

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ  
ЧЕРНІГІВСЬКИЙ НАЦІОНАЛЬНИЙ ТЕХНОЛОГІЧНИЙ УНІВЕРСИТЕТ

**PROFESSIONAL ENGLISH IN USE:  
ELECTRICAL ENGINEERING AND ELECTROTECHNICS**

**Фахові тексти та завдання для опрацювання  
професійної лексики до практичних занять з англійської мови  
та самостійної роботи для студентів першого курсу  
денної форми навчання напряму підготовки  
6.050701 – «Електротехніка та електротехнології»**

**(Частина I)**

Обговорено і рекомендовано  
на засіданні кафедри іноземних мов  
професійного спрямування

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PROFESSIONAL ENGLISH IN USE: ELECTRICAL ENGINEERING AND ELECTROTECHNICS. Фахові тексти та завдання для опрацювання професійної лексики до практичних занять з англійської мови та самостійної роботи для студентів першого курсу денної форми навчання напряму підготовки 6.050701 – «Електротехніка та електротехнології» (Частина I). / Укладач: Юсухно С.І., Корець Т.В. – Чернігів: ЧНТУ, 2015. – 26 с.

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Корець Тетяна Василівна, викладач

Відповідальний за випуск: Литвин С.В., завідувач кафедри іноземних мов професійного спрямування,  
кандидат педагогічних наук, доцент

Рецензент: Литвин С.В., кандидат педагогічних наук, доцент,  
завідувач кафедри іноземних мов професійного спрямування Чернігівського національного технологічного університету

## ВСТУП

Сучасне суспільство, що дедалі більше набуває ознак інформаційного, висуває нові вимоги до іншомовної мовленнєвої підготовки майбутнього інженера. Згідно Програми викладання англійської мови для професійного спілкування (2005 р.) вивчення іноземної мови повинно розвивати мовну компетенцію студентів, а також стратегії, необхідні для ефективної участі в процесі навчання та в ситуаціях професійного спілкування.

Методичні вказівки «PROFESSIONAL ENGLISH IN USE: ELECTRICAL ENGINEERING AND ELECTROTECHNICS» (Частина I) включають фахові тексти та завдання для опрацювання професійної лексики до практичних занять з англійської мови та самостійної роботи для студентів першого курсу денної форми навчання мають за мету навчити студентів напряму підготовки 6.050701 – «Електротехніка та електротехнології» допомогти їм опанувати фахову лексику, що дасть змогу працювати з оригінальною літературою з фаху, правильно читати та перекладати тексти науково-популярної літератури англійською мовою, розуміти загальний зміст прочитаного уривку з монографії або статті з журналу загальнонаукової тематики без обов'язкового повного та точного перекладу всіх речень, оволодіти додатковими знаннями для професійно-орієнтованого спілкування та розвивати навички самостійної роботи.

Сім розділів, представлених у методичних вказівках, базуються на лексичному матеріалі, що охоплює термінологію, пов'язану з електротехнікою та електротехнологіями. Тематика і зміст текстів не лише відповідають вимогам програми, а й задовольняють професійні інтереси та потреби студентів.

Кожен розділ містить сучасний фаховий текст та завдання різного ступеня складності, які дозволяють перевірити рівень сформованості граматичних та лексичних навичок та умінь писемного мовлення, читання та говоріння для висловлення власних думок щодо професійних проблем, розглянутих у даному розділі. Читання запропонованих фахових текстів та виконання завдань сприятиме розвитку розуміння та тлумачення різних аспектів мовної поведінки у професійному середовищі, а також розвитку вмінь, характерних для поведінки в різних професійних ситуаціях.

Методичні вказівки забезпечують ефективне формування та вдосконалення вмінь читання, говоріння та писемного мовлення.

Матеріал, вміщений у методичних вказівках, спрямований на формування у студентів лінгвістичної та фахової компетенції, дає інструменти для використання англійської мови у професійній діяльності та має привчити їх до читання оригінальної літератури за професійним спрямуванням з мінімальним використанням словника.

## LESSON 1

### *Grammar*

1. Часи групи Indefinite
2. Іменник. Присвійний відмінок
3. Займенник
4. Числівник

### **Вправи для читання**

#### **1.1. Прочитайте наступні слова, звертаючи увагу на їх вимову.**

Electricity, motor, temperature, either, thousand, continuous, numerous, foreign, contribute, development, result, vacuum, machine, familiar, night, bicycle, mechanical, object, pyrometer, imagine, civilization, refrigerator, weight, telephone, theatre

#### **1.2. Прочитайте слова та запам'ятайте їх значення.**

1. application – використання. The motors find different applications.
2. as for – що стосується, що до. My friend speaks English well. As for me I can't do it.
3. current – струм. Where is the current used?
4. device – прилад. We use different devices at home.
5. to do without – обходитися без будь-чого. We can't do without the telephone.
6. electric (al) – електричний. A vacuum cleaner is an electrical device.
7. inventor – винахідник. Popov is the inventor of the radio.
8. scientist – вчений. What scientists work at your institute?
9. to serve – служити. Atoms serve the people.
10. to transform – перетворювати. Is it possible to transform the electric current?
11. to weigh – важити. How much does this machine weigh?

