use the following question as the plan of your topic.**

1. What periods can the science of chemistry be divided into?
2. What characterizes the ancient period of chemistry?
3. How did chemistry develop in the medieval period?
4. Who is Robert Boyle? What did he discover?



5. What were the principles of phlogiston theory?
6. Who is the author of present accepted theory of combustion? What are the fundamentals of this theory?
7. What are the most important discoveries in chemistry in the 19<sup>th</sup> century?
8. What are the most essential discoveries in chemistry in the 20<sup>th</sup> century?

# Unit 6. Inorganic chemistry.

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів системи Perfect Tenses Active;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «Inorganic Chemistry», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Inorganic chemical compounds» та вправами до нього);
- граматика: навчитись утворювати форми часів Perfect Tenses Active та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Atoms and molecules»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «Atoms and molecules. Structure of periodic table of elements».

**Норма часу:** 15 годин.

## VOCABULARY AND PRONUNCIATION

### *6.1. How do you spell it? Check out the pronunciation of the following words!*

Homogeneous, covalent, mixture, emulsion, electrolyte, cation, anion, ionic bond, ionization, oxide, sulfate, crystallization, solubility, suspension, acid, base, hydroxide, radical, neutralization, concentration, halogen, alkali.

**6.2. Memorize the new words.**

|              |   |
|--------------|---|
| saturation   | насичення                                     |
| solute       | розчинена речовина                            |
| solvent      | розчинник                                     |
| dissociation | розпад, дисоціація                            |
| to evaporate | випаровуватися                                |
| medium       | 1. середовище; 2. посередник; 3. спосіб, шлях |
| limit        | межа, рубіж                                   |
| to disperse  | розсіюватися, розосереджувати, розподіляти    |
| to dissolve  | розчинятися, розкладатися                     |
| to conduct   | 1. вести, керувати; 2. проводити (струм)      |
| refining     | очищення, рафінування                         |
| purification | очищення                                      |
| dilute       | розведений                                    |
| removal      | видалення                                     |
| alloy        | сплав   |
| charged      | заряджений                                    |
| litmus paper | лакмусовий папір                              |

**6.3. Which of the variants is the best option? Fill in the gaps with appropriate word.**

1. A solution is a ... mixture composed of two or more substances.
  - a) homogeneous
  - b) dissolved
  - c) dilute
  - d) aqueous
2. The dissolved in a solution substance is called the ... .
  - a) solution
  - b) solvent
  - c) solute
  - d) solubility
3. The medium in which the substance is dissolved is the ... .
  - a) solution
  - b) solubility

- c) solute
  - d) solvent
4. The partial removal of the solvent in a solution is called ... .
- a) evaporation
  - b) concentration
  - c) refining
  - d) purification
5. The total removal of the solvent is termed ... .
- a) evaporation
  - b) concentration
  - c) refining
  - d) purification
6. Most ... are liquids, but some can be of gases or solids.
- a) emulsions
  - b) suspensions
  - c) solutes
  - d) solutions
7. Substances with ionic and covalent bonds undergo ... into ions and are called electrolytes.
- a) dissociation
  - b) concentration
  - c) purification
  - d) dispersion
8. Saturation is the ... at which a solution of a substance can dissolve no more of that substance.
- a) line
  - b) process
  - c) limit
  - d) medium

9. A mixture in which the solute particles do not dissolve, but get suspended throughout the bulk of the solvent, left floating around freely in the medium, is called ... .
- a) emulsion
  - b) suspension
  - c) mixture
  - d) solution
10. An ... is a special type of mixture made by combining two liquids that normally don't mix. (emulsion)
- a) solution
  - b) suspension
  - c) mixture
  - d) emulsion**

**6.4. Complete the word combination with appropriate preposition.**

- 1) to be combined ... different proportions
- 2) according ... the concentration
- 3) the solubility ... a substance
- 4) the solubility increases ... the rise in temperature
- 5) to be suspended ... the liquid

**6.5. Translate the following sentences in English:**

- 1. Повітря - це однорідна суміш ряду газів.
- 2. Сплави - це суміші металів, які не можна розділити фізичними методами на окремі компоненти, наприклад, латунь - це суміш 30% цинку та 70% міді.
- 3. Залежно від кількості присутньої розчиненої речовини, розчин називають розведеним, концентрованим або насиченим.
- 4. Насичені розчини - це розчини, що розчиняють стільки ж розчиненого речовини, скільки він здатний розчинятися при заданій температурі.

5. Ненасичені розчини - це ті, що мають меншу кількість розчиненого речовини, ніж потрібно для насичення.

## READING

### Inorganic chemical compounds

The purest elements and chemicals can be found on the periodic table, and the majority of those listed can be found in nature. However, most of the things we encounter and use on a daily basis are actually chemical compounds. A chemical compound is a chemical combination of two or more elements that can normally be broken down into simpler substances by chemical means and have properties different from those of its component elements.

Chemical compounds are formed by elements that bond together. These bonds are typically covalent, ionic, or metallic bonds.

Ionic bonds are formed when two or more atoms of an element are joined together when one of the elements gains or loses electrons. Covalent bonds are chemical bonds that form when two or more atoms of an element share electrons. Metallic bonds are formed when metallic ions are attracted to the electrons of another element.

An inorganic compound is any substance in which two or more chemical elements (usually other than carbon) are combined, nearly always in definite proportions. Compounds of carbon are classified as organic when carbon is bound to hydrogen. Carbon compounds such as carbides (e.g., silicon carbide), some carbonates (e.g., calcium carbonate), some cyanides (e.g., sodium cyanide), graphite, carbon dioxide, and carbon monoxide are classified as inorganic. Most inorganic compounds can be classified as acids, bases, or salts.

Many acids and bases occur naturally in nature, such as citric acid in fruits like orange, lemon etc, tartaric acid in tamarind, malic acid in apples and lactic acid in milk and milk products, hydrochloric acid in gastric juices. Similarly, many bases are found such as lime water. We use many of these acids in our day to day

life, such as vinegar or acetic acid in the kitchen, boric acid for laundry, baking soda for the purpose of cooking, washing soda for cleaning etc.

Many of the acids that we do not consume in the household are used in the laboratories and industries, which include an acid such as HCl, H<sub>2</sub>SO<sub>4</sub> etc. and bases such as NaOH, KOH etc. When these acids and bases are mixed in the right proportions, the neutralization reaction thus results in the formation of salt and water. Some naturally occurring salts found in nature include NaCl and KCl in seawater and natural rock deposits.

The term acid is derived from a Latin word ‘acidus’ or ‘acere’, which means sour. The most common characteristic is their sour taste. An acid is a substance that renders ionizable hydronium ion (H<sub>3</sub>O<sup>+</sup>) in its aqueous solution. It turns blue litmus paper red.

Based on their occurrence, they are divided into two types – natural and mineral acids. Natural acids are obtained from natural sources, such as fruits and animal products (for example, lactic, citric, and tartaric acid). Mineral acids are acids prepared from minerals (for example, hydrochloric acid (HCl), sulphuric acid (H<sub>2</sub>SO<sub>4</sub>), and nitric acid (HNO<sub>3</sub>)).

The most common characteristic of bases is their bitter taste and soapy feel. A base is a substance that renders hydroxyl ion (OH<sup>-</sup>) in their aqueous solution. Bases turn the colour of red litmus paper to blue.

Salt is an ionic compound that results from the neutralization reaction of acids and bases. Salts are constituted of positively charged ions, known as cations and negatively charged ions, known as anions, which can either be organic or inorganic in nature. These ions are present in a relative amount, thus rendering the nature of the salt neutral.

#### COMPREHENSION CHECK

**6.6. Find in the text English equivalents to the following expressions.**

- 1) у відносній кількості - .....
- 2) щоденне життя - .....
- 3) мильне відчуття - .....
- 4) складові елементи - .....
- 5) щодня зустрічатись - .....
- 6) бути притягнутими до електронів - .....
- 7) складатися з катионів та аніонів - .....
- 8) набирати електрони - .....
- 9) родовища гірських порід - .....
- 10) природні солі - .....

**6.7. Choose the right variant according to the text.**

1. In the periodic table you can find ... .
  - a) elements and compounds
  - b) chemical elements
  - c) names of organic and inorganic compounds
  - d) amount of molecules
2. A chemical combination of two or more elements in a compound has ... from its constituent elements.
  - a) the same properties
  - b) similar properties
  - c) critical properties
  - d) different properties
3. In a chemical compound elements are ...
  - a) linked together
  - b) mixed-up
  - c) replaced with other
  - d) separated
4. An inorganic compound is a substance that does not contain both ... .
  - a) carbon and oxygen



- b) hydrogen and nitrogen
  - c) carbon and hydrogen
  - d) oxygen and carbon
5. ... is included into the class of inorganic compounds.
- a) Fat
  - b) Graphite
  - c) Table sugar
  - d) Grain alcohol
6. Chemically, the action of acids is due to the presence of ...
- a) hydrogen ions
  - b) hydroxyl radical
  - c) electric current
  - d) sodium hydroxide
7. ... is one of the substances found in citrus fruits.
- a) Oxalic acid
  - b) Malic acid
  - c) Citric acid
  - d) Formic acid
8. Apples are rich with ...
- a) Oxalic acid
  - b) Malic acid
  - c) Citric acid
  - d) Formic acid
9. Grape juice includes ...
- a) Oxalic acid
  - b) Lactic acid
  - c) Formic acid
  - d) Tartaric acid
10. ... you can find both in the human stomach and in the laboratory.
- a) Sulphuric acid

- b) Hydrochloric acid
- c) Citric acid
- d) Tartaric acid

11. Litmus is blue when added into ...

- a) bases
- b) acids
- c) aqueous solutions
- d) salts

12. It feels ... if you rub a solution of strong base between your fingers.

- a) bitter
- b) wet
- c) slippery
- d) sour

13. Bases are ... to acids.

- a) linked
- b) similar
- c) close
- d) opposite

14. Neutralization is the action between ...

- a) a salt and water
- b) an acid and a salt
- c) a base and water solution
- d) an acid and a base

15. Neutralization results in ... .

- a) formation of salt and water
- b) a dissociation of an acid and formation of a base
- c) formation of a solution and base
- d) formation of salt and alkali

# GRAMMAR

## → LEARN THIS!

### Perfect Tenses Active

|                      | <b>Present</b>   | <b>Past</b>  | <b>Future</b>  |
|----------------------|--|--|--|
| <b>Вживання</b>      | <p>1) Результат або завершеність дії у теперішньому часі;</p> <p>2) Дія, що почалася в не зовсім відомий момент в минулому (неважливо, коли), але ще може бути незавершеною, а результат такої дії можна побачити в теперішньому часі.</p>   | Вираження дії, яка передувє іншій дії у минулому або ж відбувалася до певного моменту в минулому.  | Описання дії у майбутньому, яка почнеться та закінчиться до певного моменту або до іншої дії в майбутньому   |
| <b>Утворення</b>     | <b>have/has + Ved/V3</b>   | <b>had + Ved/V3</b>  | <b>will+have+ Ved/V3</b>   |
| <b>Слова-маркери</b> | <p><i>ever</i> – коли-небудь</p> <p><i>never</i> – ніколи</p> <p><i>already</i>– вже</p> <p><i>yet</i> – ще, вже</p> <p><i>not yet</i> – ще не</p> <p><i>often</i> – часто</p> <p><i>so far</i> – поки, до сих пір</p> <p><i>lately</i> – останнім часом</p> <p><i>just</i> – тільки-но</p> <p><i>recently</i> – нещодавно, на днях</p> <p><i>once</i> – одного разу</p> <p><i>many times</i> – багато разів</p> <p><i>several times</i> – декілька разів</p> <p><i>before</i> – раніше, до цього</p> <p><i>today</i> – сьогодні</p> <p><i>this week</i> – на цьому тижні, цього тижня</p> <p><i>this month</i> – в цьому місяці</p> <p><i>this year</i> – в цьому році, цього року</p> <p><i>this afternoon</i> – сьогодні вдень</p> <p><i>for an hour</i> – протягом години</p> <p><i>for two weeks</i> – протягом двох тижнів</p> <p><i>for a long time</i> – протягом довгого часу</p> <p><i>since twelve o'clock</i> – с дванадцятої години</p> <p><i>since 12 April</i> – з 12 квітня</p> <p><i>since May</i> – з травня</p> | <p><i>before</i> – до того як</p> <p><i>before the moment</i> – до (певного) моменту</p> <p><i>before the evening</i> – до (певного) вечора</p> <p><i>before the day</i> – до (певного) дня</p> <p><i>before the year</i> – до (певного) року</p> <p><i>never before</i> – ніколи раніше</p> <p><i>after</i> - після, після того, як</p> <p><i>no sooner... than</i> – лише, щойно, тільки-но, не встиг</p> <p><i>hardly... when</i> – тільки-но, щойно, ледь, не встиг і</p> <p><i>by two o'clock</i> – до 2-ї години</p> <p><i>by half past six</i> – до половини 7-ї</p> <p><i>by that time</i> – до того часу</p> <p><i>by that morning</i> – до того ранку</p> <p><i>by evening</i> – до вечора, під кінець дня</p> <p><i>by afternoon</i> – пообідь</p> <p><i>by the 2nd of July</i> – до 2-го липня</p> <p><i>by that day</i> – до того дня</p> <p><i>by that month</i> – до (початку) того місяця</p> <p><i>by that year</i> – до того року</p> <p><i>by that age</i> – до того віку</p> | <p><i>before</i> – до, перед тим, як</p> <p><i>till</i> – до (тільки для заперечних речень)</p> <p><i>until</i> – до (тільки для заперечних речень)</p> <p><i>by then</i> – до того часу</p> <p><i>by the time</i> – к того часу, як; коли</p> <p><i>by 3 p.m.</i> – до 3-ї вечора</p> <p><i>by 5 o'clock</i> – до 5-ї години</p> <p><i>by 7 a.m.</i> – к 7-ї ранку</p> <p><i>by tomorrow</i> – до завтра</p> <p><i>by next week</i> – до наступного тижня</p> <p><i>by next month</i> – до наступного місяця</p> <p><i>by next year</i> – до наступного року</p> <p><i>by next century</i> – до наступного сторіччя</p> |

