

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 другого курсу
денної форми навчання напряму підготовки
6.050701 – «Електротехніка та електротехнології»**

(Частина II)

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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 другого курсу денної форми навчання напряму підготовки 6.050701 – «Електротехніка та електротехнології» (Частина II). / Укладач: Юсухно С.І., Корець Т.В. – Чернігів: ЧНТУ, 2015. – 24 с.

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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 II) 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 вмій, характерних для поведінки в різних професійних ситуаціях.

Методичні вказівки забезпечують ефективне формування та вдосконалення вмій 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. Інфінітив. Форми інфінітиву.
2. Словотворення.

Вправи для читання

1.1 Прочитайте наступні слова, звертаючи увагу на їх вимову.

Static, voltage, control, contact, salt, disc, zinc, biography, lecture, civilization, vacuum, practical, crane, pyrometer.

1.2 Прочитайте слова та запам'ятайте їх значення.

as well as - так як
at rest - в стані спокою
behaviour - режим
charge - заряд
to flow - текти
in motion - в русі
negative - негативний
opposite - протилежний
positive - позитивний

Text 1.3 From the history of electricity.

There are two types of electricity, namely, electricity at rest or in a static condition and electricity in motion, that is, the electric current. Both of them are made up of electric charges, static charges being at rest, while electric current flows and does work. Thus, they differ in their ability to serve mankind as well as in their behaviour.

Let us first turn our attention to static electricity. For a long time it was the only electrical phenomenon to be observed by man. As previously mentioned at least 2,500 years ago, or so, the Greeks knew how to get electricity by rubbing substances. However, the electricity to be obtained by rubbing objects cannot be used to light lamps, to boil water, to run electric trains, and so on. It is usually very high in voltage and difficult to control, besides it discharges in no time.

As early as 1753, Franklin made an important contribution to the science of electricity. He was the first to prove that unlike charges are produced due to rubbing dissimilar objects. To show that the charges are unlike and opposite, he decided to call the charge on the rubber – negative and that on the glass — positive. Who does not know that the first man to get the electric current was Volta after whom the unit of electric pressure, the volt, was named? He invented a source of continuous current. The year 1800 is a date

to be remembered: for the first time in the world's history a continuous current was generated.

Вправи:

1.4 Перекладіть наступні речення, звертаючи увагу на інфінітив.

1. This is the device to be used in our experiment.
2. The thermometer is a device to measure the temperature.
3. Where are the articles to be translated by the students.
4. The letter to be answered was given to me.
5. The generator is a device to change mechanical energy into electric energy.
6. The Soviet Union was the first to use atomic energy for peaceful purposes.
7. V. V. Petrov was the first scientist to study the electrification of metals by rubbing them.
8. I was the last to answer the teacher's questions.

1.5 Дайте українські еквіваленти для наступних слів.

1. instrument	1. різниця
2. liquid	2. речовина
3. means	3. стан
4. mercury	4. заряд
5. purpose	5. потік
6. difference	6. рідина
7. law	7. ртуть
8. matter	8. протилежний
9. heat	9. закон
10. light	10. засоби
11. opposite	11. тепло
12. condition	12. мета
13. flow	13. поведінка
14. behaviour	14. пристрій
15. charge	15. світло

1.6 Заповніть пропуски словами *one* або *for*.

1. Moscow is ... of the largest cities in the world.
2. ... must remember that it is necessary to study English at least an hour a day.
3. As . . . rubber it was brought to Europe as early as the 15th century.
4. ... understands the importance of electricity when ... sees trams, trolleybuses and trains driven by it.
5. The energy of the atom is used ... peaceful purposes in our country.
6. . . . must know the chemical properties of the atom.
7. We produce rubber ... it is quite necessary ... the development of our industry.

