

**MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE**

**O. M. BEKETOV NATIONAL UNIVERSITY**

**of URBAN ECONOMY in KHARKIV**

Methodological guidelines  
for independent work  
on the subject

**«FOREIGN LANGUAGE»**  
**(ENGLISH)**

*(for 1-2 years full-time Bachelor degree students majoring in 141 – Electric Power Engineering, Electrical Engineering and Electromechanics)*

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## CONTENT

INTRODUCTION .....	4
UNIT 1 .....	5
UNIT 2 .....	17
UNIT 3 .....	24
UNIT 4 .....	35
REFERENCES .....	39

## INTRODUCTION

These educational materials are designed for the ESP students majoring in Electric Power Engineering, Electrical Engineering and Electromechanics to develop their language skills according to their profession.

The manual is based on the authentic texts. It also has the tasks for reading and translation, lexical tasks, texts for self-study. It has 4 units. Each unit contains:

- authentic texts for reading, translation and discussion in class;
- activities on vocabulary;
- activities on reading comprehension;
- additional texts with tasks.

The manual can be recommended both for using in class and for students' self-study.

## UNIT 1

### I. Make sure you know these words:

advantage	преимущество
appearance	появление
application	применение
completely	полностью, целиком
consumption	потребление, расход
cover	охватить, охватывать
design	конструировать, проектировать
device	прибор, устройство
efficient	эффективный
generate	вырабатывать, производить
imagine	представлять себе
invent	изобретать
power	энергия, мощность
property	свойство
reduce	уменьшать, снижать
replace	заменять
set up	воздвигать, сооружать
source	источник
state	положение, состояние
transform	преобразовывать
in the case of	в случае
to be based on	основываться, быть основанным на

### II. Read and translate the text, list the most important inventions in the sphere of electricity.

#### Text 1

#### ELECTRICITY

It is impossible to imagine our civilization without electricity: economic and social progress will be turned to the past and our daily lives completely transformed.

Electrical power has become universal. Thousands of applications of electricity such as lighting, electrochemistry and electrometallurgy are longstanding and unquestionable.

With the appearance of the electrical motor, power cables replaced transmission shafts, gear wheels, belts and pulleys in the 19<sup>th</sup> century workshops. And in the home a whole range of various time and labour saving appliances have become a part of our everyday lives.

Other devices are based on specific properties of electricity: electrostatics in the case of photocopying machine and electromagnetism in the case of radar and television. These applications have made electricity most widely used.

The first industrial application was in the silver workshops in Paris. The generator – a new compact source of electricity – was also developed there. The generator replaced the batteries and other devices that had been used before.

Electric lighting came into wide use at the end of the last century with the development of the electric lamp by Thomas Edison. Then the transformer was invented, the first electric lines and networks were set up, dynamos and induction motors were designed.

Since the beginning of the 20<sup>th</sup> century the successful development of electricity has begun throughout the industrial world. The consumption of electricity has doubled every ten years.

Today consumption of electricity per capita is an indicator of the state of development and economic health of a nation. Electricity has replaced other sources of energy as it has been realized that it offers improved service and reduced cost.

One of the greatest advantages of electricity is that it is clean, easily-regulated and generates no by-products. Applications of electricity now cover all fields of human activity from house washing machines to the latest laser devices. Electricity is the efficient source of some of the most recent technological advances such as the laser and electron beams. Truly electricity provides mankind with the energy of the future.

### *Notes to the text*

1. **Transmission shafts, gear wheels, belts and pulleys** – трансмиссионные валы, зубчатые колеса, ремни и блоки
2. **Time and labour saving appliances** – электроприборы, экономящие время и труд
3. **Induction motors** – индукционные моторы
4. **Per capita** – на человека, на душу населения
5. **by-products** – побочные продукты
6. **truly** – поистине

### **III. Answer the questions on the text :**

1. What is this text about?
2. What industrial applications of electricity do you know?
3. What home applications of electricity do you know?
4. Where was the generator developed?
5. Who invented the electric lamp?
6. Do you know who invented the dynamo?
7. Can you imagine our life without electricity? Why?

**IV. Translate the sentences and identify the functions of the verb *to have*.**

1. Electricity has many useful properties: it is clean and generates no by-products. 2. It has many important applications in industry as well as in our houses. 3. The latest laser devices have found application in medicine. 4. Electricity has provided mankind with the most efficient source of energy. 5. No other source of energy has been so widely used as electricity. 6. We have many various electric devices in our houses. 7. Our lives have been completely transformed with the appearance of electricity. The generator replaced batteries that had been used before. 9. The consumption of electricity has doubled every ten years.