#### **1.3. Прочитайте текст та виконайте вправи.**

### **Electric current serves us in a thousand ways**

The electric current was born in the year 1800 when Volta constructed the first source of continuous current. Since that time numerous scientists and inventors, Ukrainian and foreign, have greatly contributed to its development and practical application.

As a result, we cannot imagine modern civilization without the electric current. We can't imagine how people could do without electric lamps, without vacuum cleaners, refrigerators, washing machines and other electrically operated devices that are widely

used today. In fact, telephones, lifts, electric trams and trains, radio and television have been made possible only owing to the electric current.

Some people are more familiar with the various applications of the electric current in their everyday life than they are with its numerous industrial applications. However, electric energy finds its most important use in industry. Take, for example, the electric motor transforming electric energy into mechanical energy. It finds wide application at every mill and factory. As for the electric crane, it can easily lift objects weighing hundreds of tons.

These are only some of the various industrial applications of the electric current serving us in a thousand ways.

## **Вправи**

### **1.4. Знайдіть помилкові ствердження та виправте їх.**

1. It is impossible to measure the temperature of hot flowing metals. 2. The industrial application of the electric current contributes to the technological progress. 3. We use few electrical devices in our everyday life. 4. Modern civilization can do without the electric current. 5. The electric motor operates all electrical devices.

### **1.5. Утворіть речення з даних слів.**

Model: lift, the, heavy, can, electric, objects, crane -> the electric crane can lift heavy objects.

1. Finds, industry, energy, in, application, electric, wide.
2. Does, study, he, at, not, the, institute?
3. Day, use, every, do, devices, you, electrical?
4. The, theatre, go, to, we, yesterday, not, did.

### **1.6. Утворіть усі можливі питання до речень.**

1. The electric motor finds wide application in industry.
2. Ukrainian scientists contributed greatly to the science of electricity.

### **1.7. Дайте українські еквіваленти.**

to play a part in, to do without, to make use of, to be familiar with, to be born, to contribute to, to flow like water

### **1.8. Перекладіть на англійську мову.**

промислове застосування; важливе застосування; що перетворює механічну енергію; постійний струм; в результаті, завдяки електриці

### **1.9. Напишіть англійською мовою числа та прочитайте їх.**

15; 40; 82; 111; 751; 1920; 1945; 2005; перший; дев'яностий; сто п'ятий; тринадцятий; другий; двадцять перший.

### **1.10. Перекладіть речення, звертаючи увагу на присвійний відмінок.**

1. I dined at my friend's house
2. The teacher's question was very difficult.
3. Peter and Helen's flat is very large.
4. He had a month's holiday last summer.

## **LESSON 2**

### *Grammar*

1. Часи групи Continuous
2. Прикметник
3. Прислівник

### **Вправи для читання**

#### **2.1. Прочитайте наступні слова, звертаючи увагу на їх вимову.**

Language, science, ability, mechanical, potential, energy, chemical, turbine, hydroelectric, employ, either, generate, civilization, industrial, industry, electricity, directly, numerous, kinetic

#### **2.2. Прочитайте слова та запам'ятайте їх значення.**

1. battery – батарея. Volta made the first battery.
2. to change – перетворювати, змінювати. Electrical energy can be changed into mechanical energy.
3. chemical – хімічний. Chemical energy can be transformed into work or into electrical energy.
4. to drive – приводити в рух. Electrical current drives various machines at factories and mills.
5. to employ – використовувати. Electrical cranes are employed in industry.
6. generally – звичайно. The pyrometer is generally used to measure high temperatures.
7. generator – генератор. Generators generate electrical energy.
8. in one's turn – у свою чергу. The motor transforms electrical energy into

- mechanical energy; mechanical energy in its turn drives the machines.
9. kind – вид. There are all kinds of machines in our laboratory.
  10. to produce – виробляти, створювати. Where are these vacuum cleaners produced?
  11. source – джерела. There are different sources of energy.
  12. to turn – перетворювати. The motor turns electrical energy into mechanical energy.
  13. waterfall – водоспад. The energy of a waterfall can be used to produce electricity.

### **2.3. Прочитайте текст та виконайте вправи.**

#### **Energy**

In the language of science energy is the ability to do work. There are various forms of energy, such as heat, mechanical, electrical, chemical, atomic and so on. One might also mention the two kinds of mechanical energy—potential and kinetic, potential energy being the energy of position while kinetic energy is the energy of motion.

It is well known that one form of energy can be changed into another. A waterfall may serve as an example. When water falls from its raised position, energy changes from potential to kinetic energy.

The energy of falling water is generally used to turn the turbines of hydroelectric stations. The turbines in their turn drive the electric generators, the latter producing electric energy. Thus, the mechanical energy of falling water is turned into electric energy. The electric energy, in its turn, may be transformed into any other necessary form.

When an object loses its potential energy, that energy is turned into kinetic energy. Thus, in the above mentioned example when water is falling from its raised position, it certainly loses its potential energy, that energy changing into kinetic energy.