|          |  |   |  |
|----------|--|---|--|
| Приклади | <p>I've done this job well. – Я виконав цю роботу добре.</p> <p>She has found this kitten outside. – Вона знайшла цього кошеня на вулиці.</p> <p>They have played in the orchestra <b>since high school.</b> – Вони грали в оркестрі зі старшої школи. (Вони все ще грають там)</p> <p>I've had my cat Charlie <b>for 15 years.</b> – Мій кіт Чарлі живе в мене вже 15 років. (Він з'явився у мене 15 років тому і досі живе у мене)</p> | <p>She told you she had met your mother. – Вона сказала тобі, що зустріла твою мати. (Вона спочатку зустріла мати, а потім через деякий час розповіла про це)</p> <p>They had finished their work <b>by 6 p.m.</b> – Вони закінчили роботу до 6-ї вечора.</p> <p>Tom had drunk a cup of coffee <b>before going to work.</b> – Том випив чашку кави перед тим, як піти на роботу.</p> <p>She was upset. She had torn her favorite dress. – Вона була засмучена. Вона розірвала свою улюблену сукню.</p> <p><b>Hardly</b> had I sent my message <b>when</b> she came. – Щойно я відправив повідомлення, як вона прийшла.</p> <p><b>No sooner</b> had I drunk my glass of cold water <b>than</b> I felt toothache. – Ледь я допив стакан холодної води, як відчув зубний біль.</p> | <p>I shall have worked as a teacher <b>for 20 years by next March.</b> – До наступного березня я пропрацюю вчителем протягом 20 років.</p> <p>I will have found a new job <b>by next month.</b> – Я знайду нову роботу до наступного місяця.</p> <p>She will have cleaned the room <b>by the time you come back.</b> – Вона прибере кімнату до того часу, як ти повернешся.</p> <p>They won't have bought this house <b>until the end of the week.</b> – Вони не придбають цей дім до кінця (цього) тижня.</p> |
|----------|--|---|--|

## GRAMMAR CHECK

### 6.8. Complete the sentences with the suitable form of a verb.

- I ... recently ... that carbon dioxide is an inorganic compound composed of one carbon and two oxygen atoms.
  - have ... discovered
  - had ... discovered
  - will ... have discovered
  - has ... discovered
- I was very surprised. I ... that carbon dioxide in its solid state is called dry ice.
  - have learnt

- b) had learnt
  - c) will have learnt
  - d) has learnt
3. Carbon dioxide ... as a greenhouse gas for a long time.
- a) have acted
  - b) had acted
  - c) will have acted
  - d) has acted
4. Scientists believe that by next decade the concentration of carbon dioxide in Earth's atmosphere ... to 0,06% by volume.
- a) have risen
  - b) had risen
  - c) will have risen
  - d) has risen
5. No sooner ... carbon dioxide ... in my basement than I felt sharp and acidic odor.
- a) have ... concentrated
  - b) had ... concentrated
  - c) will ... have concentrated
  - d) has ... concentrated
6. Carbon dioxide ... commercial uses but one of its greatest uses as a chemical is in the production of carbonated beverages.
- a) has varied
  - b) have varied
  - c) has vary
  - d) have vary
7. Lately many manufacturers ... beer and soda water artificially with carbon dioxide recovered from the fermentation process.
- a) have carbonating
  - b) has carbonating

- c) have carbonated
  - d) has carbonated
8. I ... all the physical properties of carbon dioxide before using it to extinguish flames.
- a) will had studied
  - b) will had study
  - c) will have study
  - d) will have studied
9. ... you ever ... carbon dioxide to oxygen for stimulation of breathing after apnea?
- a) Will ... add
  - b) Did ... added
  - c) Are ... added
  - d) Have ... added
10. By next century, the global automobile industry ... on the next-generation refrigerant in car air conditioning. CO<sub>2</sub> is one discussed option.
- a) is decided
  - b) will have decided
  - c) decided
  - d) have decide

**6.9. Put the verb into correct form of Perfect Active.**

1. The associate professor ... (to study) sodium chloride for a long time.
2. By the evening I ... (to finish) the presentation on the chemical properties of sodium chloride.
3. I ... never ... (to know) table salt is an inorganic compound with the ionic bonds.
4. Lately, winter service vehicles ... widely ... (to apply) salt for de-icing and anti-icing of roads.

5. Before physicians started using saline solution, a mixture of sodium chloride in water, for intravenous injections, some of them ... (to administer) coconut water.
6. Since at least medieval times, people ... (to use) salt as a cleansing agent rubbed on household surfaces.
7. Students, you ... (to learn) the cubic crystal system as in solid sodium chloride by the end of this lesson.
8. In addition to the familiar domestic uses of salt, so far, more dominant applications of the sodium chloride ... (to include) chemicals and de-icing.

**6.10. Choose the right translation of the sentences.**

1. «Студент ще не визначив молекулярну формулу цієї неорганічної сполуки»:
  - a) The student hasn't defined the molecular formula of this inorganic compound yet.
  - b) The student didn't define the molecular formula of this inorganic compound the day before yesterday.
  - c) The student hadn't already determined the molecular formula of this inorganic compound.
2. «Щойно хімік додав метиловий оранжевий у розчин лугу, індикатор став рожевим»:
  - a) While the chemist was adding methyl orange into an alkali so the indicator became violet.
  - b) Before the chemist added methyl orange into an acid and the indicator became pink.
  - c) Hardly had the chemist added methyl orange into an alkali when the indicator became pink.
3. «Ця лабораторія зсинтезує нову кислоту тільки наприкінці цього місяця»:
  - a) This laboratory will synthesize the new alkali no sooner than by the end of this week.

- b) This laboratory will have synthesized the new acid only by the end of this month.
  - c) This laboratory has synthesized the new compound just by the end of that month.
4. «З кінця XIX сторіччя хімічна індустрія розвила промисловий процес електролізу розчинів хлориду натрію, що виробляє хлор та гідроксид натрію (луг / їдка сода)»:
- a) Since the end of 19<sup>th</sup> century this chemical plant develops an industrial process for the electrolysis of sodium chloride solutes that produces chlorine and sodium hydroxide (lye/sharp soda).
  - b) Since the end of 19<sup>th</sup> century the chemical industry developed an industrial process for the electrolysis of sodium chloride solvents that produced chlorine and sodium hydroxide (alkali/acidic soda).
  - c) Since the end of the 19<sup>th</sup> century, the chemical industry has developed an industrial process for the electrolysis of sodium chloride solutions that produces chlorine and sodium hydroxide (lye/caustic soda).
5. «For a long time scientists have defined the term acid and base in different ways depending on the particular way of looking at the properties of acidity and basicity:
- a) Протягом довгого часу вчені визначали термін кислота та основа по-різному, залежно від певного погляду на властивості кислотності та основності.
  - b) Вже багато разів вчені визначали термін кислота та основа по-різному, залежно від загального шляху перегляду властивостей кислотності та основності.
  - c) Протягом певного часу вчені визначали термін кислота та основа за різними точками зору властивостей кислотності та основності.
6. «The substance occurred to be the most acidic after the laboratory assistant had used the pH scale for measuring its acidity»:



- a) Розчин виявився найбільш кислотним до того, як лаборант застосував шкалу рН для опису її кислотності.
  - b) Речовина виявилась найменш кислою тільки-но лаборант застосував шкалу рН для вимірювання її кислотності.
  - c) Речовина виявилась найбільш кислою після того, як лаборант застосував шкалу рН для визначення її кислотності.
7. «By the end of this term students will have gained proficiency in all the fundamentals of inorganic chemistry»:
- a) До кінця цього терміну студенти вивчать теорію всіх галузей неорганічної хімії.
  - b) До кінця цього семестру студенти здобудуть знання всіх основ неорганічної хімії.
  - c) До кінця цього курсу студенти практично застосують всі основи неорганічної хімії.

## LISTENING

**6.11. Follow the link and watch the video about atoms and molecules. Then, choose the right variant according to the video.**

**(Link: <https://www.youtube.com/watch?v=OqJKbXaAU2U>)**

1. According to the boy's teacher, everything around us is made up of ...
  - a) atoms
  - b) matter
  - c) chemistry
  - d) elements
2. Matter is made up of ...
  - a) large particles called molecules
  - b) chemical bonds
  - c) gases
  - d) tiny particles called atoms
3. In the video the dad says, that different materials have ...

- a) similar chemical properties
  - b) different types of molecules
  - c) definite molecular structure
  - d) the same molecules
4. Molecule is ...
- a) the smallest particle of a substance that has all the properties of that substance
  - b) the part of substance that has different properties from the substance
  - c) combination of substances which has no chemical importance
  - d) the particle of an element that has opposite properties of that element
5. As examples of molecular structure, the father employs in the video ...
- a) structure of periodic table
  - b) molecules and atoms
  - c) structure water and oxygen gas
  - d) combination of chemical symbols
6. Molecules, which are made up of only one type of atoms, are called ...
- a) substances
  - b) elements
  - c) gases
  - d) compounds
7. Materials composed of molecules which contain different types of atoms are called ...
- a) substances
  - b) elements
  - c) gases
  - d) compounds
8. A different name for each element is given to ...
- a) compare them
  - b) measure them
  - c) identify them

- d) describe them
9. A symbol of the element is a short representation ...
- a) for the name of the atom that forms element
  - b) for the amount of molecules formed by this element
  - c) of the chemical properties of this element
  - d) of the amount of combinations that can be formed with this element
10. Every element in the periodic table occupies ...
- a) a flexible place in this table
  - b) a movable place in this table
  - c) a fixed place in this table
  - d) an opposite place in this table

### **SPEAKING**

***6.12. Talk about atoms, molecules and the structure of periodic table of elements.***

***Follow the given plan in the topic.***

- the difference between atoms and molecules;
- the history of periodic table completion;
- grouping methods in the table;
- periodic trends and patterns.

# Unit 7. Organic Chemistry

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів системи Perfect Tenses Passive;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «Organic chemistry», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Organic chemistry» та вправами до нього);
- граматика: навчитись утворювати форми часів Perfect Tenses Passive та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Carbohydrates»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «Carbohydrates: Sugars».

**Норма часу:** 10 годин.

## VOCABULARY AND PRONUNCIATION

### *7.1. How do you spell it? Check out the pronunciation of the following words!*

Hydrocarbon, tetravalent, amino acid, albumin, hydrolysis, carbohydrate, monosaccharide, polysaccharide, glycogen, protein, enzyme, petroleum, metabolism, globulin, formula, reactivity, electronegativity, polymer, alkane, alkene, alkyne, aliphatic, aromatic, orbital.

### 7.2. Memorize the new words.

|                             |  |
|-----------------------------|--|
| to constitute               | складати                               |
| behavior                    | поведінка                              |
| lipid                       | 1. жир, ліпід; 2. жировий              |
| tissue                      | тканина                                |
| equilibrium                 | рівновага                              |
| valence                     | валентність                            |
| to distinguish              | відрізняти, розрізняти, виокремлювати  |
| distinction                 | розрізнення, розмежування, розходження |
| artificially                | штучно                                 |
| chain                       | ланцюг                                 |
| condensed                   | стислий, короткий                      |
| line-bond /skeletal formula | скелетна формула                       |
| in turn                     | по черзі                               |
| convenient                  | зручний                                |
| diverse                     | різний, різноманітний                  |

### 7.3. Which of the variants is the best option? Fill in the gaps with appropriate word.

1. It is necessary to ... organic and organometallic chemistry.
  - a) describe
  - b) join
  - c) distinguish
  - d) forget
2.  $\text{CH}_3\text{CH}_2\text{OH}$  is a ... formula for ethanol.
  - a) condensed
  - b) wrong
  - c) structural
  - d) convenient
3. Most polymers are produced ... .
  - a) naturally
  - b) personally
  - c) easily

- d) artificially
4. Several amino acids join together to form polypeptide ... .
- a) drawings
  - b) chains
  - c) formulas
  - d) tissues
5. The structural ... of organic compounds have made their study especially challenging and exciting.
- a) distinction
  - b) solubility
  - c) saturation
  - d) decomposition
6. The characterization of the structure and ... of polymeric materials all pose unique problems for polymer chemists.
- a) nomenclature
  - b) behavior
  - c) application
  - d) description
7. The example of an organic compound is para-dichlorobenzene, the ... constituent of modern mothballs.
- a) disgusting
  - b) atomic
  - c) aromatic
  - d) unnecessary
8. Nonsystematic names of organic compounds are simpler and more ... for an average person than systematic ones.
- a) complicated
  - b) convenient
  - c) composed
  - d) controlled

9. Because of the ... molecular structures of hydrocarbons, it is difficult to generalize them into groups.
- a) simple
  - b) condensed
  - c) convenient
  - d) diverse
10. Complex compounds can have a lot of reaction steps that build ... the desired molecule.
- a) at instant
  - b) with ease
  - c) in turn
  - d) on the contrary

**7.4. Choose the right translation of the sentences.**

1. Organic chemistry provides the molecules that feed us, treat our illnesses, protect our crops, and clean our clothes.
- a) Органічна хімія надає молекули, які нас живлять, лікують наші хвороби, захищають посіви та чистять одяг.
  - b) Органічна хімія аналізує молекули, які нас лікують, захищають посіви та чистять одяг.
  - c) Органічна хімія називає молекули, які в нас містяться, лікують наші хвороби, захищають посіви та чистять одяг.
2. Anyone with a curiosity about life and living things must have a basic understanding of organic chemistry.
- a) Жоден, хто цікавиться життям і живими істотами, повинен добре знати органічну хімію.
  - b) Той, хто цікавиться життям і живими істотами, повинен добре знати неорганічну хімію.
  - c) Той, хто цікавиться життям і живими істотами, повинен добре знати органічну хімію.