**V. Find subject and predicate in the following sentences.**

1. The electricity is clean and easily-regulated is its great advantage. 2. The important fact is that electricity offers improved service at reduced cost. 3. That the two scientists Lodygyn and Yablochkov were the first in Russia to work in the field of electrical engineering is well-known. 4. One of the main advantages of electricity is that it does not pollute the environment. 5. The indicator of nation development is how much electricity is consumed per capita. 6. What has been and is being done in environment protection cannot be measured by yesterday's standards.

**VI. Identify the tense and voice of the verb, translate the sentences.**

**A.** 1. I have not cleaned the window yet. I am cleaning it now. I have cleaned it. 2. But Bob has a different idea. 3. Last year she passed school leaving exams. 4. We will be studying for our exams at the end of the term. 5. While we were having supper, all the lights went out. 6. Will people speak the same language all over the world? 7. People will land on Mars in the 21<sup>st</sup> century. 8. I think cars will be powered by electric batteries in five years' time and they will not be powered by atomic power in 100 years' time. 9. The Earth is getting warmer because of the increase of carbon dioxide in the atmosphere.

**B.** 1. It is evident that electricity will be the energy of the future. 2 the transformer was invented and the first electric lines and networks were set up at the end of the 19<sup>th</sup> century. 3. New powerful electric stations must be built because it is electricity that offers improved standards of life and work. 4. A combination of electric lines and networks are being set up throughout the country. 5. Electric power has become universal. 6. Electricity is transmitted to distant parts of this country by a combination of electric networks. 7. Our power stations have been connected by high voltage transmission lines into several networks.

**VII. Identify the parts of speech of the following words, translate them.**

invent – inventor, inventive, invention;  
transform – transformer, transformation;

generate – generator, generation, generative;  
pollute – polluter, pollutant, pollution;  
effect – effective, effectively;  
vary – variety, various;  
possible – impossible, possibly, possibility;  
complete – completely;  
recent – recently;  
replace – replacement;  
economic – economical, economically.

### **VIII. Find:**

#### **a) Synonyms:**

application, appliance, latest, power, use, enable, reach, device, longstanding, make it possible, achieve, energy, transform, old, turn to, most recent;

#### **b) Antonyms:**

future, unlimited, with, past, necessary, limited, old, unnecessary, without, present.

### **IX. Put the verbs in brackets into the appropriate grammar tense.**

My brother (enter) Kiev University (long ago, already, just, next year, last year, by the end of the month, when I came to Kiev).

### **X. Find the sentences with the words *to have, one, that*, and translate them.**

Although the US is a large country with many peoples the language is almost the same wherever one goes. There are two reasons for this. One is that people move around a great deal in the US. A man can grow up in one part of the country, go to college in another place, find work in another place and marry a girl from still another part of the country.

The second important factor is public communication. Movies, radio and television all have standard way of speech. The southern part of the US is probably the region with the most individual speech. Southern pronunciation differs from that in the rest of the country. Southerners talk slowly and often do not pronounce “r” or a final “g”. Another common Southern expression is the unusual use of the word “evening”. In most parts of the country this means the time after the sun goes down, the early part of the night, but to a Southerner it can mean any time after twelve o’clock noon. In the southern mountains there have not been new settlers from other countries for two hundred years. They have ways of speech that are like the English spoken centuries ago when the first people came there from England. Many songs they sing today are those sung long ago in England.



## **XI. Put the verb *to be* into the appropriate form.**

I ... at my English class. I ... reading a story about Thomas A. Edison. I ... learning that his laboratories are in Orange, New Jersey. I ... glad to read about such a man as Th. A. Edison. A young inventor ... in Thomas Edison's laboratory. He ... looking at an invention that ... in a glass case. It ... an electrical invention. The young inventor's pencil ... in his hand. He ... drawing the part of the invention which he came there to study. An Englishman and his young son ... in Edison's laboratory. They ... looking at hundreds of inventions. Many of them ... in glass cases. The man and his son ... interested in all Mr. Edison's inventions, they ... most interested in the electrical ones. Many of those ... in one room. Several tourists ... in this room, and among them ... the Englishman and his son. The man says to one tourist, "We ... interested in electrical ones".