We have already seen that energy of some kind must be employed to generate the electric current. Generally speaking, the sources of energy usually employed to produce current are either chemical, as in the battery, or mechanical, as in the electromagnetic generator.

Chemical sources of current have a limited application, so the great quantities of electric energy generated today come from various forms of mechanical energy.

#### **Вправи**

### **2.4. Дайте українські еквіваленти.**

1. to transform; 2. device; 3. application; 4. chemical; 5. potential; 6. source; 7. station; 8. to produce; 9. to drive; 10. to serve; 11. to do without; 12. to make use of; 13. as for

## **2.5. Виберіть правильне словосполучення.**

1. The motor changes electrical energy into a) heat energy, b) chemical energy, c) mechanical energy.
2. The generator changes mechanical energy into a) chemical energy, b) electrical energy, c) light energy.
3. The battery changes chemical energy into a) solar energy, b) heat energy, c) electric energy.
4. The electric furnace changes electric energy into a) heat energy, b) chemical energy, c) mechanical energy.
5. The vacuum cleaner changes electrical energy into a) light energy, b) mechanical energy, c) solar energy.

## **2.6. Дайте відповіді на питання до тексту.**

1. Can one form of energy be changed into another form? 2. Does a generator produce mechanical energy? 3. Is the sun an unlimited source of energy? 4. Is potential energy the energy of motion? 5. Do we need more and more electric energy every year? 6. Are there various forms of energy? 7. Do you use electric energy every day? 8. Can the energy of falling water be used to drive turbines? 9. Is kinetic energy the energy of position?

## **2.7. Поставте дієслова в дужках в потрібному часі Continuous forms та перекладіть речення.**

1. The sphere of practical laser application (to wide) constantly at present.
2. Now scientists (to develop) new methods of converting one type of energy into another.
3. In the nearest future we (to obtain) hydrogen by thermochemical decomposition of water.
4. When we entered the laboratory the electrically operated computers (to solve) difficult mathematical problems.
5. At present Great Britain (to use) mechanical improvements and inventions in the field of coal industry.
6. Hydrogen as a source of energy (to become) increasingly important.

## **2.8. Відкрийте дужки, вживаючи відповідний прикметник або прислівник.**

1. (Recent, recently) developments in electronics are astonishing.
2. During the experiment the student noticed a (gradual, gradually) change of temperature.
3. London was (original, originally) a little Celtic settlement.
4. Any material that (strong, strongly) resists the electric current flow is called an insulator.



5. The only material for them to use was (high, highly) pure germanium.
6. Computers are of great help in any field, but they cannot (full, fully) substitute human creative activity.
7. Cooperation with scientific organizations abroad is developing (successful, successfully) in Ukraine.
8. Heat energy can be (easy, easily) produced by motion.
9. Radium is still the most (common, commonly) radioactive element used in medicine.
10. The plant produces thousands of devices and instruments (annual, annually).
11. We believed this device would (considerable, considerably) increase the reliability of this machine.

**2.9. Прочитайте слова, звертаючи увагу на їх вимову та перекладіть їх.**

Chemical – chemistry – chemist -- chemically; to drive – drive -- driver; to employ – employment -- employer; generator – generation – to generate; to produce – produce – production – producer – to reproduce – reproduction.

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| <b>LESSON 3</b> |
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***Grammar***

1. Часи групи Perfect
2. To be going to
3. Словотворення

**Вправи для читання**

**3.1. Прочитайте наступні слова, звертаючи увагу на їх вимову.**

Single, high, night, quantity, source, therefore, furnace, liquid, through, turbine, nuclear, uranium, other, supply, achieve, directly, question, thermal, energy.

**3.2. Прочитайте слова та запам'ятайте їх значення.**

1. coal – вугілля. Coal is a source of energy.
2. to contain – містити. This magazine contains many useful articles.
3. engineering – техніка. The students study electrical engineering at our institute.
4. in question – об'єкт обговорення, о котом идет речь. The generators in question were constructed in Leningrad.
5. nuclear – ядерний, атомний. Nuclear fuel is used in the reactor.

6. in the form – у вигляді. We use solar energy in the form of heat.
7. power-station (plant) – електростанція. The nuclear power-station can produce not only electric energy but also heat.
8. to put into operation – приводити в дію. Several large power-stations were put into operation last year.
9. reliable – надійний. Soviet refrigerators are reliable in operation.
10. steam – пара. Steam is used to produce electricity.
11. to supply – забезпечувати, поставляти. Coal is supplied to the power plants.

### **3.3. Прочитайте текст та виконайте вправи.**

#### **Atomic Energy**

Man has, however, learned the secret of the atom. He has learned to split atoms in order to get great quantities of energy. At present, coal is one of the most important fuels and our basic source of energy. It is quite possible that someday coal and other fuel may be replaced by atomic energy. When atomic energy replaces the present sources energy, the latter will find various new applications.

The nuclear reactor is one of the most reliable "furnaces" producing atomic energy. Being used to produce energy, the reactor produces it in the form of heat. In other words, when atoms split in the reactor, heat is developed.

Gas, water, melted metals, and some other liquids circulating through the reactor carry that heat away. The heat may be carried to pipes of the steam generator containing water. The resulting steam drives a turbine, the turbine in its turn driving an electric generator.