3. Historically, the term organic chemistry dates to the late 1700s, when it was used to mean the chemistry of compounds found in living organisms.
- a) Історично термін органічна хімія датується початком 1700-х років, коли він використовувався для позначення хімії сполук, що містяться в живих організмах.
  - b) Історично термін органічна хімія датується кінцем 1700-х років, коли він використовувався для позначення хімії сполук, що містяться в живих організмах.
  - c) Історично термін органічна хімія датується 1700-ми роками, коли він використовувався для позначення хімії сполук, що містяться в неживих організмах.
4. The only distinguishing characteristic of organic chemicals is that all contain the element carbon.
- a) Єдиною схожою характеристикою органічних хімічних речовин є те, що всі вони містять елемент вуглецю.
  - b) Єдиною відмінною характеристикою органічних хімічних речовин є те, що всі вони не містять елемент вуглецю.
  - c) Єдиною відмінною характеристикою органічних хімічних речовин є те, що всі вони містять вуглець.
5. The answer to the question why carbon is so special comes from carbon's electronic structure and its consequent position in the periodic table.
- a) Відповідь на запитання, чому вуглець такий особливий, походить від електронної структури вуглецю та його подальшого положення в періодичній системі.
  - b) Відповідь на запитання, чому вуглець такий складний, походить від електронної структури вуглецю та його первинного положення в періодичній системі.
  - c) Відповідь на запитання, чому вуглець такий особливий, походить від електронного номеру вуглецю та його складного положення в періодичній системі.



6. Carbon, alone of all elements, is able to form an immense diversity of compounds, from the simple methane, with one carbon atom, to the staggeringly complex DNA, which can have more than 100 million carbons.
- a) Вуглець, не єдиний з усіх елементів, здатний утворювати величезну різноманітність сполук - від простого метану з одним атомом вуглецю до приголомшливо складної ДНК, яка може містити більше 100 мільйонів вуглеводнів.
  - b) Вуглець, єдиний з усіх елементів, здатний утворювати обмежену кількість сполук - від простого метану з одним атомом вуглецю до приголомшливо складної ДНК, яка може містити більше 100 мільйонів вуглеводнів.
  - c) Вуглець, єдиний з усіх елементів, здатний утворювати величезну різноманітність сполук - від простого метану з одним атомом вуглецю до приголомшливо складної ДНК, яка може містити більше 100 мільйонів атомів вуглецю.
7. A simple way of indicating the covalent bonds in molecules is to use what are called Lewis structures, or electron-dot structures, in which the valence-shell electrons of an atom are represented as dots.
- a) Простий спосіб позначення ковалентних зв'язків у молекулах полягає у використанні так званих структур Льюїса, або електронно-лінійних структур, в яких електрони атома валентної оболонки представлені у вигляді ліній.
  - b) Простий спосіб позначення ковалентних зв'язків у молекулах полягає у використанні так званих структур Льюїса, або електронно-точкових структур, в яких електрони атома валентної оболонки представлені у вигляді точок.
  - c) Основний спосіб розпаду ковалентних зв'язків у молекулах полягає у використанні так званих структур Льюїса, або електронно-точкових структур, в яких електрони атома валентної оболонки представлені у вигляді точок.

8. Simpler still is the use of Kekulé structures, or line-bond structures, in which a two-electron covalent bond is indicated as a line drawn between atoms.
- a) Менш простішим залишається використання структур Кекуле або структур лінійних зв'язків, у яких двоелектронний ковалентний зв'язок позначений як лінія, що розділяє атоми.
  - b) Простішим залишається використання структур Кекуле або структур лінійних зв'язків, у яких двоелектронний ковалентний зв'язок позначений як лінія, проведена між атомами.
  - c) Найскладнішим залишається використання структур Кекуле або лінійних структур, у яких двоелектронний ковалентний зв'язок позначений як подвійна лінія, проведена між атомами.
9. It is certainly important to be able to read line-bond structures fluently, but it is equally important to be able to draw them proficiently.
- a) Безумовно, важливо вміти вільно читати структури лінійних зв'язків, але не менш важливо вміти грамотно їх малювати.
  - b) Сумнівно, що важливо вміти читати структури лінійних зв'язків, але зовсім не важливо вміти грамотно їх малювати.
  - c) Можливо, важливим є вміти розрізняти структури лінійних зв'язків, але не менш важливо вміти грамотно їх розшифровувати.
10. Line-bond structures not only simplify the drawing process but also are easier to read.
- a) Структури лінійних зв'язків не тільки погіршують процес нанесення, але й складніше читаються.
  - b) Структури лінійних зв'язків тільки спрощують процес нанесення, але вони не легше читаються.
  - c) Структури лінійних зв'язків не тільки спрощують процес нанесення, але й легше читаються.

**7.5. Match the word with the definition.**

|  |                           |
|--|---------------------------|
| 1. The number of bonds usually formed by each element is called ...  | a) orbital                |
| 2. The compounds that have the same molecular formula, yet they differ from each other in the way the atoms are connected are called ... | b) covalent bond          |
| 3. To recognize or understand the difference between two things means ...  | c) formula                |
| 4. The bond of carbon to other atoms, not by gaining or losing electrons, but by sharing them is called ...                              | d) electronegativity      |
| 5. A region of space that can be occupied by an electron is called ...   | e) reactivity             |
| 6. A measure of the ability of an atom to attract electrons is called ...  | f) bond                   |
| 7. A concise way of expressing information symbolically is called ...  | g) to distinguish         |
| 8. To form or make something means ...   | h) valence                |
| 9. The force holding atoms together in a molecule is called ...  | i) constitutional isomers |
| 10. A measure of how much a substance reacts when it is mixed with another substance is called ...                                       | j) to constitute          |

## READING

### Organic Chemistry

Organic chemistry is a branch of chemistry that studies the structure, properties and reactions of organic compounds, which contain carbon in covalent bonding. Study of structure determines their chemical composition and formula. Study of properties includes physical and chemical properties, and evaluation of chemical reactivity to understand their behavior. The study of organic reactions includes the chemical synthesis of natural products, drugs, and polymers,

and study of individual organic molecules in the laboratory and via theoretical study.

The range of chemicals studied in organic chemistry includes hydrocarbons (compounds containing only carbon and hydrogen) as well as compounds based on carbon, but also containing other elements, especially oxygen, nitrogen, sulfur, phosphorus (included in many biochemicals) and the halogens.

It is important to distinguish between the three types of formulas in organic chemistry for avoiding confusions. Molecular formula shows the number of atoms of each element, for example  $C_5H_{12}O$ . The condensed formula is often used in text, and was particularly used in early organic chemistry publications, where use of graphics was limited. An example of this formula is  $CH_3CH_2OH$  for ethanol. Each carbon in the molecule is written out in turn, with the atoms attached to it written directly after. Brackets are used to indicate branching in the molecule, or multiple identical groups. Although this system tends to be problematic in application to cyclic compounds, it remains a convenient way to represent simple structures. The skeletal formula is the simplest way of representing organic molecules, and as such is commonly seen in both textbooks and research publications. It involves representing the main carbon chain as a zig-zagging line, where the end of lines and the vertices represent carbon atoms. It is necessary to draw structural formulas for organic compounds because in most cases a molecular formula does not uniquely represent a single compound.

Organic compounds form the basis of all earthly life and constitute the majority of known chemicals. They form the basis of, or are constituents of, many commercial products including pharmaceuticals; petrochemicals and agrichemicals, and products made from them including lubricants, solvents; plastics; fuels and explosives.

Organic compounds may be classified in a variety of ways. One major distinction is between natural and synthetic compounds. Natural compounds refer

to those that are produced by plants or animals. Compounds that are prepared by reaction of other compounds are known as "synthetic". They may be either compounds that already are found in plants or animals or those that do not occur naturally. Another distinction, based on the size of organic compounds, distinguishes between small molecules and polymers. Two main groups of polymers are synthetic polymers and biopolymers. Synthetic polymers are artificially manufactured, and are commonly referred to as industrial polymers. Biopolymers occur within a respectfully natural environment, or without human intervention.

Traditionally organic compounds are divided into hydrocarbons, lipids, proteins and nucleic acids, and they perform different functions.

The simplest class of organic compounds is the *hydrocarbons*, which consist entirely of carbon and hydrogen. The four major classes of hydrocarbons are the following: the alkanes, which contain only carbon–hydrogen and carbon–carbon single bonds; the alkenes, which contain at least one carbon–carbon double bond; the alkynes, which contain at least one carbon–carbon triple bond; and the aromatic hydrocarbons, which usually contain rings of six carbon atoms that can be drawn with alternating single and double bonds. Alkanes are also called saturated hydrocarbons, whereas hydrocarbons that contain multiple bonds (alkenes, alkynes, and aromatics) are unsaturated. Alkanes, alkenes, and alkynes are generally called aliphatic hydrocarbons. The name comes from the Greek word meaning “oil”, because the first examples were extracted from animal fats. In contrast, the first examples of aromatic hydrocarbons, also called “arenes”, were obtained by the distillation and degradation of highly scented (thus aromatic) resins from tropical trees.

A more complicated group of organic compounds are the **lipids** or fats. They include a hydrocarbon chain but also have a part where the chain bonds with oxygen. Lipids are categorized as fats, steroids and phospholipids. Lipids help to form cell walls and membranes and are a major component of food.

Most **proteins** are very large molecules with complex structures that allow them to take on important roles in organic chemical reactions. In such reactions, parts of the proteins break apart, are rearranged or join with new chains. Even the simplest proteins have long chains and many subsections. They form part of the cell and organ structures, but they are also enzymes, hormones and other organic chemicals that take part in chemical reactions to produce the materials essential for life.

**Nucleic acids** form the basis of the genetic code of living cells and are long strings of repeating subunits. As RNA and DNA, they store the instructions for chemical processes involving other proteins. They are the helix-shaped molecules of the genetic code.

## COMPREHENSION CHECK

### 7.6. Find in the text English equivalents to the following expressions.

- 1) втручання людини - .....
- 2) формувати стінки клітини - .....
- 3) розгалуження в молекулі - .....
- 4) довгі рядки повторюваних субодиниць - .....
- 5) потрібний зв'язок - .....
- 6) виникати природнім шляхом - .....
- 7) спіралеподібні молекули - .....
- 8) хімічний склад і формула - .....
- 9) матеріали, необхідні для життя - .....
- 10) повністю складатися з карбону та гідрогену - .....
- 11) штучно виготовлений - .....
- 12) зигзагоподібна лінія - .....
- 13) бути переставленими або приєднуються до нових ланцюгів - .....
- .....
- 14) шляхом теоретичного вивчення - .....

15) бути добутим з тваринних жирів - .....

**7.7. Choose the right variant according to the text.**

1. What does organic chemistry study?
  - a) hydrogen double bonds
  - b) carbon in covalent bonding
  - c) compounds excluding carbon
2. What does the study of organic reactions include?
  - d) chemical synthesis of polymers
  - e) chemical formulas
  - f) DNA and RNA
3. What does NOT the range of chemicals studied in organic chemistry include?
  - a) halogens
  - b) lipids
  - c) sulfur
4. How many types of formulas are there in organic chemistry?
  - a) two
  - b) four
  - c) three
5. What is the simplest way of representing organic molecules?
  - a) molecular formula
  - b) skeletal formula
  - c) condensed formula
6. What is one major distinction in classification of organic compounds?
  - a) synthetic polymers and biopolymers
  - b) natural and synthetic compounds
  - c) compounds extracted from plants and animals
7. How many groups of organic compounds are there traditionally?
  - a) four
  - b) three

- c) five
8. What is also called saturated hydrocarbons?
- a) alkenes
  - b) aromatics
  - c) alkanes
9. How many groups of lipids are there in the organic chemistry?
- a) three
  - b) two
  - c) six
10. What forms the basis of the genetic code of living cells?
- a) lipid
  - b) protein
  - c) nucleic acid

***7.8. Decide whether the following statements are true or false according to the text.***

1. Study of properties of organic compounds includes calculation of chemical reactivity to understand their action.
2. The range of chemicals studied in organic chemistry is limited by hydrocarbons.
3. If you don't distinguish between the types of formulas in organic chemistry, you won't be confused.
4. In a molecular formula each carbon in the molecule is written out one after another.
5. Brackets are used in the chemical formula to show the division in the molecule.
6. The skeletal formula is the most complex of all.
7. Organic compounds are the component of most all common chemicals.
8. There are many classifications of organic compounds.
9. Proteins are incredibly complex and have a lot of subdivisions.