8. In 1819 Volta returned to Como ... he wanted to spend the rest of his life there.
9. This is a more important problem than that
10. I haven't got a dictionary, I must have

1.7 Дайте антоніми для наступних слів.

north, pole, dark, on the one hand, small, arrangement, larger, magnetized, unfamiliar, like, positive, similar, to rest, in motion

1.8 Перекладіть наступні слова.

charge - to charge - chargeable - to discharge - to recharge - rechargeable;
to control - control - controllable;
condition - conditional - to condition;
negative - negation - negatively;
opposite - to oppose - opposition;
positive - positively;
to travel - travel - traveller

1.9 Дайте відповіді на запитання до тексту.

1. What types of electricity do you know?
2. What is the difference between electricity at rest and electricity in motion?
3. What are the two kinds of electrical charges?
4. Who was the first to produce a continuous current?

LESSON 2

Grammar

1. Дієслівні сполучення

V + to V

V + V

V + Ving

2. Словотворення.

Вправи для читання

2.1 Прочитайте наступні слова, звертаючи увагу на їх вимову.

since, continuous, theory, subject, vice versa, charge, famous, Ampere, unit, determine, circuit, negative, right, certainly, wrong, opposite, thought, wire, minute, particle, however, liquid, through, requirement, example, without, themselves, other,

electrolyte, alternating, purpose, cycle, advantage, voltage, high, although, practice
pose, cycle, advantage, voltage, high, although, practice

2.2 Прочитайте слова та запам'ятайте їх значення.

alternating current	- змінний струм
as well	- також
to be certain	- обов'язково
to consider	- передивитись, вважати
to determine	- визначати
direction	- напрямок
direct current	- постійний струм
to meet requirements	- задовольняти потреби
statement	- твердження

Text 2.3 Electric current.

Ever since Volta first produced a source of continuous current, men of science have been forming theories on this subject. Then the famous French scientist Ampere determined the difference between the current and the static charges. In addition to it, Ampere gave the current direction: he supposed the current to flow from the positive pole of the source round the circuit and back again to the negative pole.

We consider Ampere to be right in his first statement but he was certainly wrong in the second, as to the direction of the current. The student is certain to remember that the flow of current is in a direction opposite to what he thought.

Let us turn our attention now to the electric current itself. The current which flows along wires consists of moving electrons. What can we say about the electron? We know the electron to be a minute particle having an electric charge. We also know that that charge is negative. As these minute charges travel along a wire, that wire is said to carry an electric current.

In addition to traveling through solids, however, the electric current can flow through liquids as well and even through gases. In both cases it produces some most important effects to meet industrial requirements.

When the electrons flow in one direction only, the current is known to be d. c., that is direct current. The simplest source of power for the direct current is a battery, for a battery pushes the electrons in the same direction all the time (i.e., from the negatively charged terminal to the positively charged terminal).

The letters a.c. stand for alternating current. The current under consideration flows first in one direction and then in the opposite one.

Вправи

2.4 Поставте дієслова в дужках у потрібну форму (Ving, to V або V).

1. The lecturer stopped (speak) because it was too noisy in the auditorium.

2. You must (work) hard to master the English language.
3. Would you mind (make) the experiment once more.
4. The engineers decided (install) new equipment at the metallurgical plant.
5. Our scientists continued (carry on) scientific research in the natural science and made numerous reports.
6. The student forgot (put down) the results of the test.
7. The technician tried (repair) the electric motor.
8. We can (measure) the temperature of hot flowing metal by means of a pyrometer.

2.5 Перекладіть наступні слова.

to be certain — certain — certainly;
 to consider — considerable—consideration—considerably;
 to determine— determinate—determination;
 to direct—direction—direct—indirect—misdirection—directly;
 to increase— increase;
 to state— statement —state;
 to subject —subject — subjective;
 to wire— wire —wireless

2.6 Складіть речення з наступних частин.

A

1. The electric current is
2. Kinetic energy is
3. Static electricity is
4. Potential energy is
5. The direct current is
6. Lightning is

B

- a. the energy of position.
- b. electricity at rest.
- c. the flow of moving electrons.
- d. the energy of motion.
- e. a discharge of electricity.
- f. the flow of electrons in one direction.

2.7 Дайте відповіді на запитання до тексту.