So we see that a nuclear power-station is like any other power-station but the familiar coal-burning furnace is replaced by a nuclear one, that is the reactor supplies energy to the turbines. By the way, a ton of uranium (nuclear fuel) can give us as much energy as 2.5 to 3 million tons of coal.

The importance of atomic energy will grow still more when fast neutron reactors are used on a large scale. These reactors can produce much more secondary nuclear fuel than the fuel they consume.

#### **Вправи**

### **3.2. Дайте пари антонімів.**

a) 1. possible; 2. useful; 3. to construct; 4. present; 5. largest; 6. unlimited; 7. to increase; 8. to lose

b) 1. past; 2. impossible; 3. to find; 4. useless; 5. limited; 6. smallest; 7. to destroy; 8. to decrease

### **3.5. Заповніть пропуски прийменниками.**

1. Electricity plays an important part ... everyday life. 2. It is difficult to imagine now how people could do ... electricity. 3. I often go ... bed late ... night. 4. One form

... energy can be changed ... another form. 5. Only a little part ... solar energy is used directly ... present. 6. Ukrainian scientists made a great contribution ... nuclear engineering.

### **3.6. Дайте відповідь на питання.**

1. What is the difference between potential energy and kinetic energy? 2. What sources of energy do you know? 3. What form of energy can be changed into another form? 4. What are the industrial uses of electricity? 5. Can you name the device which changes chemical energy into electrical energy? 6. What is the difference between a battery and a generator? 7. What may coal be replaced by in future? 8. What electrical device do you use at home? 9. What forms of energy do you know? 10. What is the world's first nuclear icebreaker?

### **3.7. Виберіть правильну форму дієслова та перекладіть речення.**

1. Radio engineering, electronics and television have already found / found great application in industry, transport and medicine.
2. The automation of industrial processes of heat and power stations, all this became / has become possible due the achievements of electronics.
3. Our workshop will be equipped / will have been equipped with new multipurpose machine-tools by the end of the year.
4. They have already applied / applied new methods in their research.
5. Our country made / has made great progress in all fields of industry, technology and science.
6. By the end of the last century scientists had obtained / obtained the first synthetic materials.

### **3.8 Перекладіть речення на українську мову, звертаючи увагу на зворот to be going to.**

1. Are you going to have your English this evening?
2. When are you going to have your English?
3. What are you going to do in the evening?
4. When are you going to do your exercises?
5. When are you going to read this book?
6. What are you going to do tonight?
7. Are you going to be at home on Sunday?
8. We are going to discuss this problem.
9. I only know English but I am going to learn German.
10. When is your friend going to come to Kiev?

### **3.9. Прочитайте та перекладіть наступні слова на українську мову.**

to achieve – achievement;  
to construct – construction – constructor – constructive – to reconstruct;  
to contain – container;  
to contribute – contribution;  
to install – installation;  
to form – to reform – form – reformation – formation;  
nuclear – nucleus – nuclei;  
peaceful – peace;  
to rely – reliable – reliability

## LESSON 4

### *Grammar*

1. Типи питань
2. Словотворення

### **Вправи для читання**

#### **4.1. Прочитайте наступні слова, звертаючи увагу на їх вимову.**

burn, therefore, require, ton, however, thunderstorm, mankind, light, thus, atmospheric, earth, key, thought, among, electrify, jar, use, famous

#### **4.2. Прочитайте слова та запам'ятайте їх значення.**

1. to connect — з'єднувати, зв'язувати. All the batteries are connected. My work is connected with semiconductors.

2. to develop — розвивати, розробляти. Franklin developed a new theory of electricity.

3. to electrify — електрифікувати, електризувати. Our country is electrified. These objects are electrified.

4. to mention — згадувати. Speaking about continuous current we can mention the name of Volta.

5. power — енергія, держава. The reactor supplies power to the turbine.

6. to protect — захищати. Workers of the nuclear power-station are protected from radiation.

7. substance — речовина, матерія. Many chemical substances can be produced from coal.

8. lightning conductor — громовідвід. Franklin invented the lightning conductor.

9. manifestation — прояв. The first manifestation of electricity was lightning.

10. thunderstorm — гроза. There are many thunderstorms in spring in this area.

11. proof — доказ. There is no proof of this fact.

### 4.3. Прочитайте текст та виконайте вправи.

#### Atmospheric electricity

It has already been mentioned that atmospheric electricity is the earliest manifestation of electricity known to man. However, nobody understood that phenomenon and its properties until Benjamin Franklin made his kite experiment. On studying the Leyden jar (for long years the only known condenser), Franklin began thinking that lightning was a strong spark of electricity. He began experimenting in order to draw electricity from the clouds to the earth. The story about his famous kite is known all over the world.

On a stormy day Franklin and his son went into the country taking with them some necessary things such as: a kite with a long string, a key and so on. The key was connected to the lower end of the string. "If lightning is the same as electricity," Franklin thought, "then some of its sparks must come down the kite string to the key." Soon the kite was flying high among the clouds where lightning flashed.