10. Nucleic acids have the most elementary structure of all groups of organic compounds.

## GRAMMAR

→ **LEARN THIS!**

### Perfect Tenses Passive

| Present Perfect Tense  |   |
|--|---|
| Auxiliary verbs used in Passive Voice: <b>Has been / Have been</b> |   |
| Active Voices  | Passive Voices                                    |
| He has completed the work.   | The work <b>has been</b> completed by him.        |
| He has not completed the work.                                     | The work <b>has not been</b> completed by him.    |
| Has he completed the work?   | <b>Has</b> the work <b>been</b> completed by him. |
| She has written five poems.  | Five poems <b>have been</b> written by her.       |
| I have made some cakes.  | Some cakes <b>have been</b> made by me.           |

| Past Perfect Tense                                     |  |
|--|--|
| Auxiliary verbs used in Passive Voice: <b>Had been</b> |  |
| Active Voices  | Passive Voices                               |
| They had won the game.                                 | The game <b>had been</b> won by them.        |
| They had not won the game.                             | The game <b>had not been</b> won by them.    |
| Had they won the game?                                 | <b>Had</b> the game <b>been</b> won by them? |
| He had collected coins.                                | Coins <b>had been</b> collected by him.      |

| Future Perfect Tense   |  |
|--|--|
| Auxiliary verbs used in Passive Voice: <b>Will have been</b> |  |
| Active Voices  | Passive Voices   |
| He will have received the letter.                            | The letter <b>will have been</b> received by him.        |
| He will not have received the letter.                        | The letter <b>will not have been</b> received by him.    |
| Will he have received the letter?                            | <b>Will</b> the letter <b>have been</b> received by him? |

### GRAMMAR CHECK

#### 7.9. Put the verbs in brackets into Perfect Passive.

- The new compound already ... (to classify) as organic, as it ... (to derive) from a living organism.

2. Before all polar covalent bonds of methanol were identified, the direction of the inductive effects ... .
3. A covalent bond ... (to form) from the overlap of atomic orbitals in laboratory experiment by tomorrow morning.
4. Molecular dipole moments (at 20°C) for several common solvents ... (to observe) experimentally.
5. After the portion of a compound responsible for its medicinal properties ... (to identify) similar compounds with better properties were designed.

**7.10. Transform the sentences into Perfect Passive.**

1. The scientist has just determined the organic compound by the functional group present in this compound.
2. Before an alkene was formed the laboratory assistant had observed the reaction of elimination.
3. Pharmaceutical students will have identified the substituents of the alkene by the end of this class.
4. In this reaction HCl has donated a proton to H<sub>2</sub>O that is why HCl functions as an acid.
5. After the chemist had analyzed the criteria for aromaticity, he applied those criteria to identify other ring systems that were also aromatic.

**7.11. Complete the sentences with the suitable form of Perfect Active or Passive.**

1. Over the past century, our society ... heavily reliant on polymers.
  - a) had been become
  - b) has become
  - c) has been become
  - d) had become
  - e) will have become
2. By the end of the lesson the chemistry teacher ... how methanol was mixed with water in different proportions.

- a) had been demonstrated
  - b) has demonstrated
  - c) will have been demonstrated
  - d) had demonstrated
  - e) has been demonstrated
3. A remarkably sophisticated ability to design and synthesize new organic compounds in the laboratory ... by modern chemists.
- a) has been developed
  - b) has developed
  - c) had developed
  - d) have been developed
  - e) have developed
4. Hardly ... the new nuclear magnetic resonance (NMR) spectroscopy ... when the scientists obtained great results.
- a) have ... been provided
  - b) will ... have provided
  - c) has ... provided
  - d) had ... been provided
  - e) had ... provided
5. The commercial success of polymers ... great interest and investment in chemical industry.
- a) have been sparked
  - b) has sparked
  - c) have sparked
  - d) had been sparked
  - e) will have been sparked
6. Biochemists ... biological materials such as hormones by then.
- a) had been able to manufacture
  - b) have been able to manufacture
  - c) has been able to manufacture

- d) will have able to manufacture
  - e) had able to manufacture
7. When we came, the proteins ... already ... by the abnormally high temperature.
- a) had destroyed
  - b) have destroyed
  - c) had been destroyed
  - d) have been destroyed
  - e) will have destroyed
8. The scientist ... the chain of DNA by the time he finishes his report.
- a) have analyzed
  - b) has been analyzed
  - c) will have been analyzed
  - d) had analyzed
  - e) will have analyzed
9. The active constituents of the compound ... by tomorrow.
- a) have extracted
  - b) will have extracted
  - c) had been extracted
  - d) have been extracted
  - e) will have been extracted
10. Modern scientists ... 20 new elements so far.
- a) has been discovered
  - b) will have discovered
  - c) had been discovered
  - d) have discovered
  - e) will have been discovered

## LISTENING

***7.12. Follow the link and watch the video about carbohydrates. Then, choose the right variant according to the video.***

(**Link:** <https://www.youtube.com/watch?v=jQi84TnstI4>)

1. Little ring-shaped molecules made of carbon, hydrogen and oxygen - either alone or in pairs are called ...
  - a) simple sugars
  - b) polysaccharides
  - c) complex carbohydrates
2. Sugar actually refers to a family of molecules called ...
  - a) maltose
  - b) fructose
  - c) saccharides
3. The most important member of the sugar family is ...
  - a) glucose
  - b) maltose
  - c) lactose
4. Table sugar is also called ...
  - a) maltose
  - b) sucrose
  - c) fructose
5. Larger chains with branches and the most abundant type of carbohydrates found in food are ...
  - a) monosaccharides
  - b) oligosaccharides
  - c) polysaccharides
6. ... have molecular bonds that are resistant to human intestinal enzymes.
  - a) fibers
  - b) polysaccharides
  - c) starches
7. To the fact that the molecules are lined up next to one each other refers the indication ... .
  - a) beta

- b) glycosidic bond
  - c) alpha
8. To break different linkages help different ... .
- a) fibers
  - b) enzymes
  - c) hormones
9. When glucose levels in the blood increase after eating, the pancreas releases the hormone ... .
- a) insulin
  - b) enzyme
  - c) glycogen
10. Fructose is handled a bit differently by the ... .
- a) pancreas
  - b) intestine
  - c) liver

***7.13. Decide whether the following statements are true or false according to the video.***

1. Carbohydrates include either simple sugars or complex carbohydrates.
2. Sugars can be found naturally or added to the food.
3. Oligosaccharides contain more molecules of sugar than disaccharides.
4. Galactose is considered as polysaccharide.
5. Sugars do not combine with other sugars.
6. Dietary fibers are carbohydrates that can be broken down intestinal enzymes.
7. Fiber is essential because it can slow down the rate of absorption of simple sugars and can help maintain healthy blood glucose levels.
8. In lactose the molecules are built up one higher than the other.
9. Insulin helps to improve fat and protein synthesis.
10. The World Health Organization and the US Dietary Guidelines recommend that added sugars make up more than 10% of total calories.

## **SPEAKING**

***7.14. Talk about carbohydrates and sugars. Use the following question as the plan of your topic.***

- 1) What are the carbohydrates?
- 2) What does a group of saccharides include?
- 3) What are the chemical groups of saccharides?
- 4) What functions do carbohydrates perform in the living organisms?
- 5) What is the role of carbohydrates in nutrition?

# Unit 8. Pharmaceutical (medicinal) chemistry.

## Цілі:

- знайомитись з новою фаховою лексикою з теми;
- вдосконалити навички розуміння змісту прочитаного тексту англійською мовою та переклад рідною мовою;
- повторити утворення часів;
- вдосконалити навички аудіовізуального сприйняття інформації на задану тему;
- навчитися вести бесіду та надавати основну та додаткову інформацію з наданої теми.

## Питання, що підлягають вивченню:

- лексика: вивчити нові слова до теми «Pharmaceutical chemistry», навчитись правильно їх вимовляти;
- читання: навчитись працювати з фаховою інформацією (робота з текстом «Pharmaceutical chemistry» та вправами до нього);
- граматики: повторити утворення форми часів та вживати їх в різних типах речень;
- аудіювання: робити анотацію або реферування на основі прослуханого та побаченого з теми «Routes of drugs administration»;
- говоріння: робити повідомлення у вигляді інформації або розгорнутої доповіді на тему «At the chemist's shop».

**Норма часу:** 10 годин.

## VOCABULARY AND PRONUNCIATION

### *8.1. How do you spell it? Check out the pronunciation of the following words!*

Design, manufacture, therapeutic, pharmacognosy, screening, efficiency, sublimation, extraction, decoction, filtration, granulation, trituration, distillation,



pharmacokinetics, pharmacodynamics, chemotherapy, antidote, toxicity, oral, parenteral, intramuscular, intravenous, rectal, subcutaneous, refrigerator.

### 8.2. Memorize the new words.

|                           |   |
|---------------------------|---|
| to administer             | призначати (ліки)   |
| preparation               | приготування, підготовка  |
| hit                       | вдала спроба  |
| clinical trial            | клінічне випробовування   |
| pulverization/comminution | подрібнювання, перетворення на порошок                            |
| levigation                | відмулювання, відмучування, розтирання в порошок у вологому стані |
| maceration                | вимочування; розмочування   |
| dessication               | висушування, сушіння  |
| fusion                    | сплавлення, плавка; розплавлення                                  |
| menstruum                 | розчинник   |
| elutriation               | зціджування, промивання   |
| evaporation               | випаровування   |
| idiosyncrasy              | ідіосинкразія, гіперчутливість до чогось, алергія                 |
| complication              | ускладнення   |
| route                     | шлях  |
| contraindication          | протипоказання  |
| to prescribe              | виписувати (ліки)   |
| prescription              | рецепт  |
| side effect               | побічний ефект  |
| over-the-counter          | той, що продається без рецепта                                    |
| to dispense               | відпускати (ліки)   |
| drug cabinet              | шкаф для зберігання ліків   |
| medicine dropper          | крапельниця   |
| drastic                   | сильнодіючий  |
| powder                    | порошок   |
| ointment                  | мазь  |

### 8.3. Which of the variants is the best option? Fill in the gaps with appropriate word.

1. There are the following methods of drug ...: dry and wet.
  - a) design
  - b) preparation
  - c) registration

- d) dispensing
2. One of the dry preparation methods is ..., i.e. the process of crushing or pressing dry materials to become powder.
    - a) elutriation
    - b) solution
    - c) filtration
    - d) pulverization
  3. ... refers to powdering the drug by rubbing it down with a fluid in which it is soluble.
    - a) levigation
    - b) concentration
    - c) sublimation
    - d) extraction
  4. ... consists in diffusing an insoluble powder in water, allowing only the heavier part to settle out.
    - a) decoction
    - b) filtration
    - c) elutriation
    - d) trituration
  5. The process of converting a substance into granules or granlike particles is known as ....
    - a) comminution
    - b) maceration
    - c) evaporation
    - d) granulation
  6. The removal of moisture is known as ... and is necessary in succulent plants because fermentation may start.
    - a) dessication
    - b) filtration
    - c) infusion

- d) sublimation
7. The melting of a drug by means of heat is called ... .
- a) diffusion
  - b) fusion
  - c) filtration
  - d) digestion
8. ... is a method of wet preparation and means the extraction of active principles from drugs by boiling with water for a prescribed time.
- a) decoction
  - b) distillation
  - c) evaporation
  - d) filtration
9. The process involving the steeping or soaking of drugs in a cold menstruum is known as ... .
- a) evaporation
  - b) extraction
  - c) sublimation
  - d) maceration
10. The removal of volatile liquids in order to concentrate fluid is called ... .
- a) solution
  - b) infusion
  - c) evaporation
  - d) filtration

**8.4. Complete the word combination with appropriate preposition.**

- 1) to triturate a dry substance ... a mortar;
- 2) to facilitate the process ... mediate pulverization;
- 3) extracting the active principles ... drugs;
- 4) the conversion of a liquid ... vapor;
- 5) to be necessary ... case of wet preparation.