1. Who first produced a source of continuous current?
2. After whom was the unit of current named?
3. Who determined the difference between the current and the static charges?
4. What did Ampere suppose?
5. What can you say about an electron?
6. What charges do you know?
7. When does a wire carry an electric current?
8. Do liquids conduct current?

2.8 Складіть питання до речень.

1. if electricity is a form of energy.
2. if there are two types of electricity.
3. if alternating voltage can be increased and decreased.
4. if Franklin made an important contribution to the science of electricity.
5. if Ampere determined the difference between the current and the static charges.
6. if the electric current can flow through liquids and through gases.
7. if the electrolytes change greatly when the current passes through them.
8. if a negatively charged electron will move to the positive end of the wire.

2.9 Знайдіть помилкові речення та виправте їх.

1. Electrons flow from the positively charged terminal of the battery to the negatively charged terminal.
2. Ampere supposed the current to flow from the negative pole to the positive one.
3. Static electricity is used for practical purposes.
4. Static electricity is not very high in voltage and it is easy to control it.
5. The direct current is known to flow first in one direction and then in the opposite one.
6. The direct current used for power and lightning purposes is assumed to go through 50 cycles a second.

LESSON 3

Grammar

1. Інфінітивні конструкції. (Complex Object, Complex Subject).
2. Словосполучення N + N

Вправи для читання

3.1 Прочитайте наступні слова, звертаючи увагу на їх вимову.

another, term, cause, weightless, certain, effect, development, compression, expansion, molecular, death, besides, quite, molecule, single, assume, although, process, fire, collision, jump, farther, tea, really, quantity, needle, nevertheless, higher, while, other, thermometer

3.2 Прочитайте слова та запам'ятайте їх значення.

to cause	-	викликати , змушувати
collision	-	зіткнення
expansion	-	збільшення, розширення
fire	-	вогонь
to place	-	вміщувати
to take place	-	відбуватися
to seem	-	здаватися
to contain	-	вміщувати

Text 3.3 What is heat?

What makes one thing hot and another cold? What the terms "hot" and "cold" really mean?

Scientists are known to have worked for a long time to find an answer to the last question. They decided at last that the manifestation of heat was caused a weightless substance or fluid called "caloric" which flowed from a hot body to a cold one.

M. V. Lomonosov was the first to state that heat phenomena were due to molecular motion. His statement proved to be correct years after his death.

At present we know heat to be a form of energy. Besides, we are quite familiar with the fact that all substances are made up of little particles called molecules. These are so minute that a single drop of water, for example, contains millions of them. Although a drop of water left on the table may seem to be at rest, everyone of its molecules is really moving about, colliding with other molecules, pushing them, and changing direction. Of course, while one molecule is travelling, all the other millions of molecules in the drop of water are doing the same thing.

What process takes place when we place a kettle full of cold water on the fire, in other words when we want to heat water? The molecules begin to move much faster then, so that every time there is a collision, they jump away from each other much farther than they did before. As a result, the drop of water becomes larger, that is to say, it expands. In scientific language this property is called expansion.

Вправи

3.4 Перекладіть наступні речення, звертаючи увагу на інфінітивні звороти (Complex Object, Complex Subject).

1. Static charges are known to be at rest.
2. Alternating current changes its direction many times a second.
3. We know the electric charges to be positive and negative.
4. Some liquids are known to conduct current without any changes to themselves.
5. On the contrary the electrolytes are known to change greatly when the current flows through them.
6. One can charge dissimilar objects by rubbing them.
7. When water boils there is a gradual change of water into gas.

3.5 Перекладіть речення з української на англійську.

1. Ми знаємо, що теплова енергія - це енергія молекулярного руху.
2. Відомо, що молекули рухаються в різних напрямках.
3. Протягом довгого часу вважали, що тепло – це невагома речовина.
4. Кажуть, що молекули води рухаються швидше, коли їх нагрівають.