However, when the kite raised, some time passed before there was any proof of its electrification. Then the rain fell and wetted the string. The wet string conducted the electricity from the clouds down the string to the key. Franklin and his son both saw electric sparks which grew bigger and stronger. Thus, it was proved that lightning is a discharge of electricity like that got from the batteries of Leyden jars.

Trying to develop a method of protecting buildings during thunderstorms, Franklin continued studying that problem and invented the lightning conductor. He wrote necessary instructions for the installation of his invention, the principle of his lightning conductor are in use until now.

Thus, protecting buildings from strokes of lightning was the first discovery in the field of electricity employed for the good of mankind.

#### Вправи

**4.3 Заповніть пропуски дієсловами, де необхідно і дайте відповіді на питання.**

1. What ... the earliest manifestation of electricity? 2. What ... electricity? 3. Who ... invented the lightning conductor? 4. What story ... known all over the world. 5. ... anybody understand the phenomenon of atmospheric electricity. 6. What ... Franklin write?

**4.4 Утворіть питання до виділених слів.**

1. Benjamin Franklin made **his kite experiment**. 2. **Nobody** understood that phenomenon. 3. **The story** of his kite is known all over the world. 4. **On a stormy day** Franklin and his son went into the country. 5. **The key** was connected to the lower end of the string. 6. Soon **the kite** was flying high among the clouds. 7. The electric sparks proved **that lightning is a discharge of electricity**. 8. The **wet** string conducted the electricity. 9.

**Franklin** invented the lightning conductor.

#### 4.5 Дайте українські еквіваленти.

1. to connect; 2. scientific; 3. because of; 4. charge; 5. power; 6. to destroy; 7. to protect; 8. phenomenon; 9. to name after; 10. to develop;  
11. observation; 12. discovery; 13. property; 14. to electrify; 15. substance; 16. to solve a problem

#### 4.6 Заповніть пропуски прийменниками.

1. It is dangerous to go ... .. a stormy day. 2. Lightning is a very great flash ... light resulting... a discharge... atmospheric electricity. 3. Protecting buildings ... lightning was the first discovery ... the field ... electricity used ... the good ... mankind. 4. ... thousands ... years people knew nothing ... thunderstorms. 5. There is always some danger ... a thunderstorm ... a very high building or a man standing ... the open field. 6. It is difficult to see a single drop ... water ... the sea. 7. Some scientists ... the past melted metals ... the help ... solar furnaces. 8. Modern civilization cannot do ... electrical appliances. 9. Electric current is necessary ... the operation ... trolley-buses, buses, and modern trains.

#### 4.7 Утворіть 5 речень.

- |                            |  |
|----------------------------|--|
| 1. The generator           | a. measures the temperature of hot melted metals.        |
| 2. The lightning conductor | b. lift objects weighting thousands of tons.             |
| 3. The motor               | c. turns electrical energy into mechanical energy.       |
| 4. The electric crane      | d. protects buildings from lightning strokes.            |
| 5. The pyrometer           | e. 5. converts mechanical energy into electrical energy. |

#### 4.8 Прочитайте групи слів та перекладіть на українську мову

to connect—connection—to disconnect;  
to develop— development;  
to discover—discovery—discoverer—to rediscover;  
to electrify—electrification;  
engineer—engine— engineering;  
to power —power—powerful;  
to protect—protection—protector—protective;  
to value—valuable—value

## LESSON 5

### *Grammar*

1. Модальні дієслова *must, can, may, should* та їх еквіваленти.

### **Вправи для читання**

#### **5.1 Прочитайте наступні слова, звертаючи увагу на їх вимову.**

phenomena, knowledge, effect, earth, object, learned man, contribute, scientific, research, century, philosopher, minute, light, physicist, Europe, engage.

#### **5.2 Прочитайте слова та запам'ятайте їх значення.**

1. *due to* — завдяки, внаслідок. We can watch TV due to electricity.

2. *famous* — відомий. Famous scientists work at our institute.

3. *to generate* — виробляти, генерувати. The first nuclear power plant generated current in 1954.

4. *in spite of* — незважаючи на. We burn coal in spite of its being a source of chemical products.

5. *to mean* — значити, означати. The words 'atmospheric electricity' and 'lightning' mean one and the same thing.

6. *needless to say* — годі й говорити. Needless to say, we need more and more electrical energy.

7. *research* — дослідження. Soviet scientists contribute greatly to scientific research.

8. *to take time* — займати час. Learning English words takes much time.

9. *that is to say* — тобто, інакше кажучи. Nuclear fuel, that is to say, uranium is used in reactors.

10. *various* — різноманітний. Gilbert made various experiments on electricity and magnetism.

#### **5.3. Прочитайте текст та виконайте вправи.**

### **Early history of electricity**

It took a long time before scientists learned how to make use of electricity. In effect, most of the electrically operated devices, such as the electric lamp, the refrigerator, the tram, the lift, the radio, and so on, are less than one hundred years old. In spite of their having been employed for such a short period of time, they play a most important part in man's everyday life all over the world. Needless to say, we cannot do without them at present.