### 8.5. Choose the right translation of the sentences.

1. Suppositories can be extemporaneously prepared by one of three methods: hand rolling, compression molding and fusion molding.
  - a) Супозиторії для негайного прийому можна приготувати одним із трьох методів: ручне прокатування, формування під тиском та формування через розплавлення.
  - b) Супозиторії для зберігання можна приготувати одним із трьох методів: промислове прокатування, стиснення та формування після подрібнення.
  - c) Супозиторії для майбутнього прийому можна приготувати одним із трьох методів: ручне розтирання, формування під тиском та формування через висушування.
2. Granulation, the process of particle enlargement by agglomeration technique, is one of the most significant unit operations in the production of pharmaceutical dosage forms, mostly tablets and capsules.
  - a) Гранулювання, процес зменшення частинок методом агломерації, є однією з найважливіших операцій у виробництві фармацевтичних лікарських форм, переважно таблеток та капсул.
  - b) Гранулювання, процес змінення частинок методом агломерації, є однією з найменш важливих одиничних операцій у виробництві фармацевтичних лікарських форм, за виключенням таблеток та капсул.
  - c) Гранулювання, процес збільшення частинок методом агломерації, є однією з найважливіших одиничних операцій у виробництві фармацевтичних лікарських форм, переважно таблеток та капсул.
3. Among currently available technologies, spray drying, roller compaction, high shear mixing, and fluid bed granulation are worth of note.

- a) Серед доступних в даний час технологій заслуговують на увагу сушіння розпиленням, ущільнення валиків, змішування з великим зсувом та грануляція в псевдозрідженому шарі.
  - b) Серед доступних в майбутньому часі технологій заслуговують на увагу сушіння подрібненням, ущільнення валиків, змішування з великим зсувом та грануляція в псевдозрідженому шарі.
  - c) В даний час доступні технології не заслуговують на увагу, крім сушіння розпиленням, розтирання валиків, змішування з великим зсувом та грануляція в рідкому шарі.
4. Dissolution involves the transfer of a solid drug into solution in the surrounding physiological fluid.
- a) Відмулювання передбачає переміщення рідкого лікарського засобу в розчин у навколишній фізіологічній рідині.
  - b) Розчинення передбачає переміщення твердого лікарського засобу в розчин у навколишній фізіологічній рідині.
  - c) Промивання передбачає переміщення твердого лікарського засобу в розчин у навколишньому фізіологічному середовищі.
5. New hybrid powders have been produced by the dry processing of six drugs by means of an electric mortar and a powder surface reforming system designed to produce hybrid powders.
- a) Нові гібридні препарати були отримані шляхом сухої обробки шести препаратів за допомогою електричного розчину та системи риформінгу поверхні порошку, призначеної для отримання гібридних препаратів.
  - b) Нові гібридні порошки були отримані шляхом сухої обробки шести препаратів за допомогою електричної ступки та системи риформінгу поверхні порошку, призначеної для отримання гібридних порошків.
  - c) Нові гібридні порошки були отримані шляхом мокрої обробки шести препаратів за допомогою електричного розчину та

порошкової системи риформінгу поверхні, використаної для отримання гібридних порошків.

## **READING**

### **Pharmaceutical chemistry**

Pharmaceutical (medicinal) chemistry is concerned with the design (drug design) and synthesis of biologically active molecules. The aim is to gain new chemical molecules that could enable the discovery of new pharmaceuticals or optimize already known drug structures, thereby to expand the portfolio of chemical drugs. Although organic chemistry plays a crucial role, only knowledgeable pharmaceutical chemists are able to work effectively in a highly interdisciplinary environment and interact with scientists in other disciplines, such as molecular biology, structural biology, pharmacology, physical chemistry, biochemistry, pharmacokinetics, pharmaceutical technology, toxicology or with experts from the field of translational medicine, etc.

The term pharmaceutical (medicinal) chemistry appeared first in the literature shortly after World War II. During the development of molecular pharmacology, it was possible to express the biological activity of any chemical compound by means of quantifiable molecular properties. Since then the scientists have begun using the term "drug design" and started to develop new drugs systematically. After the computer technology and programming had been introduced, the possibility to study the relationship between the chemical structure and biological activity of a molecule in a quantitative sense was significantly increased. Nowadays, these rational methods in designing new drugs are preferred, although the observation of chance or adverse effects still plays significant role in the development of new drugs.

In the years to follow, the development of new drugs has been remarkably accelerated by radioactive drug and metabolite labelling, which in turn enables scientists to identify new therapeutic targets.

The introduction of molecular biology revolutionized the pharmacokinetics features (understanding of the fate of the drug and its metabolites in the body) and pharmacodynamics (understanding of the molecular mechanisms of drugs). The advances in analytical evaluation of new molecules, development of computer technologies and their applications in molecular modelling approaches have all significantly expanded the scope and use of pharmaceutical chemistry, and ultimately have brought the possibility to provide a broader range of new drugs with a new therapeutic potential.

At the beginning of the 21st century, pharmaceutical (medicinal) chemistry has developed new molecules with ever-increasing structural diversity. Apart from the small synthetic ligands and natural products, pharmaceutical chemists focus on the development of modified peptides and proteins, biological agents (e.g. monoclonal antibodies), multifunctional molecular complexes and synthetic vaccines.

***In the path of drug discovery.***

Discovery is the identification of novel active chemical compounds, often called "hits", which are typically found by assay of compounds for a desired biological activity. Initial hits can come from repurposing existing agents toward a new pathologic processes, and from observations of biologic effects of new or existing natural products from bacteria, fungi, plants, etc. In addition, hits also routinely originate from structural observations of small molecule "fragments" bound to therapeutic targets (enzymes, receptors, etc.), where the fragments serve as starting points to develop more chemically complex forms by synthesis. While a number of approaches toward the identification and development of hits exist, the most successful techniques are based on chemical and biological intuition developed in team environments through years of rigorous practice aimed solely at discovering new therapeutic agents.

Further chemistry and analysis is necessary, first to identify the "triage" compounds that do not provide series displaying suitable SAR and chemical characteristics associated with long-term potential for development, then to

improve remaining hit series with regard to the desired primary activity, as well as secondary activities and physiochemical properties such that the agent will be useful when administered in real patients. High Throughput Screening (HTS) uses robotics, data processing/control software, liquid handling devices, and sensitive detectors to rapidly conduct millions of pharmacological, chemical, and genetic tests, eliminating hours of painstaking testing by scientists. HTS identifies active compounds, genes, or antibodies that affect human molecules.

The final synthetic chemistry stages involve the production of a lead compound in suitable quantity and quality to allow large scale animal testing, and then human clinical trials. This involves the optimization of the synthetic route for bulk industrial production, and discovery of the most suitable drug formulation. In clinical trials Phase I studies are used to evaluate pharmacokinetic parameters and tolerance, generally in healthy volunteers. These studies include initial single-dose studies, dose escalation and short-term repeated-dose studies. Phase II clinical studies are small-scale trials to evaluate a drug's preliminary efficacy and side-effect profile in 100 to 250 patients. Additional safety and clinical pharmacology studies are also included in this category. Phase III studies are large-scale clinical trials for safety and efficacy in large patient populations.

## COMPREHENSION CHECK

### 8.6. Find in the text English equivalents to the following expressions.

- 1) нові терапевтичні цілі - .....
- 2) сфера та застосування фармацевтичної хімії - .....
- 3) дуже міждисциплінарне середовище - .....
- 4) за допомогою кількісних молекулярних властивостей - .....  
.....
- 5) маркування метаболітів - .....
- 6) оптимізувати вже відомі лікарські структури - .....  
.....
- 7) раціональні методи проектування нових препаратів - .....



- .....;
- 8) бути надзвичайно прискореним - .....
- 9) постійно зростаюча структурна різноманітність - .....
- .....;
- 10) побічні ефекти - .....

**8.7. Choose the right variant according to the text.**

1. Pharmaceutical chemistry is the study of drugs, and it involves ... .
  - a) drug development
  - b) drug selling
  - c) systematization of organic compounds
  - d) computer technologies
2. Medicinal chemistry is a stimulating field as ... and allows for collaboration with scientists from other fields.
  - a) it is very easy to study
  - b) it offers the best job opportunities
  - c) it links many scientific disciplines
  - d) it plays a leading role in organic chemistry
3. A branch of pharmacology dedicated to determine the fate of substances administered to a living organism is called ... .
  - a) molecular pharmacology
  - b) pharmacokinetics
  - c) translational medicine
  - d) pharmacodynamics
4. The development of medicinal chemistry was accelerated by ... greatly.
  - a) new therapeutic targets
  - b) the invention of the computer
  - c) rational methods in drug design
  - d) analytical evaluation of molecules

5. The study of the biochemical and physiologic effects of drugs (especially pharmaceutical drugs) is known as ... .
- a) molecular pharmacology
  - b) pharmacokinetics
  - c) translational medicine
  - d) pharmacodynamics
6. Hundreds of thousands of new organic chemicals are prepared annually throughout the world, and many of them are entered into pharmacological screens to determine whether they have ... .
- a) clear systematization
  - b) existing agents
  - c) useful biological activity
  - d) adverse effects
7. Medicinal chemists apply their chemistry training to the process of ... .
- a) synthesizing new pharmaceuticals
  - b) writing scientific articles
  - c) development of computer technologies
  - d) analyzing only existing agents
8. Medicinal chemists are concerned with the isolation of organic medicinal agents found in ..., as well as the creation of new synthetic drug compounds.
- a) molecules
  - b) hits
  - c) therapeutic targets
  - d) plants
9. The process of drug discovery consists of ... .
- a) clinical trials
  - b) three steps
  - c) discovering hits
  - d) metabolite labelling

10. Nowadays a lot of attention is paid to the modifying of biological agents and the development of ....

- a) small molecule "fragments"
- b) therapeutic targets
- c) novel active chemical compounds
- d) synthetic vaccines

**8.8. Decide whether the following statements are true or false according to the text.**

1. The discipline of medicinal chemistry is devoted to the discovery and development of new agents for treating diseases.
2. Drug discovery is the process by which an existing candidate medications is described.
3. Discovery often begins with target identification, it means choosing a biochemical mechanism involved in a disease condition.
4. In the "hit to lead" process, small molecule hits from an HTS are decomposed into lead compounds.
5. In the lead optimization process, the lead compounds are analyzed and modified to reduce potency and increase side effects.
6. Active pharmaceutical ingredients are biologically active ingredients in a drug candidate that produce effects.
7. The drug discovery process ends when one lead compound is found for a drug candidate, and the process of drug development starts.
8. Once preclinical research is complete, researchers move on to clinical trials.
9. In clinical trials during the first phase more than 1000 volunteers will help researchers assess the safety and pharmacokinetics, as well as any side effects for safe dosage ranges.
10. Not earlier than in the third phase of clinical trials is the first time when the drug is tested on humans.

## GRAMMAR

→ LEARN THIS!

### Revision of Tenses

| Tense                    | Active Voice   | Passive Voice   |
|--------------------------|--|---|
| Simple Present Tense     | Sub + <u>V<sup>1</sup></u> + Obj                         | Obj + <u>am/is/are</u> + V <sup>2</sup> + by + Obj.Pronoun                |
| Simple Past Tense        | Sub + <u>V<sup>2</sup></u> + Obj                         | Obj + <u>was/were</u> + V <sup>2</sup> + by + Obj.Pronoun                 |
| Simple Future Tense      | Sub + <u>shall/will</u> + V <sup>1</sup> + Obj           | Obj + <u>shall/will + be</u> + V <sup>3</sup> + by + Obj.Pronoun          |
| Present Continuous Tense | Sub + <u>am/is/are + V<sup>1</sup> + ing</u> + Obj       | Obj + <u>am/is/are + being</u> + V <sup>2</sup> + by + Obj.Pronoun        |
| Past Continuous Tense    | Sub + <u>was/were + V<sup>1</sup> + ing</u> + Obj        | Obj + <u>was/were + being</u> + V <sup>2</sup> + by + Obj.Pronoun         |
| Future Continuous Tense  | Sub + <u>shall/will + be + V<sup>1</sup> + ing</u> + Obj | Obj + <u>shall/will + being</u> + V <sup>2</sup> + by + Obj.Pronoun       |
| Present Perfect Tense    | Sub + <u>have/has + V<sup>3</sup></u> + Obj              | Obj + <u>have/has + been</u> + V <sup>2</sup> + by + Obj.Pronoun          |
| Past Perfect Tense       | Sub + <u>had + V<sup>3</sup></u> + Obj                   | Obj + <u>had + been</u> + V <sup>2</sup> + by + Obj.Pronoun               |
| Future Perfect Tense     | Sub + <u>shall/will + have + V<sup>3</sup></u> + Obj     | Obj + <u>shall/will + have + been</u> + V <sup>2</sup> + by + Obj.Pronoun |

### GRAMMAR CHECK

#### 8.9. Complete the sentences with the suitable form of a verb.

- Drugs are chemical substances that ... in medicine in the treatment of diseases.
  - use
  - are used
  - have used
  - are using
- Chemical substances can ... from many different sources.
  - are coming
  - came
  - comes
  - come
- A long time ago pharmacists ... digitalis drugs from the foxglove plant.