3.6 Складіть пари антонімів з наступних слів.

at rest, positive, solid, right, fast, the last, useful, charge, hot, dark, negative, the first, increase wrong, valuable, decrease, liquid, in motion, invaluable, slow, useless, discharge, cold, light

3.7 Складіть пари синонімів з наступних слів.

to employ, to make, to travel, motion, similar, various, different, like, to receive, liquid, movement, to help, fluid, to assist, to do, to get, to use, to move

3.8 Дайте дієслова до іменників.

increase, weight, statement, movement, difference, compression, collision, flow, application, requirement, knowledge, education, expansion, heat, water, paper

3.9 Перекладіть групи слів.

to cause—cause—causeless;
certain—uncertain—certainly;
to effect— effect —effective;
to expand— expansion — expansive;
to place— place —to displace—to replace;
quantity—quantitative—quantitatively;
to collide— collision

LESSON 4

Grammar

1. Дієприкметник
2. Умовні речення
3. Пасивний стан дієслова
4. Словотворення

4.1 Перекладіть та запам'ятайте наступні групи слів.

To help - help - helper - helpful - helpless;

To care - care - carefree - careful - carefully - careless;

To use - use - useful - useless - user;

To produce - producer - production - productive - productivity - product - producible;

Peace - peaceful - peaceable - peacefully;

4.2 Запам'ятайте наступні слова та словосполучення з тексту.

charge	- заряд
friction	- тертя
quantity	- кількість
current	- струм
circuit	- коло
direct current	- постійний струм
alternative current	- змінний струм
to supply	- постачати, забезпечувати
storage battery	- акумулятори батарея
self	- елемент
coil	- котушка, шпуля
to enable	- давати можливість

Text 4.3 Some inventions in the field of power engineering

Many methods of making and storing electric charges were discovered during the 18th century. One of the first was the friction machine. Another was the Leyden Jar for storing electric charge. Benjamin Franklin discovered in 1752 that lightning and electricity were the same. At that time the Russian Academicians *M. V. Lomonosov* and *Rikhman* proved the electrostatic nature of electricity of the atmosphere.

The electricity, which was known up to that time, was what we call static electricity. Little use could be made of it because it was difficult to produce it in large quantities. Current electricity was discovered in 1780 by Galvani. Current which flowed through a circuit in one direction was called a direct current. Current, changing its direction was called alternative.

The first electric cell was made in 1800 by the Italian scientist Volta. This discovery proved that chemical energy could be changed into electrical energy. Davy used 2,000 of these cells to supply the first arc light. The first storage battery was made in 1803, but the first one like ours today was not made until 1859.

By 1730 scientists had noticed a close interaction between electricity and magnetism. It was not until 1819, however, that Oersted discovered the action of an electric current on a magnet. The first powerful electromagnet was made by Henry in 1825. Then Michael Faraday found that with the aid of a bar magnet he could get a current of electricity in the coil. This is the basic principle of the dynamo and motor.

4.4 Перекладіть англійською мовою слова та словосполучення.

Зберігати електричні заряди, фрикційна машина, статична електрика, електричне коло, взаємодія, відкриття, змінний струм.

4.5 Перекладіть речення українською мовою та визначте функції дієприкметника.

1. Traveling all over the world the scientist saw many interesting things and collected important material. 2. Not understanding what they wanted he repeated his question. 3. Discussing chemical reactions we ought first to make clear what a chemical reaction is. 4. A group of laughing people came up to us. 5. The catalyst being used in this reaction accelerates the chemical change.

4.6 Заповніть пропуски правильною формою дієприкметника, перекладіть речення українською мовою.

1 .The girl... on the blackboard is our monitor. Everything... here is quite right, (writing, written) 2. The house... by tall trees is very beautiful. The wall... the house was very high, (surrounding, surrounded) 3.The exercises ... by the students are easy. Who is that student... his homework at the window? (doing, done) 4.The girl... the floor is my sister. The ... floor looked very clean. (washing, washed)

4.7 Перекладіть речення на українську мову та визначте тип підрядних речень.