So far, we have not named the scientists who contributed to the scientific research on electricity as centuries passed. However, famous names are connected with its history and among them we find that of Phales, the Greek philosopher. As early as about 600 B. C. (that is, before our era) he discovered that when amber was rubbed, it attracted and held minute light objects. However, he could not know that amber was charged with electricity due to the process of rubbing. Then Gilbert, the English physicist, began the first systematic scientific research on electrical phenomena. He discovered that various other substances possessed the property similar to that of amber or, in other words, they generated electricity when they were rubbed. He gave the name "electricity" to the phenomenon he was studying. He got this word from the Greek "electrum" meaning "amber".

Many learned men of Europe began to use the new word "electricity" in their conversation as they were engaged in research of their own. Scientists of Ukraine, France and Italy made their contribution as well as the Englishmen and the Germans.

## **Вправи**

### **5.4 Для словосполучень у (а) знайдіть еквіваленти у (в).**

а) 1. поки що; 2. незважаючи на; 3. насправді; 4. завдяки; 5. тобто; 6. між іншим; 7. в результаті; 8. принаймні; 9. замість; 10. більш менш; 11. в свою чергу; 12. той, що розглядається;

в) 1. at least; 2. as a matter of fact; 3. that is to say; 4. in one's turn; 5. in question; 6. so far; 7. instead of; 8. more or less; 9. in spite of; 10. thanks to; 11. as a result; 12. by the way.

### **5.5 Заповніть пропуски наступними словами та словосполученнями.**

**in the form of, because, because of, to be interested in, as for, to be named after, in question.**

1. The discovery ... was made by a well-known Ukrainian scientist. 2. Moscow University ... Lomonosov. 3. Franklin ... making experiments with atmospheric electricity. 4. ... the electric current, it is used both in industry and in our homes. 5. Professor Rihman was killed by a stroke of lightning ... he did not think of possible danger. 6. Atom finds a wide application ... its ability of producing heat and energy.

### **5.6 Дайте відповідь на запитання.**

1. Is magnetism and electricity one and the same thing? 2. Do magnets possess the property of attracting iron? 3. Do you know who discovered magnetism? 4. Was the phenomenon of electricity known to people in the past? 5. Did Gilbert work in the field of electricity? 6. Do you carry out experiments on lightning? 7. Is lightning a strong spark of electricity? 8. Can atomic energy be used for the good of mankind? 9. Do you know the history of electricity? 10. Was Phales a German philosopher? 11. Did you study the



history of electricity? 12. Have you ever come into contact with an electric fish? 13. Can you do without electricity?

### 5.7 Перепишіть речення у минулому та майбутньому часі.

1. All the students must take part in the conference “The innovations in power engineering”.
2. The lecturer can answer all the questions on the subject.
3. You should pay more attention to your studies.
4. We may borrow books from the library for two weeks.

### 5.8 Виберіть переклад виділеного присудка.

1. It is important that our institute should continue this research.

- a) повинен продовжувати; в) продовжував би; с) буде продовжувати

2. There are problems which should be solved in co-operation with other countries.

- a) повинні вирішуватися; в) будуть вирішуватися; с) вирішувались би

We were told that we should test new flexible lines at our workshop.

- a) повинні випробувати; в) випробували б; с) будемо випробувати

4. The engineer proposes that the new automatic line should begin operating at once

- a) почне працювати; в) щоб почала б працювати; с) повинна почати працювати

5. If we had completed the test, we should have analyzed the results.

- a) повинні аналізувати; в) будемо аналізувати; с) повинні були б проаналізувати

### 5.9 Замініть слова в дужках еквівалентами модальних дієслів, наданих нижче.

1. You (повинні) to replace this old lathe.
2. In a future we (зможемо) to use solar energy more effectively.
3. They (було дозволено) to test the machine-tool.
4. The students (змогли) to make the experiment.
5. They (дозволяють) to improve the old equipment.

- a).were allowed; b).shall be able; c).have; d).were able; e).are allowed; f).were

## LESSON 6

### *Grammar*

1. Пасивний стан.
2. Ступені порівняння прикметників
3. Словотворення.

### **Вправи до читання**

#### **6.1 Прочитайте наступні слова, звертаючи увагу на їх вимову.**

Chemical, definition, properties, lead, to differ from, similar, structure, comparatively, neutrons, protons, subatomic, complete, equal, weight.

#### **6.2 Прочитайте слова та запам'ятайте їх значення.**

1. to take part in — брати участь. The students took part in the conference last month.
2. to differ from — відрізнятися. The atoms of gold differ from the atoms of silver.
3. to consist of — складатися. The atom consists of electrons, protons and neutrons.
4. to be composed — складатися. The atom is composed of electrons, protons and neutrons.
5. to make up — застосовувати. Electrons, protons and neutrons make up an atom.
6. to carry (an electrical charge) — нести (електричний заряд). Each electron carries a negative charge.
7. to define, definition — визначати, визначення. There are two definitions of an atom.
8. negative, positive — негативний, позитивний.
9. to weigh, weight — важити, вага. An elephant weighs a lot.
10. nucleus, nuclei — ядро, ядра. Nucleus is the main part of an atom.