- a) obtained
  - b) obtains
  - c) will obtain
  - d) are obtaining
4. Since the middle of the 20<sup>th</sup> century, physicians ... penicillin to treat infections.
- a) were used
  - b) are being used
  - c) have used
  - d) have been used
5. The scientist ... hormones from the glands of an animal, before he obtained the drug.
- a) will extract
  - b) had extracted
  - c) is extracting
  - d) extracts
6. Many drugs made from chemical substances ... in the laboratory.
- a) synthesize
  - b) are synthesized
  - c) is synthesized
  - d) will synthesize
7. At present, this patient ... vitamins in addition to that are usually contained in food substances. ?
- a) is taking
  - b) won't take
  - c) had been taken
  - d) will take
8. By then prednisone, an anticancer drug, ... in the laboratory.
- a) will be synthesized
  - b) doesn't synthesize
  - c) is synthesizing

- d) had been synthesized
9. For already 20 years this pharmacy ... a great variety of drugs.
- a) dispense and store
  - b) has been dispensing and storing
  - c) will dispense and store
  - d) is dispensing and storing
10. The field of medicine which studies drugs, their nature, origin and effect in the body ... pharmacology.
- a) call
  - b) doesn't call
  - c) is called
  - d) has called
11. When the scientist ... the lecture in chemistry, he explained that pharmacodynamics involved the study of how drugs exert their effects in the body.
- a) delivers
  - b) was delivering
  - c) is being delivered
  - d) will deliver
12. Drug absorption involves the process of how drugs ... into the bloodstream.
- a) pass
  - b) has been passed
  - c) will have passed
  - d) don't pass
13. While drugs undergo changes within the body, they ... .
- a) don't metabolize
  - b) had metabolized
  - c) will metabolize
  - d) are being metabolized
14. The drug ... from the body of the patient in two days.

- a) did excrete
- b) was excreting
- c) will be excreting
- d) has been excreted

15. Molecular pharmacologists ... the interaction of the new drug with DNA, RNA and enzymes by the end of the year.

- a) had analyzed
- b) will have analyzed
- c) analyzed
- d) are being analyzed

16. The studies of molecular pharmacology ... important information about the mechanisms of action of the drug.

- a) didn't provide
- b) has been provided
- c) will provide
- d) is being provided

17. Pharmacogenetics deals with clinical testing of genetic variation that ... rise to different responses to drugs.

- a) gives
- b) is given
- c) will be given
- d) had given

18. Recently chemotherapy, a new subdivision of pharmacology, ... a lot of attention.

- a) will have drawn
- b) is drawn
- c) has drawn
- d) had been drawing

19. Chemotherapy ... treatment of infectious diseases, mental illnesses and cancer.

- a) will be included

- b) includes
- c) didn't include
- d) has been included

20. Even before entering the university I ... already ... that any drug, if given in high enough doses, can have harmful actions on the body.

- a) will know
- b) is known
- c) have known
- d) did know

21. During the third academic year students ... toxicology in order to learn harmful chemicals and their dangerous effects on the body.

- a) will be studying
- b) have studied
- c) were studied
- d) is studying

22. The scientist ... a proper antidote to the harmful effect of the new drug before he ... it on the conference.

- a) finds / presents
- b) will find / has presented
- c) had been finding / is presented
- d) had found / presented

23. The patient ... an antidote to neutralize the unwanted effect of the drug.

- a) gives
- b) will have given
- c) was given
- d) didn't give

24. Drug toxicity ... to the poisonous and potentially dangerous effects of some drugs.

- a) refers
- b) has referred



- c) was referred
  - d) will be referring
25. This patient ... idiosyncrasy as (to?) an unpredictable type of drug toxicity.
- a) will be developed
  - b) has developed
  - c) develop
  - d) is developing
26. If the dosage of certain drugs ..., unfavorable effects may be produced.
- a) is increased
  - b) had increased
  - c) was increasing
  - d) increase
27. The doctor ... the unusual therapeutic dosage of the drug and several side effects, such as nausea and vomiting, ... in the patient.
- a) will prescribe / will occur
  - b) prescribes / has occurred
  - c) was prescribed / is occurring
  - d) prescribed / occurred
28. All the factors in the patient's condition which make the use of a drug dangerous ... usually ... on a label as contraindications.
- a) are written
  - b) will write
  - c) have written
  - d) are writing
29. If the patient continues to take these drugs, he ... such complications as cataract formation and neuropathy in two weeks.
- a) has got
  - b) is being got
  - c) will get
  - d) was getting

30. By the end of the previous month, this patient ... cholestatic jaundice and photosensitivity because of drug usage.

- a) will develop
- b) had developed
- c) doesn't develop
- d) is developing

### LISTENING

**8.10. Follow the link and watch the video about routes of drugs administration. Fill in the table with information from the video. Then, write an annotation to the video (5-7 sentences).**

(**Link:** <https://www.youtube.com/watch?v=5Lrg4y7P-Bc>)

#### Routes of administration

| <i>Route</i> | <i>Medicinal form</i> | <i>Pros</i> | <i>Cons</i> | <i>Examples</i> |
|--------------|-----------------------|-------------|-------------|-----------------|
|              |                       |             |             |                 |
|              |                       |             |             |                 |

### SPEAKING

**8.11. Talk about the chemist's shop". Use the following question as the plan of your topic.**

1. How many departments are there in every chemist's shop?
2. What things can you buy at the chemist department?
3. What kinds of drugs are there at the prescription department?
4. What things can we buy for medical care at the chemist's?
5. Where are different drugs kept in the chemist's?
6. How are different drugs labeled in the pharmacy?
7. What does a manager of a chemist's do?
8. What does a dispensing pharmacist do?
9. What does a controller do?
10. What does a pharmacist of supply do?

# Revision Tests to Units 5-8

**Task 1. Read and translate:**

## Chemistry and Medicine

Chemistry may be of use to medicine in quite different ways. One of them is analytical chemistry which deals with discovering the components of things. Structural chemistry studies the way in which materials are arranged. Physical chemistry is a still more recent development of chemistry. It is the study of macroscopic, and particulate phenomena in chemical systems in terms of the principles, practices, and concepts of physics. Pharmaceutical chemistry is the study of drugs, and it involves drug development. This includes drug discovery, delivery, absorption, metabolism, etc. Understanding chemistry, pharmacists are able to develop drugs that fight disease, develop better nutrition, and develop healthier environments to avoid disease. To make any medicine can be complicated without elementary knowledge of chemistry.

**Task 2. Choose the right variant:**

1. Chemistry helps to understand physicochemical properties of drugs that is useful in dosage forms designing and in achieving drug  
a) True  
b) False
2. The scope of chemistry includes such roles as compounding and dispensing of medications, and it also includes more modern services related to health care.  
a) True  
b) False
3. Pharmaceutical chemistry has become increasingly important part of modern medical and pharmaceutical research.  
a) True  
b) False
4. Chemistry, a branch of science, is the study ...

- a) of the composition, properties and behavior of matter.
  - b) involved with elements and compounds composed of atoms, molecules and ions.
  - c) concerned with the substances of which matter is composed.
  - d) all of the above
5. Chemistry is essential for meeting our *основних потреб* of food, clothing, shelter, health, energy, and clean air, water, and soil.
- a) basic needs
  - b) daily needs
  - c) basic property
  - d) daily changes
6. Chemistry helps pharmacists to understand *фізико-хімічні властивості ліків* that is useful in dosage forms designing and in achieving drugs
- a) physicochemical properties of drugs
  - b) properties of medical substances
  - c) physicochemical destruction of drugs
  - d) cellular properties of drugs
7. The development of new drugs involves chemical analysis and ... .
- a) synthesis of new compounds
  - b) physical changes of a substance
  - c) chemical composition of matter
  - d) radioactivity of new substance
8. Chemical analysis is ... that the environment remains healthy and safe.
- a) important for checking
  - b) necessary to show
  - c) useful for being sure
9. The aim of medicinal chemistry is to gain new chemical molecules that could enable the discovery of new pharmaceuticals.
- a) Метою лікарської хімії є отримання нових хімічних молекул, які могли б відкрити нові фармацевтичні препарати.

- b) Медична хімія полягає у отриманні нових хімічних молекул, які могли б створити нові фармацевтичні препарати.
- c) Метою лікарської хімії є дослідження та аналіз хімічних молекул, які могли б відкрити фармацевтичні препарати.
- d) Метою медичної хімії є створення нових сучасних ліків, які могли б замінити на ринку існуючі фармацевтичні препарати.

10. Хімічний аналіз - це визначення фізичних властивостей або хімічного складу зразків речовини.

- a) Chemical analysis is a determination of the physical properties or chemical composition of samples of matter.
- b) Chemical analysis is a traditional technique for identification and verification of a material sample.
- c) Chemical analysis is necessary to have an understanding of how substances dissociate to form ions.

***Task 3. Read and translate:***

### **Inorganic Compounds in Medicine**

Inorganic drugs have a major impact in modern medicine as these are used to diagnose a variety of diseases and conditions relating to cancer care, infection control, diabetic control, neurological, cardiovascular, anti-inflammatory diseases, and have promising therapeutic properties. Lithium carbonate is used for the treatment of manic-depressive disorders and germanium complexes act as antitumour agents. Gold complexes show promise as anti tumour agents while them also act as anti-rheumatic agents, and the possible mechanisms of therapeutic activity have been discussed. Selenium compounds show antioxidant, antineoplastic, anti-allergic and antiviral potential. Polyoxometallates show anti-HIV potential while vanadium compounds act as insulin mimetics. Ruthenium compounds with anticancer activity penetrate tumours through a transferrin-mediated process and bind to cellular DNA following intracellular activation by reduction. So, understanding of inorganic chemistry helps pharmacists to open up a

wide range of complexes that could provide an arsenal of compounds for clinical uses.

**Task 4. Choose the right variant:**

1. Gold-based drugs are prescribed for the treatment of rheumatoid arthritis
  - a) True
  - b) False
2. Lithium carbonate is used as anti-allergic agent.
  - a) True
  - b) False
3. A lot of ruthenium compounds were found to have very promising anticancer activity.
  - a) True
  - b) False
4. Inorganic chemistry is defined as the study of ...
  - a) the chemistry of materials from non-biological origins.
  - b) compounds based on the chemistry of carbon.
  - c) such compounds as proteins, carbohydrates, and fats.
5. Inorganic compounds, and metal complexes in particular, offer *механізми дії ліків* that can be quite distinct from those of organic drugs.
  - a) mechanisms of drug action
  - b) mechanisms of drug characteristic
  - c) properties of drug action
  - d) properties of unique action
6. Metal complexes offer *унікальні властивості* in comparison to organic drugs.
  - a) unique properties
  - b) excellent characteristics
  - c) proper quantity
  - d) significant quality
7. Some inorganic compounds are ... in water, while others are not.

- a) soluble
- b) slippery
- c) covalent
- d) active

8. Many synthetic drugs can be ... without causing serious harm.

- a) used
- b) sold
- c) bought
- d) kept

9. Drugs sometimes have quite complicated chemical structures and are biologically active compounds.

- a) Ліки іноді мають досить складну хімічну структуру і є біологічно активними сполуками.
- b) Препарати завжди містять хімічні компоненти, що складаються з біологічно активних сполук.
- c) Ліки іноді отримуються зі складних хімічних речовин і тому вважаються біологічно активними сполуками.
- d) Ліки іноді мають досить складні фізичні властивості і є біологічно активними сполуками.

10. Неорганічна хімія - це одна з найбільших областей спеціалізації серед різних галузей хімії.

- a) Inorganic chemistry is one of the largest area of specialization among the various fields of chemistry.
- b) Inorganic chemistry is concerned with the large area of specialization of different fields of chemistry.
- c) Inorganic chemistry is the most important area of specialization among the various fields of chemistry.
- d) Organic chemistry is one of the largest area of specialization among the various fields of chemistry.

***Task 5. Read and translate:***

**ESSENTIALS OF ORGANIC CHEMISTRY**

Organic chemistry is one of the major and the most important chemical sciences in pharmaceutical and medical studies. It is the study of the structure, properties, composition, reactions, and preparation not only of carbon-containing compounds, but also compounds with hydrogen, nitrogen, oxygen, halogens, phosphorus, silicon, and sulfur. Carbon is unique in the variety and extent of structures. When combined with variable amounts of hydrogen, oxygen, nitrogen, sulfur, phosphorus, and other elements, the structural possibilities of carbon compounds become limitless. A major focus of organic chemistry is the isolation, purification, and structural study of these naturally occurring substances. The correlation of the physical and chemical properties of compounds with their structural features is the domain of organic chemistry. Some products are easier to synthesize than to collect and purify from their natural sources. The range of application of organic compounds is enormous and includes pharmaceuticals, petrochemicals, food, explosives, paints, and cosmetics. Current trends in organic chemistry are chiral synthesis, green chemistry, microwave chemistry and fullerene chemistry.

***Task 6. Choose the right variant:***

1. Organic chemistry is the study of the synthesis, structure, reactivity and properties of the group of chemical compounds primarily constructed of carbon.
  - a) True
  - b) False
2. Carbon-containing compounds can not be produced artificially in the laboratories.
  - a) True
  - b) False
3. Organic compounds are called "organic" because they are associated with living organisms.
  - a) True



- b) False
4. Due to *здатності вуглецю* to form chains with other carbon atoms, millions of organic compounds are known.
- a) carbon's ability
  - b) carbon's property
  - c) quality of carbon
  - d) carbon's structure
5. A lot of *синтетичних речовин* have novel properties that make them especially useful.
- a) synthetic substances
  - b) organic compounds
  - c) synthetic compounds
  - d) synthetic materials
6. The preparation, under controlled laboratory conditions, of specific compounds is known as ... .
- a) synthetic chemistry
  - b) analytical chemistry
  - c) physical chemistry
  - d) chemical engineering
7. Many of these are still extracted from natural sources because they would be ... to produce artificially.
- a) more expensive
  - b) more active
  - c) more useful
  - d) more important
8. What is the application of organic chemistry in medicine?
- a) Like a drug
  - b) To study the diseases
  - c) For diagnosis
  - d) All of the above

9. There are a large number of organic compounds and therefore a proper systematic classification was required.

- a) Існує велика кількість органічних сполук, і тому потрібна була відповідна систематична класифікація.
- b) Існує велика кількість органічних препаратів, і тому вчені створили для них відповідну класифікацію.
- c) Існує велика кількість різноманітних органічних препаратів, і тому лікарі призначають їх згідно до вимог певної класифікації.