1. If a solid body or a liquid is heated, it will usually expand.
2. Providing mercury did not expand when heated, it would not be used for taking temperatures.
3. Had the information been received in time, we should have used it in our calculations.
4. Were there no atmosphere, the surface of the Earth would become too hot by day and too cold at night.
5. If the temperature is low, the reaction will proceed slowly.
6. If we had a really pure insulator it could not be heated.

4.8 Випишіть і перекладіть українською мовою речення, в якому дієслово вжито в пасивному стані.

1. Modern machines do work which a man is unable to do.
2. Mathematics is loved by many people, disliked by a few, admired and respected by all.
3. Heat and electricity are forms of energy due to their ability to do work.
4. Modern equipment had been put into operation at our plant.
5. Lasers are also widely used in drilling the diamonds.

6. Numerous methods will be used for this type of measurements.
7. A modern engineer must get a substantial training in subjects of his speciality.
8. During the experiment the air in the laboratory was being purified by two ventilators.

4.9 Дайте відповіді на запитання до тексту.

1. What discovery did Benjamin Franklin make?
2. Who proved the electrostatic nature of electricity of the atmosphere?
3. Why could little use be made of static electricity?
4. When and by whom was the first electric cell made?
5. What did Michael Faraday find?
6. What can we say about the discoveries made by scientist in the nineteenth century?

LESSON 5

Grammar

1. Непряма мова
2. Питання у непрякій мові
3. Словотворення

Вправи для читання

5.1 Прочитайте наступні слова, звертаючи увагу на їх вимову.

circuit, really, complete, purpose, electromotive, required, through, thus, break, liquid, vacuum, series, another, single, typical, passage, fault, fuse

5.2 . Прочитайте слова та запам'ятайте їх значення.

to carry	–	нести, пропускати (струм)
closed circuit	–	замкнений контур
complete	–	повний, замкнений
conductor	–	провідник
fault	–	пошкодження, аварія
fuse	–	запобіжник
load	–	навантаження
open circuit	–	розімкнений контур
to pass	–	проходити, пропускати
safety device	–	запобіжний пристрій
short circuit	–	коротке замикання
to supply	–	постачати, підводити (струм)

Text 5.3 From the history of electricity.

The circuit is a complete path which carries the current from the source of supply to the load and then carries it again from the load back to the source.

The path along which the electrons travel must be complete otherwise no electric power can be supplied from the source to the load. Thus we close the circuit when we switch on our electric lamp.

If the circuit is broken or, as we generally say “opened” anywhere, the current is known to stop everywhere.

There are various kinds of electric circuits such as: open circuits, closed circuits, series circuits, parallel circuits and short circuits.

To understand the difference between the following circuit connections is not difficult at all. When electrical devices are connected so that the current flows from one device to another, they are said to be connected in series. Under such conditions the current flow is the same in all parts of the circuit, as there is only a single path along which it may flow. The electrical bell circuit is considered to be typical example of a series circuit. The parallel circuit provides two or more paths for the passage of current. The circuit is divided in such a way that part of the current flows through one path, and part through another. The lamps in your room and your house are generally connected in parallel.

Now we shall turn our attention to the short circuit sometimes called "the short" The short circuit is produced when the current is allowed to return to the source of supply without control and without doing the work that we want it to do. The short circuit often results from cable fault or wire fault. Under certain conditions, the short may cause fire because the current flows where it was not supposed to flow. If the current flow is too great a fuse is to be used as a safety device to stop the current flow.

Вправи

5.4 Перепишіть речення, змінюючи пряму мову на непряму.

1. My friend said to me, “I lived in Odessa before”.
2. Helen said to her friend, “I will make a report at the conference”.
3. The lecturer said, “Scientists made a lot of experiments and observations on this phenomenon”.
4. Peter to his friend, “I go to the library every day and work in the reading-hall”.
5. The student said, “I will be studying the whole day tomorrow to get ready for the test”.
6. The dean of the department said, “The students who didn’t pass all the exams would be expelled at the end of the term”.