#### **6.3 Прочитайте текст та виконайте вправи.**

### **The structure of the atom**

One definition of an atom is that it is the smallest part of an element that can take part in a chemical reaction. It is also defined as the smallest part of an element which has all the properties of that element. It follows from this second definition that atoms of silver differ from atoms of lead, that atoms of lead differ from those of gold, and so on.

Although atoms of different elements are different from each other, they all have a similar structure. Thus, all atoms consist of comparatively heavy nucleus around which one or more comparatively light electrons orbit. This nucleus is composed of one or more neutrons and one or more protons. Because these parts of an atom are smaller than the complete atom, they are called subatomic particles.

Compared to the size of the complete atom, the size of the nucleus is extremely small. In spite of its smallness, however most of the weight of an atom is concentrated in the nucleus. Each electron, on the other hand, weighs only about - 1/1800 of the weight of a proton or neutron.

There are other important differences between the subatomic particles that make up an atom. Each proton carries a single unit of positive electricity, while each neutron is neutral, and each orbiting electron carries a single unit of negative electricity. Thus, since the number of protons in the nucleus of a complete atom is equal to the number of electrons, a complete atom is electrically neutral.

## **Вправи**

### **6.4 Дайте відповіді на запитання до тексту.**

1. What is the definition of an atom?
2. What does an atom consist of?
3. How big is an electron compared to a neutron?
4. What was Thomson's concept of the structure of the atom?
5. When is an atom electrically neutral?

### **6.5 Перекладіть речення, звертаючи увагу на пасивний стан.**

1. Now solar energy is being studied by a lot of research groups.
2. Trains, airplanes and ships are equipped with various electronic devices.
3. At the institutes the students are taught many different subjects.
4. The academic year is divided into two terms.
5. The first iron bridge was built in 1778.
6. The students were asked many questions at physics examination.

### **6.6 Перекладіть речення, звертаючи увагу на особливості перекладу пасивних конструкцій.**

1. The discovery of radium was followed by other important inventions.
2. The construction of this generator was paid great attention to.
3. Einstein theory of relativity is often referred to by a great number of researchers.
4. The result of this investigation can be relied on.
5. All the machines were looked at with great interest.
6. His report was followed by a short film.

### **6.7 Перекладіть речення, звертаючи увагу на пасивний стан.**

1. Most of the weight of an electron is concentrated in its nucleus.

2. A single unit of negative electricity is carried by an electron.
3. A neutron is not electrically charged.
4. The subatomic particle electron was discovered by Ernest Rutherford.
5. Thomson's new theory of the atomic structure was accepted worldwide.

### 6.8 Заповніть пропуски, вибравши потрібну форму прикметника

1. The rubber pipes are \_\_\_\_\_ of the three materials.  
a) flexible      b) more flexible      c) the most flexible
2. The pressure in the boiler is \_\_\_\_\_ than it is necessary.  
a) little      b) less      c) the least
3. Mathematics is \_\_\_\_\_ for technical students than many other subjects.  
a) important      b) more important      c) the most important
4. The results of this last experiment were \_\_\_\_\_ than before.  
a) bad      b) worse      c) the worst
5. Metal is \_\_\_\_\_ than rubber or plastic.  
a) strong      b) stronger      c) the strongest
6. Plastic is \_\_\_\_\_ material of the three materials: metal and rubber.  
a) light      b) lighter      c) the lightest
7. Which is \_\_\_\_\_ of these three substances: wood, steel or iron?  
a) hard      b) harder      c) the hardest
8. Which is \_\_\_\_\_ of these substances: steel, wood or stone?  
a) combustible      b) more combustible      c) the most combustible

### 6.9 Перекладіть речення, звертаючи увагу на ступінь порівняння прикметника.

1. According to Einstein nothing can move faster than light.
2. Einstein is one of the greatest scientists of our age.
3. Radio is one of the best means of communication.
4. Hydrogen is one of the most widespread elements of the Earth.
5. Hydrogen is the lightest gas.
6. Glass is the worst conductor.

### 6.10 Перекладіть наступні речення.

1. The more we study the language, the better we understand the structure of the sentence.

2. The more difficult the problem is, the greater my interest is in it.
3. The brighter the light is, the greater distance we can see it.
4. The fuller the dictionary is, the more meanings of words it contains.
5. “Ann, asked Bob, did you hear an old American student’s joke:

The more we study, the more we know  
 The more we know, the more we forget  
 The more we forget, the less we know  
 The less we know, the less we forget  
 The less we forget, the more we know.  
 So why should we study?”

## LESSON 7

### *Grammar*

1. Неозначені займенники some, any, few, little, many, much.
2. Прийменники часу та місця.