10. Багато препаратів, що застосовуються для лікування хвороб, виготовляються з органічних сполук.

- a) Many drugs used for the treatment of diseases are made of organic compounds.
- b) Many drugs used for the diagnosis cancer diseases are made of carbon compounds.
- c) Many drugs used for the treatment of diseases are made artificially in the laboratories.
- d) Many drugs used for the studying of disease are made of organic substances.

***Task 7. Read and translate:***

Most of the time, medicines make our lives better. They reduce aches and pains, fight infections, and control problems such as high blood pressure or diabetes. But medicines can also cause unwanted reactions. One problem is interactions, which may occur between: a) two drugs, such as aspirin and blood thinners; b) drugs and food, such as statins and grapefruit; c) drugs and supplements, such as ginkgo and blood thinners; d) drugs and diseases, such as aspirin and peptic ulcers. Interactions can change the actions of one or both drugs. The drugs might not work, or you could get side effects. Side effects are unwanted effects caused by the drugs. Most are mild, such as a stomach aches or drowsiness, and go away after you stop taking the drug. Others can be more serious. Drug allergies are another

type of reaction. They can be mild or life-threatening. Skin reactions, such as hives and rashes, are the most common type.

The administration of a medicine is a common but important clinical procedure. The route of drug administration is simply defined as the path by which a drug is taken into the body for diagnosis, prevention, cure or treatment of various diseases and disorders.

***Task 8. Choose the right variant:***

1. Drug interactions can increase or decrease the effectiveness of a drug.
  - a) True
  - b) False
2. Pharmacies sell prescription drugs only.
  - a) True
  - b) False
3. Administration of medication requires thorough understanding the drug.
  - a) True
  - b) False
4. The method of *введення препарату* is based on the actual disease diagnosed and the agent's effectiveness.
  - a) administering the drug
  - b) prescribing the medicine
  - c) dispensing the agent
  - d) synthesizing the drug
5. Before administering a medicine, it is *важливо зрозуміти* the benefits and limitation of the routes of administration.
  - a) important to understand
  - b) important to produce
  - c) important to prescribe
  - d) necessary to understand
6. The consequences of drugs interactions are unintended and ... , potentially fatal.

- a) can be dangerous
  - b) have the benefits
  - c) have a therapeutic effect
  - d) can be effective
7. Drug delivery is a method by which ... .
- a) a drug is administered to achieve a therapeutic effect
  - b) desired therapeutic effect is produced
  - c) the target of action is based
  - d) a drug is sold or distributed safely to the patient
8. A medication (medicine, pharmaceutical drug, or simply drug) is a drug used ....
- a) to diagnose disease
  - b) to cure disease
  - c) to treat disease
  - d) to prevent disease
  - e) all of the above
9. Medicines and other chemicals, for both diagnostic and therapeutic reasons, can be administered in a wide variety of ways.
- a) Ліки та інші хімічні речовини, як з діагностичних, так і з терапевтичних причин, можна вводити різними способами.
  - b) Шляхи введення ліків в організм можуть бути різними і визначаються залежно від мети (діагностичної або терапевтичної) їх призначення.
  - c) Лікарські засоби, що вживають для профілактики, діагностики, лікування захворювань, можна вводити в організм різними способами.
  - d) Лікарська форма хімічної речовини має відповідати діагностичній або терапевтичній мети та в вводитьься в організм різними способами.
10. Найчастіше ліки приймають для лікування хвороби або іншого медичного стану.
- a) Most of the time drugs are taken to treat a disease, or other medical condition.
  - b) Most medicines are taken incorrectly and they may actually cause harm.

- c) Most of the time drugs are taken to help restoring of balance to the certain medical condition.
- d) Most of the time drugs interact each with other and can cause undesired condition.

**Task 9. Grammar test. Choose the right variant:**

1. A new medicine for diabetes ... now.
  - a) is being tested
  - b) is testing
  - c) is tested
  - d) was being tested
2. This medicine ... to the patient when we came in.
  - a) was being injected
  - b) was injected
  - c) is being injected
  - d) is injected
3. ...you ... this anesthesiologist before?
  - a) Have ... seen
  - b) Do ... see
  - c) Did ... see
  - d) Has ...seen
4. I ... a new pharmacy today.
  - a) have visited
  - b) visited
  - c) has visited
  - d) visits
5. This solution ... not ... yet.
  - a) has ... been infused
  - b) have ... been infused
  - c) has ... infused

- d) have ... infused
6. These organic reactions ... a revolutionary in the pharmaceutical field.
- a) have brought
  - b) has brought
  - c) has been brought
  - d) have been brought
7. How long ... you ... pharmacy?
- a) have ... been studying
  - b) have been ... studying
  - c) have ...studied
  - d) has ...been studying
8. The pharmacist ... this solution for half an hour.
- a) has been mixing
  - b) has been mixed
  - c) have been mixing
  - d) have been mixed
9. I have been taking this medication for 5 months, but I do not feel better.
- a) Я приймаю ці ліки протягом 5 місяців, але не відчуваю себе краще.
  - b) Я приймав ці ліки протягом 5 місяців та вже відчуваю себе набагато краще.
  - c) Я приймав ці ліки протягом 5 місяців та зараз відчуваю себе краще.
  - d) Я приймаю ці ліки протягом 5 місяців та вже зараз відчуваю себе краще.
10. Я чекаю на Вас у лабораторії вже півгодини.
- a) I've been waiting for you in the lab for half an hour.
  - b) I've waited for you in the lab for half an hour.
  - c) I am waiting for you in the lab for half an hour.
  - d) I always wait for you in the lab during half an hour.

## ПЕРЕЛІК ВИКОРИСТАНОЇ ТА РЕКОМЕНДОВАНОЇ ЛІТЕРАТУРИ

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7. <https://nuph.edu.ua/>



## РЕФЕРУВАННЯ ТЕКСТУ

**Анотуванням** називається процес складання коротких відомостей про наукову працю, що характеризують її з боку змісту, спрямованості, інформативної цінності, призначення і оформлення. Завданням анотування є складання загальної характеристики першоджерела, за якою споживач інформації міг би судити про подальшу необхідність більш детального знайомства з ним.

**Реферування** – це стисле точне викладення змісту текста, що включає основні фактичні відомості й висновки, без додаткової інтерпретації або критичних зауважень автора реферату.

**Мета реферування:** знайомити читача зі змістом оригіналу і в такий спосіб заміщати його.

### **Методика реферування тексту:**

- ✓ розділити текст на логічні частини;
- ✓ виділити головну ідею кожної частини;
- ✓ прочитати оригінал ще раз;
- ✓ спланувати свій майбутній текст: продумати, що буде включено до вступу, основної частини і висновку;
- ✓ дотримуватись наведеної нижче структури;
- ✓ використати слова з шаблонів;
- ✓ образна мова в більшості випадків непридатна;
- ✓ не інтерпретувати або оцінювати думку автора;
- ✓ уникати оцінних слів і фраз в тексті реферату,
- ✓ використовувати перефразування.

### **Особливості стилю анотації/реферування:**

1. Для передачі змісту використовуються, головним чином, пасивні безособові речення, що починаються з “It”.

2. Форма присудка визначається характером повідомлюваної інформації. Так, речення, в яких переказується зміст першоджерела, мають присудок у формі Present Simple Passive (is/are Ved):

*(In this paper) some experimental observations are presented and discussed.*

Речення, в яких повідомляється про отримані результати, містять присудок у формі Present Perfect Passive (has/have been Ved):

*A new technique has been developed.*

Рідше використовується форма Past Simple Passive (was/were Ved), в основному для опису зробленої роботи (перебігу експерименту, етапів дослідження, кроків обчислення) або для посилань на попередні роботи (екскурс в історію розвитку питання):

*A comprehensive and orderly framework was used for planning.*

3. Щоб забезпечити зв'язність нового тексту, необхідно використати ряд сполучних елементів, таких як:

|                      |                                   |
|----------------------|-----------------------------------|
| First(ly)            | По-перше                          |
| Second (ly)/then     | По-друге / потім                  |
| Third (ly)/also      | По-третє / також                  |
| Finally              | На закінчення                     |
| Besides              | Крім того                         |
| In addition          | На додаток                        |
| Furthermore/moreover | Більше того                       |
| Therefore/so         | Тому, отже                        |
| Thereby              | Таким чином, у зв'язку із цим     |
| That's why           | От чому                           |
| However              | Однак                             |
| Nevertheless         | Проте, однак                      |
| On the one hand      | З одного боку                     |
| On the other hand    | З іншого боку                     |
| On the contrary      | Навпаки                           |
| Similarly            | Аналогічно, подібним чином і т.п. |

## План анотації/реферування

| <i>Складові компоненти</i>  | <i>Стандартні фрази</i>   |
|---|---|
| <b>I. Вступна частина.</b>  |   |
| <b><i>1. The title of the article.</i></b>  | <p>The article is headlined...</p> <p>The headline of the article I have read is...</p> <p>As the title implies the article describes...</p>  |
| <b><i>2. The author of the article, where and when the article was published.</i></b>   | <p>The author of the article is...</p> <p>The author's name is...</p> <p>Unfortunately the author's name is not mentioned.</p> <p>The article is written by...</p> <p>It was published in ... (on the Internet).</p> <p>It is a newspaper/scientific article published on March 5, 2020/in 2019.</p>  |
| <b><i>3. The main idea of the article.</i></b>  | <p>The main idea of the article is...</p> <p>The article is about...</p> <p>The article is devoted to...</p> <p>The article deals/is concerned with...</p> <p>The article touches upon the issue of...</p> <p>The purpose of the article is to give the reader some information on...</p> <p>The aim of the article is to provide the reader with some material on...</p> |
| <b>II. Передача основного змісту</b>  |   |
| <b><i>The contents of the article.</i></b><br><b><i>Some facts, names, figures.</i></b> | <p>The author starts by telling (the reader) that...</p> <p>The author (of the article) writes (reports, states, stresses, thinks, notes, considers, believes, analyses, points out, says, describes) that... /</p>   |

|   |  |
|---|--|
|   | <p>draws reader's attention to...</p> <p>Much attention is given to...</p> <p>According to the article...</p> <p>The article goes on to say that...</p> <p>It is reported (shown, stressed) that...</p> <p>It is spoken in detail about...</p> <p>From what the author says it becomes clear that...</p> <p>The fact that ... is stressed.</p> <p>The article gives a detailed analysis of...</p> <p>Further the author reports (writes, states, stresses, thinks, notes, considers, believes, analyses, points out, says, describes) that... / draws reader's attention to...</p> <p>In conclusion the author writes (reports, states, stresses, thinks, notes, considers, believes, analyses, points out, says, describes) that.../ draws reader's attention to...</p> <p>The author comes to the conclusion that...</p> <p>The following conclusions are drawn: ...</p> |
| <p><b>III. Суб'єктивна думка стосовно змісту тексту</b></p> |  |
| <p><i>Your opinion.</i></p>                                 | <p>I found the article (rather) interesting (important, useful) as /because...</p> <p>I think / In my opinion the article is (rather) interesting (important, useful) as /because...</p> <p>I found the article too hard to understand/rather boring as /because...</p>  |