5.5 Перепишіть речення, змінюючи пряму мову на непряму, і зверніть увагу на особливості трансформування питань у непряму мову.

1. The lecturer said to the students, "When in the atom neutral?"
2. The teacher said to the student, "What device did Franklin invent?"
3. The professor asked the student, "Can static electricity do work?"
4. He asked us, "What electrically operated devices do we have at home?"
5. She asked me, "When will the new power-station be put into operation?"
6. The teacher asked us, "What types of energy do you know?"

5.6 Перекладіть речення англійською мовою.

1. Лектор сказав, що перша атомна електростанція була побудована в 1999 р.
2. Ми знали, що він проводить дослідження у області атомної фізики.
3. Професор запитав студента, коли був винайдений електричний струм.
4. Ми знали, що багато статей було написано по цій проблемі.
5. Він сказав, що інженери будуть випробувати ці прилади наступного дня.
6. Вона сказала, що буде приймати участь у конференції.

5.7 Дайте відповіді на запитання до тексту.

1. What is discussed in the present article?
2. What do we call an electric current?
3. What kinds of circuits do you know?
4. When is a "short" produced?
5. What does a short circuit often result from?
6. What safety device is used in the circuit when the current is too great?
7. What does the term "closed circuit" mean?
8. Why does the current flow when the circuit is closed?
9. What do you call a fuse?
10. Does the current flow when the switch is in the open position?

5.8 Додайте прийменники до дієслів та складіть речення з ними.

to apply, to be interested, to contribute, to consist, to depend, to connect, to pay attention, to go, to carry

5.9 Перекладіть групи слів.

to carry – carrier;
to complete – complete – completely – incomplete;
to conduct – conductor – conduction – conductivity – conductive;
fault – faulty – faultless;
to load – load – to overload – to unload;
to pass – pass – passage;

to supply – supply – supplement – supplementary;
to switch on – to switch off –switch

LESSON 6

Grammar

1. Інфінітив
2. Інфінітивні конструкції
3. Герундій
4. Словотворення

6.1 Перекладіть та запам'ятайте наступні групи слів.

to apply - applicable - applicant - application
to cover - coverage - covered - covering - coverture
to attach - attached - attachment
to perform - performance - performer
to distribute - distribution - distributing - distributor
to recommend - recommendation – recommendatory

6.2 Запам'ятайте наступні слова та словосполучення з тексту.

energy sources - джерела енергії
pollution - забруднення
fossil fuels - скам'яніле паливо
nuclear fuels - ядерне паливо
non-renewable - не відновлюваний
crust - кірка, кора (земна)
generate - створювати, генерувати
combustion - горіння
steam turbines - парова турбіна
oxidation - окислення
byproduct - побічний продукт
disaster - катастрофа
global warming - глобальне потепління

Text 6.3 Non-renewable sources of energy

Everything in the universe is either energy or matter. For us humans, energy is the means for doing work. There are non-renewable and renewable sources of energy. Almost all of the energy we use comes from non-renewable sources.

All non-renewable energy sources create pollution, in part due to their extraction from the crust of our planet but mainly from their burning. Only two types exist: the fossil fuels (coal, oil, natural gas) and nuclear fuels (uranium, plutonium, and, for the future, unusual types - isotopes - of hydrogen such as deuterium and tritium).

Fossil fuels are useful to us only because they liberate heat energy when we burn the carbon they contain. "Burning" - combustion - is really oxidation; matting carbon and oxygen combine to liberate heat. Unfortunately for us, the principal by product is carbon dioxide. Most scientists believe that this is an important contributor to global warming. The heat from coal, gas and oil we can use either directly or indirectly to raise steam in boilers and generate electricity using steam turbines to drive generators. By contrast, properly managed nuclear fuels liberate no pollution to the atmosphere at all. Accidents are rare in the nuclear power industry but when they occur, their potential for long-lasting damages is horrific. The disaster at Chernobyl was by far the world's worst nuclear accident.

6.4 Перекладіть англійською мовою слова та словосполучення.