### **Вправи для читання**

#### **7.1 Прочитайте наступні слова, звертаючи увагу на їх вимову.**

thermocouple, quite, gradually, language, phenomenon, rise, however, measure, effect, neither, data, numerical, development, purpose, air, pressure, instrument, famous, German, physicist, Fahrenheit, therefore, liquid, mercury

#### **7.2 Прочитайте слова та запам’ятайте їх значення.**

1. body — тіло. It is very important to know the quantity of energy present in a body.
2. to boil — кипіти. We boil water to produce steam.
3. boiling point — точка кипіння. The boiling point of water depends on atmospheric pressure.
4. degree — градус; степінь. Steel melts at 1300 degrees.
5. data — данні. These data were used in research work.
6. difference — різниця. What is the difference between potential and kinetic energy?
7. freezing point — точка замерзання. What is the freezing point of water?
8. to indicate — вказувати. The capacity of the generator is indicated in the instruction.
9. the latter — останній із згаданих. Coal and uranium are fuels, the latter is used in nuclear reactors.

10.liquid — рідина. At what temperature does this liquid boil?

11.means — засіб. A lightning conductor is a means of protecting houses from lightning.

12.mercury — ртуть. Mercury is a metal.

13.pressure — тиск. What is the atmospheric pressure today?

14.purpose — мета, намір. What is the purpose of this laboratory work?

15.to put into use — вводити в дію, запускати. A new reactor was put into use.

16.to rise — підніматися, зростати. When the body is heated its temperature rises.

### **7.3. Прочитайте текст та виконайте вправи.**

#### **History of thermometers**

Placing a kettle full of cold water on the fire is quite an ordinary thing. This time we shall do it to carry out a simple experiment. Placing a finger into the kettle from time to time, we find that the water is gradually becoming hotter and hotter, until it boils at last. In scientific language we describe this phenomenon by saying that the temperature of the water is rising.

However, we need some more exact means of measuring the difference of temperature than our finger. In effect, the finger can give us neither exact information, nor numerical data.

Making the first measuring instruments was not an easy thing at all. Needless to say, the most difficult problem of all was that of marking the degrees on the thermometer, in other words, of graduating the scale. It was decided, at last, to take two fixed points and to divide the interval between them into small equal parts or degrees. And then, in 1701, Isaak Newton, the famous English scientist, whose name is known all over the world, constructed a scale in which the freezing point of water was taken as zero and the temperature of the human body as 12°.

Some time later the German physicist Fahrenheit proved that the temperature of boiling water was always the same at the same atmospheric pressure. It might therefore be used as a second fixed point instead of the temperature of the human body. As for the liquid used, it was mercury which has been mostly employed since that time.

#### **Вправи**

### **7.4 Заповніть пропуски наступними словами та словосполученнями.**

coloured, Centigrade, amber, measuring, English-speaking countries, air thermometer, indicating, changes of atmospheric pressure, scientific

1. A thermometer is employed for ... temperature and for ... its changes. 2. The glass tube was immersed into a ... liquid. 3. As early as 1602 Galileo invented an ... .4. The ... scale is employed in the Soviet Union. 5. ... looks like a yellow stone. 6. The

Fahrenheit scale is mainly used in ... . 7. Galileo's air thermometer was sensitive to ... . 8. The scientists worked out the plan of their ... research.

### **7.5 Знайдіть для дієслів у (а) іменники у (в).**

a) 1. to carry out; 2. to put into; 3. to contribute to; 4. to solve; 5. to deliver; 6. to take part in; 7. to go

b) 1. research; 2. a problem; 3. on foot; 4. an experiment; 5. operation; 6. science; 7. a lecture

### **7.6 Перекладіть наступні словосполучення.**

temperature scale, lightning conductor, freezing point, human body, German-speaking countries, measuring instrument, temperature difference, boiling point, atmospheric pressure, numerical data, mercury thermometer, electrical device

### **7.7 Дайте синоніми до наступних слів.**

to use, big, learned man, owing to, instrument, various

### **7.8 Відкрийте дужки, вживаючи відповідний займенник.**

1. Do you learn (some, any) foreign languages?
2. Has your friend got (some, any) English magazines?
3. I didn't get (some, any) letters yesterday.
4. I have (some, any) questions to the speaker.
5. Do you do (many, much) homework?
6. He spends (many, much) money on books.
7. When we were in London, we met (many, much) interesting people.
8. He is a financial expert. There are (few, little) things he doesn't know about money.
9. He has (few, little) experience in the field of power engineering.

### **7.9 Перекладіть речення, звертаючи увагу на вживання кількісних займенників та їх синонімів.**

1. This generator produces a great amount of electric energy.
2. The scientists presented a few methods of solution of this important problem.
3. A lot of changes took place in this field of knowledge.
4. If you work much, you will get good results.
5. There is some but not much mercury in the tube, put a little more.
6. How much water does this river give off to the sea in a year?
7. Einstein studied plenty of subjects to increase his knowledge but physics became his life interest.
8. Not many scientists understood Einstein's discovery at the beginning of the

20<sup>th</sup> century.

**7.10 Заповніть пропуски прийменниками місця або часу.**

1. The electric current is a flow of free electrons ... a conductor.
2. Static electricity is produced by friction ... electric charges are removed ... one substance and transferred ... the other.
3. A neutron is a subatomic particle ... the nucleus of an atom.
4. ... the early days of experimentation with electricity, it was thought that the electric current flowed ... the same way as water.
5. ... there are too many electrical devices in the circuit, the conducting wire may overheat.
6. ... Thomas Edison built the first generating station ... New York ... 1882, he supplied direct current for his system.



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