## **XII. Complete the sentences filling in the prepositions: *to, with, at, for, on, in*.**

This morning father spoke ... my brother and me ... going to see our aunt this evening. It is our aunt's birthday. We wanted to surprise her family. Our mother was going to go ... us. We had to be ready ... seven o'clock. We wanted to be ... our aunt's house ... seven thirty. We left ... my aunt's house ... seven ... our mother and father. But the aunt was not ... home. Her children had taken her and the uncle ... the theater. We laughed: we had a surprise party, but it was on us. We left the presents and went ... a show ourselves.

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We went ... Kuskovo yesterday. I went ... my mother and father. We took our lunch ... us. We reached Kuskovo ... noon. Father went ... a parking station, but it was full. He went to another and then ... another. Every parking station was crowded. Father drove for a while. ... one o'clock he found a place ... a car. ... two o'clock our friends came, we sat down ... grass and ate our lunch. We didn't see much because too many people were there ... Kuskovo. Next time we have a day to spend we shall go ... some other place.

## **XIII. Read and translate the text without a dictionary.**

Before Faraday's inventions in the field of electricity and magnetism the only source of electricity that was used was the galvanic battery. It made possible some practical applications: the electric light and electric telegraph. The practical use of electricity on a larger scale became possible after developing electromagnetic machines, generators and transformers. It is considered that the development of the induction motor has become the most important technical achievement. At first, the induction motor had a constant and unchangeable speed. Some years later a motor

with two speeds was designed. Since its invention the induction motor has been considerably improved and its power increased. But the principle of operation still remains the same.

#### **XIV. Speaking practice**

##### **Exercise 1. Answer the questions.**

1. What is electricity? (a source of electric power used in everyday life and industry)
2. What are the sources of electricity? (batteries, generators, electric motors and many other devices)
3. What properties of electricity have made it widely used? (electrostatics and electromagnetism)
4. What are the advantages of electricity? (clearness, easy regulation, no byproducts, low cost, improved service)
5. What are home uses of electricity? (lighting, heating, various time and labour saving appliances, radio, television, video and many others)
6. What are the latest industrial applications of electricity? (lasers and electronic devices)

##### **Exercise 2. Make a sentence out of the two parts.**

- |   |   |
|---|---|
| 1. Electricity  | 1. have already become universal.   |
| 2. The applications of electricity in the home and industry | 2. has completely transformed our everyday life.                          |
| 3. Electricity was used for the first time                  | 3. per capita is an indicator of the state of development of a nation.    |
| 4. The generator, a new source of electricity               | 4. the wide industrial use of electricity has begun throughout the world. |
| 5. Since the beginning of the 20 <sup>th</sup> century      | 5. was also developed in Paris.   |
| 6. Today consumption of electricity                         | 6. for industrial purposes in the silver workshops in Paris.              |

##### **Exercise 3. Read and learn.**

##### **A Story about Edison.**

Edison: Oh, Ben, I'm glad to see you. How are you?

Wilson: Fine, and how are you?

Ed.: So-so. A lot of work to do. Just today I've begun some important work. Oh, excuse me, meet my assistant John Smith. John, this is my old friend from my home town, Ben Wilson.

Smith: How do you do, Mr. Wilson?

W.: How do you do, Mr. Smith? Glad to meet you.

Ed.: Will you come to my laboratory and have dinner with John and me tonight?

W.: Yes, I will.

Ed.: Come at six tonight, will you?

W.: I'll certainly come.

### **At six o'clock at the laboratory.**

W.: Good evening, Tom. Good evening Mr. Smith.

S.: Good evening, Tom. Good evening Mr. Wilson. Mr. Edison is experimenting with a microscope. All his interest is there. Would you mind walking around for a while looking at Mr. Edison's inventions.

W.: With a pleasure.

S.: In a few minutes dinner will be brought. We usually eat our dinner here. Don't you mind?

W.: Certainly not.

S.: The dinner is ready. Let Mr. Edison know you are here.

W.: Shall we eat, Tom? But he doesn't answer.

S.: He is busy working with his microscope.

W.: But I'm quite hungry. Tom, the food looks good, and it is getting cold.

S.: You see, Mr. Edison never stops working for a second till he is satisfied with what he is doing.

W.: Then let's sit down and eat.

*Two hours later Mr. Wilson and Smith finished eating and left the laboratory.*

Ed. (entering the laboratory):

Oh, I am hungry. If those dishes were not empty, I'd say I've had no dinner tonight.