Всесвіт, енергія, вугілля, природний газ, нафта, важливий внесок, піднімати пар в парових котлах, ядерна катастрофа, безкінечний потік енергії, необмежені запаси енергії, водневі бомби, відкриття ядерних реакцій, не відновлювані джерела енергії.

6.5 Заповніть пропуски словами з тексту.

1.(Скам'яніле паливо) are useful to us only because they liberate (теплова енергія) when we burn the carbon they contain. 2. All (не відновлювальні джерела енергії) create (забруднення). 3. Everything in (всесвіті) is either energy or matter. 4. Nuclear engineers deliberately arrange to 'split' certain atoms - this is called (ядерне розщеплення). 5. Properly managed (ядерне паливо) liberate no pollution to the atmosphere at all. 6. (Катастрофа) at Chernobyl on April 26, 1986 was by far the world's worst nuclear accident. 7. The principal product of (горіння) is carbon dioxide.

6.6 Укажіть функції інфінітива, перекладіть речення українською мовою.

1. To produce changes in physical state a considerable amount of thermal energy must be supplied to metal. 2. To prepare metals for practical use requires much knowledge and experience. 3 The aim of any research is to enlarge the possibilities which are offered by modern science. 4. In order to prevent corrosion metals to be used in industry must be covered with special paint. 5. A very good practice is to introduce the best scientific inventions into industry. 6. Steel is the metal to be formed from iron with a definite amount of carbon. 7. The engineer was asked to design a transistor device which will regulate the temperature in the laboratory.

6.7 Перекладіть речення та визначте, яку інфінітивну конструкцію вони мають.

1. We know matter to exist in four states: solids, liquids, gases and plasma.
2. We believe him to carry out research in the field of thermal engineering.
3. We may suppose the alpha-particles within the nucleus to be in motion.
4. Chemical investigations have shown each element to combine with another only in definite proportions.
5. We know metal to conduct electricity.
6. Every student knows steam to consist of minute drops of water.
7. Faraday is considered to have made many experiments in chemistry and physics.
8. He is known to search through a lot of literature to get exact data.
9. Some laboratory methods are supposed to be effective.
10. Ordinary objects are unlikely to move with a velocity approaching the velocity of light.
11. Our daily life seems to be quite impossible without the wireless.
12. A computer is known to be a device with the ability to accept, store and process enormous quantities of data.

6.8 Знайдіть герундій в реченнях та перекладіть речення на українську мову.

1. Maintaining constant temperature and pressure during the test was absolutely necessary.
2. We know of silver and copper being very good conductors of electricity.
3. At present scientists take great interest in the methods of turning the light and heat of the sun directly into electricity.
4. One cannot transform water into steam without heating it.
5. The engineer mentioned his having tested this material for strength.
6. After testing the motor they put down the results.
7. By testing a metal one can define its mechanical properties.

6.9 Дайте відповіді на запитання до тексту.

1. What kinds of energy sources do you know?
2. Why do all non-renewable energy sources create pollution?
3. What do fossil fuels comprise?
4. What do nuclear fuels comprise?
5. Why are fossil fuels useful to us?
6. What is the principal byproduct of combustion?
7. How can we use heat from coal, gas and oil?
8. What is the advantage of nuclear fuels?
9. What is called nuclear fission?
10. What is the result of nuclear fission?

LESSON 7

Grammar

1. Іменник у функції означення (N + N Construction)
2. Модальні дієслова імовірності may, might, must, can't, could.
3. Словотворення

Вправи для читання

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

Insulator, ease, length, through, passage, nevertheless, iron, socket, once, telephone, air, bare, wire, path, purpose, why

7.2 . Прочитайте слова та запам'ятайте їх значення.

air	–	повітря
bare wire	–	оголений провід
cord	–	шнур
to cover	–	покривати
electrical engineering	–	електромеханіка
insulation	–	ізоляція
to leak off	–	стікати
to resist	–	чинити опір, протидіяти
rubber	–	гума
to transmit	–	передавати

Text 7.3 Conductors and insulators

All substances have some ability of conducting the electric current, however, they differ greatly in the ease with which the current can pass through them. Metals, for example, conduct electricity with ease while rubber does not allow it to flow freely. Thus, we have conductors and insulators.