**Корисні лексичні засоби для анотації/реферування:**

**Дієслова**

|   |  |
|---|--|
| to examine  | вивчати, досліджувати, розглядати, перевіряти                            |
| to analyze  | вивчати, досліджувати, аналізувати                                       |
| to consider   | вивчати, розглядати (беручи до уваги різні параметри)                    |
| to describe   | описувати, давати опис   |
| to outline  | коротко описувати, описувати загалом                                     |
| to discuss  | обговорювати, описувати, викладати, розглядати                           |
| to estimate   | оцінювати, обчислювати або підраховувати приблизно                       |
| to evaluate   | оцінювати (різні параметри); визначати, з'ясовувати, знаходити (причини) |
| to perform  | проводити, виконувати  |
| to demonstrate the feasibility (of)                     | демонструвати можливість, імовірність                                    |
| to call attention to                                    | звертати увагу на...   |
| to concentrate on                                       | концентруватися на...  |
| to give consideration to                                | розглядати   |
| to give description of                                  | давати опис, описувати   |
| to make a contribution to                               | робити внесок  |
| to make an attempt/attempts                             | робити спробу, намагатися  |
| to make an effort/efforts                               | докладати зусиль, намагатися   |
| to make calculation of                                  | підраховувати, розраховувати, рахувати, знаходити, визначати             |
| to make estimation of                                   | давати оцінку, підраховувати, оцінювати                                  |
| to make mention of                                      | згадувати  |
| to make reference to                                    | посилатися на...   |
| to place emphasis on                                    | підкреслювати, вирізняти   |
| to propose a solution                                   | пропонувати рішення  |
| to show preference to                                   | віддавати перевагу   |
| to take (no) account of                                 | (не) враховувати, (не) брати до уваги                                    |
| to be useful/helpful/of use                             | бути корисним, годитися, підходити, використовуватися, застосовуватися   |
| to be applicable/ used/ employed/ applied/ utilized     | використовуватися, застосовуватися, знаходити застосування               |
| to find use/ find application/ have application         | використовуватися, застосовуватися, знаходити застосування               |
| to provide data/evidence (for)                          | наводити дані/докази, свідчити про..                                     |
| to provide a basis for                                  | забезпечувати основу для..   |
| to make/give (a) comparison of ... with/between ... and | проводити/робити порівняння/зіставлення                                  |
| to differ from ... in/by                                | відрізнятися від/на  |

|                                      |  |
|--------------------------------------|--|
| to summarize/sum up                  | підсумовувати  |
| <b>Іменники</b>                      |  |
| paper                                | документ, наукова доповідь, стаття                                 |
| article                              | наукова стаття   |
| study                                | наукова праця, монографія  |
| investigation                        | дослідження  |
| survey                               | огляд, наукова розвідка  |
| experiment                           | експеримент, дослід  |
| theory                               | теорія   |
| hypothesis                           | гіпотеза, припущення   |
| aim/object/purpose/task              | мета, призначення, завдання  |
| field                                | поле, сфера вивчення   |
| approach to                          | метод, підхід (до рішення/проблеми), розгляд (з певної точки зору) |
| feature                              | риси   |
| characteristics                      | характерна риса  |
| peculiarity                          | особливість  |
| advantage/merit                      | достоїнство, перевага  |
| limitation/disadvantage/drawback     | недолік, вада, обмеження   |
| remark                               | зауваження, спостереження  |
| findings (on)                        | висновки, одержані дані (відомості) (про/по/відносно)              |
| data (on, concerning, as to)         | дані, відомості (про/ відносно)                                    |
| evidence (for, on, concerning, that) | дані, докази, свідчення  |
| assumption                           | допущення  |
| supposition                          | припущення   |
| viewpoint                            | погляд, точка зору   |
| issue                                | питання, проблема  |
| <b>Прикметники</b>                   |  |
| brief/short                          | стислий  |
| extensive                            | великий, широкий   |
| critical                             | критичний, осудливий; важливий, цінний                             |
| particular/special/specific          | особливий  |
| main/chief/basic/principal           | основний, головний   |
| additional                           | допоміжний, додатковий   |
| modern/current/up-to-date            | сучасний   |
| out-of-date                          | той, що вийшов із ужитку, застарів                                 |
| conventional/usual                   | звичайний, загальноприйнятий                                       |
| unconventional                       | нестандартний  |
| valuable                             | коштовний, цінний  |
| reliable                             | надійний   |
| appropriate                          | підходящий, відповідний  |

|  |   |
|--|---|
| valid  | застосовний (до даного випадку), обґрунтований, що має силу |
| promising/perspective                          | перспективний   |
| remarkable/distinguished/notable               | помітний, чудовий, примітний                                |
| obvious/distinct                               | очевидний, явний  |
| ambiguous/contradictory                        | суперечливий  |
| convincing                                     | переконливий  |
| <b>Прислівники</b>                             |   |
| accurately                                     | точно   |
| carefully/thoroughly                           | ретельно, уважно  |
| in detail                                      | докладно, детально, в усіх подробицях                       |
| comprehensively                                | вичерпно  |
| especially/particularly/specially/specifically | особливо  |
| <b>Прийменники, прийменникові конструкції</b>  |   |
| as compared to/with                            | у порівнянні з, порівняно з                                 |
| in contrast to/with, as opposed to             | на противагу  |
| except/except for/with the exception of        | крім, за винятком   |

### Тренувальні завдання

**Task 1. Read only the first paragraph. Answer the following question:**

*How do you think, where this text was taken from?*

- an article
- a review
- an extract from the book
- a report
- a letter
- an essay

Baking soda and baking powder are both leavening agents. That is, they both produce CO<sub>2</sub> that will make a dough or batter fluffy. We will now explore how each of these compounds accomplishes its task, beginning with baking soda. As mentioned earlier in this chapter, baking soda is the household name for sodium bicarbonate. Because sodium bicarbonate is mildly basic, it will react with an acid to produce carbonic acid, which in turn degrades into CO<sub>2</sub> and water.

The mechanism for the conversion of carbonic acid into CO<sub>2</sub> and water will be discussed in Chapter 21. From the chemical reaction, it is clear that an acid must be present in order for baking soda to do its job. Many breads and pastries include ingredients that naturally contain acids. For example, buttermilk, honey, and citrus fruits (such as lemons) all contain naturally occurring organic acids.

When an acidic compound is present in the dough or batter, baking soda can be protonated, causing liberation of CO<sub>2</sub>. However, when acidic ingredients are absent, the baking soda cannot be protonated, and CO<sub>2</sub> is not produced. In such a situation, we must add both the base (baking soda) and some acid. Baking powder does exactly that. It is a powder mixture that contains both sodium bicarbonate and an acid salt, such as potassium bitartrate. Baking powder also contains some starch to keep the mixture dry, which prevents the acid and base from reacting with each other. When mixed with water, the acid and the base can react with each other, ultimately producing CO<sub>2</sub>.

Baking powder is often used when making pancakes, muffins, and waffles. It is an essential ingredient in the recipe if you want your pancakes to be fluffy. In any recipe, the exact ratio of acid and base is important. Excess base (sodium bicarbonate) will impart a bitter taste, while excess acid will impart a sour taste. In order to get the ratio just right, a recipe will often call for some specific amount of baking soda and some specific amount of baking powder. The recipe is taking into account the amount of acidic compounds present in the other ingredients, so that the final product will not be unnecessarily bitter or sour. Baking is truly a science!

***Task 2. Read the text to the end. How do you think, which title passes the most?***

- ✓ Baking Soda versus Baking Powder
- ✓ Chemical properties of Baking Soda
- ✓ Chemical formulas of Baking Soda and Powder
- ✓ Application of Baking Soda and Powder

***Task 3. Choose the best options as key words to the text:***



- exploring of chemical compounds
- production of CO<sub>2</sub> in leavening process
- mechanism for the conversion of carbonic acid
- ingredients that naturally contain acids
- chemical reaction of the acid and base
- exact ratio of acid and base
- specific amounts of baking powder
- baking soda and baking powder as leavening agents

**Task 4. Answer the question: In your opinion, which sentence formulates the main topic of the text in a best way?**

- a) The text is devoted to the investigation of the baking process.
- b) In the text the author discusses the physical peculiarities of acids and bases on the example of baking soda.
- c) The main purpose of the text is to give the description of acid-base reactions through the comparison of baking soda and baking powder.
- d) The text deals with the analysis of the process of CO<sub>2</sub> production.

**Task 5. Translate the words and word combinations into English:**

1. The author *посилається* to the information from the previous chapters. (makes reference)
2. The author *заявляє* that baking soda *відрізняється* the baking powder. (states; differs from)
3. Basic properties of sodium bicarbonate *стисло описані*. (are briefly/shortly outlined/described)
4. The author *згадує* of *загальноприйнятю* information about acid-base reactions. (makes mentions; conventional/usual)
5. *Більше того*, the author *підкреслює* on physical characteristics of the exact ratio of acid and base in any recipe. (Moreover/Furthermore; places emphasis)

**Task 6. Choose the sentence with the similar meaning:**

1. Baking soda and baking powder are both leavening agents. That is, they both produce CO<sub>2</sub> that will make a dough or batter fluffy.
  - a) To make a dough or batter soft such leavens as baking soda or baking powder are applied.
  - b) People use leaving agents to produce CO<sub>2</sub> in baking soda and baking powder.
  - c) Leavening agents contain CO<sub>2</sub> and thus harden a dough or batter.
2. Because sodium bicarbonate is mildly basic, it will react with an acid to produce carbonic acid, which in turn degrades into CO<sub>2</sub> and water.
  - a) Because of basic properties of sodium bicarbonate the reaction with an acid results in composing of CO<sub>2</sub> and water.
  - b) Sodium bicarbonate reacts strongly to the carbonic acid, as well as CO<sub>2</sub> and water.
  - c) Sodium bicarbonate is a mild base which, having reacted with an acid, eventually breaks down into CO<sub>2</sub> and water.
3. From the chemical reaction, it is clear that an acid must be present in order for baking soda to do its job.
  - a) Baking soda starts working in order to produce an acid.
  - b) To produce a chemical reaction an acid should to be added into baking soda.
  - c) It is determined, that an acid should be present to prevent baking soda from chemical reaction.
4. When an acidic compound is present in the dough or batter, baking soda can be protonated, causing liberation of CO<sub>2</sub>. However, when acidic ingredients are absent, the baking soda cannot be protonated, and CO<sub>2</sub> is not produced.
  - a) To protonate the baking soda an acidic compound should be eliminated.
  - b) It is only in the presence of both a base and an acid that CO<sub>2</sub> can be liberated.

- c) Baking soda protonates the dough or batter causing production of acidic ingredients.
5. In such a situation, we must add both the base (baking soda) and some acid. Baking powder does exactly that.
    - a) Baking powder contains all the components needed for the CO<sub>2</sub> production.
    - b) Baking powder must be added exactly to the base and acid.
    - c) Baking powder adds or the base or some acid to the situation.
  6. Baking powder also contains some starch to keep the mixture dry, which prevents the acid and base from reacting with each other.
    - a) Baking powder is dry to keep starch, the acid and base away from each other.
    - b) To provoke the acid and base to react with each other baking powder should be mixed with some starch.
    - c) Some starch is added into a baking powder to avoid the beginning of reaction between the acid and base.
  7. In any recipe, the exact ratio of acid and base is important. Excess base (sodium bicarbonate) will impart a bitter taste, while excess acid will impart a sour taste.
    - a) If you add too much sodium bicarbonate in any recipe you will get a bitter or sour taste.
    - b) Whatever you bake the acid and base should be balanced in order not to get a bitter or sour taste.
    - c) The exact amount of the acid and base will provide any recipe with a bitter or a sour taste.

**Task 7. Match the beginning of the sentence with the ending:**

|  |  |
|--|--|
| 1. I find the article not convincing ... | a) as the author demonstrates new approaches to the problem.               |
| 2. To my mind this text is valuable ...  | b) because the subject of the research is not relevant to my profession or |

|   |  |
|---|--|
|   | interests.   |
| 3. In my personal opinion the article is hard to understand ...           | c) because the author gives ambiguous evidences.   |
| 4. I think that the foundings of the research are very perspective ...    | d) because the author represents the results of the experiment in a very unconventional way. |
| 5. As for me, this article is rather boring ...                           | e) as the author provides up-to-date findings.   |
| 6. From my point of view this text is very interesting and innovative ... | f) because there is no newness as well as valuable viewpoints.                               |

**Task 8. Think of three positive aspects of the text “Baking soda versus baking powder”. Explain why you have chosen them.**

- 1) .....
- 2) .....
- 3) .....

**Now, think of two drawbacks of the text. Explain why you have chosen them.**

- 1) .....
- 2) .....

**Task 9. Write the summary to the text:**

### **Mass Spectrometry for Detecting Explosives**

Mass spectrometry is an incredibly important tool that has found a broad array of applications. Following is a summary of some major applications of mass spectrometry, categorized by the industry in which they are applied:

- Pharmaceutical: drug discovery, drug metabolism, reaction monitoring
- Biotechnology: amino acid sequencing, analysis of macromolecules
- Clinical: neonatal screening, hemoglobin analysis

- Environmental: drug testing, water quality testing, contamination level measurements in food
- Geological: evaluation of oil compositions
- Forensic: explosive detection

Significant advances have taken place in developing the field of mass spectrometry for use in detecting explosive materials at airports. In a post-9/11 world, there is a great demand for devices that can accurately and reliably detect the presence of explosive materials that might be present in a traveler's luggage or carry-on bags. Specialized mass spectrometers, called ion mobility spectrometers, are now being utilized at hundreds of major airports in U.S. cities. These devices collect chemicals from the surface of a traveler's luggage, subject these chemicals to a process that converts them into ions, and then measures the speed of these ions as they pass through an electric field. These spectrometers are designed to detect the presence of any ions that move at a speed consistent with known explosive materials. Several recent advances have made this possible, and new techniques are constantly being developed as this is an area of significant ongoing research. One such technique, developed by researchers at Purdue University, enables the acquisition of chemicals from the surface of luggage in just a few seconds. This method utilizes a technique called *desorption electrospray ionization (DESI)*, in which the surface of the suitcase is sprayed with a gaseous mixture that dislodges any residual explosive compounds that may be present on the surface of the suitcase as a result of someone loading the suitcase with explosives. The gaseous mixture is then sucked into a mass spectrometer where it can be analyzed in seconds. Many other advances in this field are emerging each year, and the role of mass spectrometry in explosive detection is likely to undergo further improvement in the years to come.

(David R. Klein "Organic Chemistry, 2012)