### **Exercise 4. Speak about:**

1. Electricity – its nature, history and development.
2. Applications of electricity cover all fields of human activity.

Use exercises 1, 2, as well as the following words and word combinations for your topic: it is difficult to imagine; applications such as; completely; to replace; to come into wide use; to double every ten years; to be an indicator; the latest technological advances.

## **Text 2**

**Read the text and answer the question, why did Edison say not to watch the clock.**

### **A GREAT CITIZEN OF THE WORLD**

Every day many people visited Thomas A. Edison's laboratories in Orange, New Jersey. Some of them were young inventors who went to study, but many more of them were tourists. They came from all parts of the US and from other countries as well.

One day a very important citizen from England visited Edison's factories, taking with him his young son, eight years old. They spent many hours in great workshops, looking at hundreds of useful inventions.

Before leaving the laboratories the man went to the office of the main building. Giving his card to the person in charge, he asked: "May I speak to Mr. Edison, please?" The man looked at the card and then answered: "Wait a minute, I'll see". Soon he returned and said: "Come this way, please. Mr. Edison will see you".

The father and his son went into the great inventor's workroom. "Mr. Edison", said the Englishman, "I brought my young son here to see what the world's greatest citizen has done. I want this day to help him all his life. Will you please shake hands with him and say something that he will remember?"

Mr. Edison took the boy's hand. He laid his other hand on the child's shoulder and looked into his eyes. "My boy", he said, "don't watch the clock".

In 1928 Mr. Edison was eighty-one years old, but he still worked sixteen hours a day.

## **Text 3**

**Read the text and tell about the advantages of solar power as a source of electricity.**

### **SOLAR LIGHT BY NIGHT**

Most people living in towns consider it a usual thing that streets are lit at night. But street lights need a power supply therefore distant areas with no source of electricity remain in darkness until the sun comes up again.

With new appliances now offered by several British firms, many distant places could be lit with solar-powered street lights. It may seem strange that the lamps can use the power of the sun which shines by day when the lamps are needed at night, but they work by using energy accumulated during the day from a solar panel. The solar panel produces electricity which charges a battery. When the sun goes down, the

battery power is then used for lighting. Each lamp has its own panel so the system can be used for one individual light or a number of them.

In the south of Saudi Arabia a motorway tunnel miles from any power supply is lit day and night by solar-powered devices. The solar panels provide power during the day and charge batteries which accumulate enough power to light the tunnel at night. The generation of electricity by batteries is still expensive but the advantage of sun-powered lamps is that they can bring light to areas distant from any other power supply.

There is one more advantage of solar power: not only it is unlimited, but also its use does not pollute the environment. That is why it is very important to develop devices which make it possible to transform solar power into mechanical or electric forms of power.

#### **Text 4**

**Read the text. Find information about the most promising sources of energy, speak about traditional and non-traditional sources of energy.**

#### **NON-TRADITIONAL RENEWABLE SOURCES OF ENERGY**

It is known that much is being done in the world today for the development of non-traditional sources of energy. Without them the Earth cannot support its present population of 5 billion people and probably 8 billion people in the 21<sup>st</sup> century. Now we are using traditional power sources, that is, oil, natural gas, coal and water power with the consumption of more than 50 billion barrels per year. It is evident that these sources are not unlimited.

That is why it is so important to use such renewable sources of energy as the sun, wind, geothermal energy and others. Research is being carried out in these fields.

One of the most promising (перспективный) research is the development of power stations with direct transformation of solar energy into electricity on the basis of photo-effect. It was Russia that was the first in the world to develop and test a photoelectric battery of 32,000 volts and effective area of only 0.5 sq.m., which made it possible to concentrate solar radiation. This idea is now being intensively developed in many countries.

However, the efficiency of a solar power station is considerably reduced because of the limited time of its work during the year. But it is possible to improve the efficiency of solar power stations by developing different combinations of solar power stations and traditional ones – thermal, atomic and hydraulic. Today some engineers are working at the problem of developing electric power stations with the use of a thermal-chemical cycle. It will operate on products of the transformation of solar energy, whereas the “solar” chemical reactor uses CO<sub>2</sub> and water steam of the thermal power station. The result is that we have a closed cycle.

In Kamchatka there are geothermal power stations operating on hot water-steam mixture from the depth of about a kilometer. In some projects water will be

heated by the warmth of mountains at a depth of four-five km.

It is planned that plants working on the energy of the solar heat provided by the sun will be built on a larger scale.

That different wind energy plants are being developed is also well-known. These energy plants can be small (of several kilowatts) and large powerful systems.