What do the terms "conductors" and "insulators" mean? Substances through which electricity is easily transmitted are called conductors. Any material that strongly resists the electric current flow is known as an insulator.

Let us first turn our attention to conductance, that is the conductor's ability of passing electric charges. The four factors conductance depends on are: the size of the wire used, its length and temperature as well as the kind of material to be employed.

There is a great difference in the conducting ability of various substances. For example, almost, all metals are good electric current conductors. Nevertheless copper carries the current more freely than iron; and silver, in its turn, is a better conductor than copper.

Generally speaking, copper is the most widely used conductor. That is why the electrically operated devices in your home are connected to the wall socket by copper wires.

A material like string which resists the flow of the electric current is called an insulator.

There are many kinds of insulation used to cover the wires. The kind used depends upon the purposes the wire or cord is meant for. The insulating materials we generally use to cover the wires are rubber, asbestos, glass, plastics and others.

One of the almost insulators of all, however, is air. That is why power transmission line wires are bare wires depending on air to keep the current from leaking off.

Вправи

7.4 Перекладіть словосполучення.

Research work – research work plan;

Water pipe – water pipe material – water pipe material quality;

Power supply – power supply increase – power supply increase problem;

Transmission line – transmission line wire – transmission line wire insulation;

Space investigation – space investigation program – space investigation program discussion

7.5 Дайте українські еквіваленти до наступних слів.

- | | |
|-----------------|-------------------------------|
| 1. wire | a. позитивний |
| 2. statement | b. також |
| 3. to cause | c. враховувати, передивлятися |
| 4. collision | d. напрям |
| 5. to control | e. очікувати, розраховувати |
| 6. feature | f. поміщати |
| 7. similar | g. шлях, контур |
| 8. direction | h. протидія |
| 9. opposition | i. особливість |
| 10. positive | j. подібний |
| 11. path | k. зіткнення |
| 12. to consider | l. керувати |
| 13. as well | m. твердження |
| 14. to expect | n. викликати, примушувати |
| 15. to place | o. проволока |

7.6 Дайте відповіді запитання до тексту.

1. What is discussed in the present article?
2. Do all substances conduct electric current easily?

3. What is a conductor?
4. What does conductance depend upon?
5. What materials are the best conductors of electricity?
6. Does temperature influence the conductor's resistance?
7. What is the difference between a conductor and an insulator?
8. What insulators do you know?
9. Why are power transmission line wires bare?
10. What insulation is used on the cords of your electrical devices?

7.7 Дайте переклад речень, звертаючи увагу на вживання модальних дієслів ймовірності.

1. They must be tired. They have been travelling all night.
2. He can't be coming. It's after ten o'clock.
3. They must know each other well. They have been working in the same department for 2 years.
4. You must be joking! No one buys two Rolls Royces!
5. He can't have been conducting research work. He has never interested in the subject.
6. I might have left the results of the experiments in my office.
7. He has bought a new car. He might have won a lottery.

1.8 Перепишіть речення, використавши модальне дієслово у дужках, та перекладіть їх.

Example: I'm sure she's had a holiday (must). She must have had a holiday.

1. I'm sure you didn't work hard for your exams. (can't)
2. I'm sure he has passed his exams. (must)
3. Perhaps they made this experiment while we were on holiday. (may)
4. I'm sure he is working in the library now. (must)
5. He has probably made great progress in his scientific work. (must)
6. Perhaps he took part in the conference which was held in Kiev. (might)
7. It's possible that they entered the university. (could)

7.9 . Прочитайте та перекладіть групи слів.

to air – air;
 to cover – cover – to discover – to uncover;
 to insulate – insulation – insulator;
 to oppose – opposition – opposite;
 to resist – resistance – resistor;
 to rub – rubber;
 similar – similarity – dissimilar;
 to transmit – transmitter – transmission.

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