It is important that all these advances in developing new sources of energy and improving the old ones help to solve the energy problem as a whole and they do not have negative effects on the environment.

### **Additional tasks**

#### **Exercise 1.**

**A. Read the following expressions and guess the meaning of the underlined words and phrases.**

1. such as **lighting**
2. applications are **longstanding**
3. in the 19<sup>th</sup> century **workshops**
4. **a range of** appliances
5. devices **are based on**
6. **in the case of**
7. all **fields of**
8. **human activity**

**B. Match the following words and expressions with their meaning.**

- |                   |                       |
|-------------------|-----------------------|
| 1. lighting       | a. for                |
| 2. longstanding   | b. area of sphere     |
| 3. workshops      | c. are built on       |
| 4. a range of     | d. for a long time    |
| 5. are based on   | e. a number of        |
| 6. in the case of | f. things done by man |
| 7. fields         | g. electric lamps     |
| 8. human activity | h. a small factory    |

#### **Exercise 2.**

**A. Read the text and find the words and expressions with the meaning *portable, work, generate, at present***

Although most electricity comes from power stations, power can also be generated by far smaller means. Nowadays, electricity generators can be small

enough to hold in hand. A portable generator can provide electricity no matter how far you are from the mains (сеть). It works by turning the movement of a piston into electrical energy. Such a generator can produce a 700 watt output, enough to operate lights, television, and some domestic appliances. Larger versions provide emergency power to hospitals and factories.

**B. Find in the text A the words with the following meaning:**

1. method, way
2. change, transform
3. principal wire to transmit electricity into a building
4. house
5. to be of no importance
6. much, considerably
7. situation needing action as soon as possible
8. power, energy produced
9. variant, form

**Exercise 3. Complete the sentences using the following words:**

electricity increase consumers power use generation reduce consumption far  
users application provide sources energy light

We hear so much these days of local problems of electricity (1) ... Many (2) ... are taking steps to (3) ... their electricity (4) ... This is as a result of the recent (5) ... in electricity tariffs for (6) ... We should all try to (7) ... less (8) ..., by insulating our houses, turning off the (9) ... when leaving a room and using less hot water.

We must try to develop alternative (10) ... of energy to (11) ... electricity for domestic and industrial (12) ... It is known that nuclear power comes to the consumer as electricity, which is clean and convenient form of (13) ... Although nuclear (14) ... stations are large, they can be built (15) ... from places where people live.

**Exercise 4. Complete the sentences using antonyms instead underlined words.**

1. Though the capital investment, that is, the initial cost of building the nuclear power station, is **high**, the cost of generating electricity from a nuclear power station is relatively ... .
2. There is a **limited** supply of fossil fuels such as oil, gas and coal on the earth, but a supply of natural uranium is ... .
3. **Cheap impure** coal produces much more CO<sub>2</sub> than ... ... coal of high quality.

4. It is evident to all that an **old inefficient** power station is more dangerous to the environment than a ... .. power station.

**Exercise 5. Word building. Complete the table.**

Verb	Noun	Personal noun
...	...	producer
...	operation	...
generate	...	...
...	...	mover
act	...	...
...	design	...
invent	...	...
consume	...	...
...	transformation	...
...	regulation	...
indicate	...	...

**Exercise 6. Make up expressions using verbs and nouns from the columns. Remember them.**

**A**

1. carry out (conduct)
2. solve (face, work at, deal with)
3. become
4. suffer from
5. bring about
6. have
7. make
8. develop
9. take
10. achieve

**B**

- a. a problem
- b. changes
- c. a success
- d. an effect on
- e. measures
- f. study, research, experimental work
- g. the center of, a part of
- h. investments
- i. a program, concept, theory
- j. noise, pollution

**Exercise 7.**

**A. Name 10 – 15 key words and expressions on the topic: “Electricity as a source of energy”.**

**B. Speak about:**

The main types of fuel or processes used to generate energy in our country.



## UNIT 2

### I. Make sure you know these words:

achievement	достижение
below	ниже, внизу
benefit	выгода, польза
boil	кипеть
continue	продолжать
cool	охлаждать
current	электрический ток
discover	открывать, обнаруживать
introduce	вводить
lack	нуждаться
master	овладевать
pass	пропускать
present	представлять
previously	ранее, предварительно
prominent	выдающийся, известный
random	беспорядочный, случайный
resistivity	удельное сопротивление
return	возвращаться
satisfactory	приемлемый, удовлетворительный
sufficiently	достаточно
tend	стремиться, иметь тенденцию
wire	провод
at once	сразу, немедленно
spectacular breakthroughs	захватывающие открытия
IBM	компания Ай Би Эм
Well above	намного выше

### Text 1

### II. Read and translate the text.

#### SUPERCONDUCTIVITY

According to the prominent scientist in this country V.L. Ginzburg the latest world achievements in the field of superconductivity mean a revolution in technology and industry. Recent spectacular breakthroughs in superconductors may be compared with the physics discoveries that led to electronics and nuclear power. They are likely to bring the mankind to the threshold of a new technological age. Prestige, economic and military benefits could well come to the nation that first will master this new field

of physics. Superconductors were once thought to be physically impossible. But in 1911 superconductivity was discovered by a Dutch physicist K. Onnes, who was awarded the Nobel Prize in 1913 for his low-temperature research. He found the electrical resistivity of a mercury wire to disappear suddenly when cooled below a temperature of 4 Kelvin ( $-269^{\circ}\text{C}$ ). Absolute zero is known to be 0 K (Kelvin). This discovery was a completely unexpected phenomenon. He also discovered that a superconductivity material can be returned to the normal state either by passing a sufficiently large current through it or by applying a sufficiently strong magnetic field to it. But at that time there was no theory to explain this.

For almost 50 years after K. Onnes' discovery theorists were unable to develop a fundamental theory of superconductivity. In 1950 physicists Landau and Ginzburg made a great contribution to the development of superconductivity theory. They introduced a model which proved to be useful in understanding electromagnetic properties of superconductors. Finally, in 1957 a satisfactory theory was presented by American physicists, which won for them in 1972 the Nobel Prize in physics. Research in superconductors became especially active since a discovery made in 1986 by IBM scientists in Zurich. They found a metallic ceramic compound to become a superconductor at a temperature well above the previously achieved record of 23 K.

It was difficult to believe it. However, in 1987 American physicist Paul Chu informed about a much more sensational discovery: he and his colleagues produced superconductivity at an unbelievable before temperature 98 K in a special ceramic material. At once in all leading laboratories throughout the world superconductors of critical temperature 100 K and higher (that is, above the boiling temperature of liquid nitrogen) were obtained. Thus, potential technical uses of high temperature superconductivity seemed to be possible and practical. Scientists have found a ceramic material that works at room temperature. But getting superconductors from the laboratory into production will be no easy task. While the new superconductors are easily made, their quality is often uneven. Some tend to break when produced, others lose their superconductivity within minutes or hours. All are extremely difficult to fabricate into wires. Moreover, scientists lack a full understanding of how ceramics become superconductors. This fact makes developing new substances largely a random process. This is likely to continue until theorists give a fuller explanation of how superconductivity is produced in new materials.

### **III. Answer the following questions on the text.**

1. What is this text about?
2. What is the phenomenon of superconductivity?
3. Who was the first to discover the phenomenon?
4. What scientists do you know who have worked in the field of superconductivity?
5. What materials are the best superconductors?

6. Is it possible to return superconducting materials to the normal state?
7. How can it be done?
8. In what fields of science and technology can the phenomenon of superconductivity be used?

**IV. Decide yourself if it is *true* or *false*. If it is false correct the statement.**

1. The latest achievements in superconductivity mean a revolution in technology and industry.
2. Superconductors were once thought to be physically impossible.
3. The achievements in superconductivity cannot be compared with the discoveries that led to electronics and nuclear power.
4. The electrical resistivity of a mercury wire disappears when cooled below 4 K.
5. A superconducting material cannot be returned to the normal state.
6. Landau and Ginzburg introduced a model which was useful in understanding electromagnetic properties of superconductors.
7. Scientists from IBM found a ceramic material that became a superconductor at a temperature of 23 K.
8. Potential technical uses of high temperature superconductivity are unlikely to be possible and practical.

**V. What parts of speech do these words refer to?**

Resistant, resist, resistance, resistor, resistivity; superconductivity, superconductive, superconductor, superconducting; theory, theorist, theoretical, theorize; physics, physicist, physical, physically; explain, explainable, explanation; store, storage, storable.

**VI. Find the equivalent to the Russian words.**

достижение – achievable, achievement, achieve;  
 электронный – electronics, electronic, electron;  
 легче – easily, easy, easier;  
 удовлетворять – satisfy, satisfactory, satisfaction;  
 действительно – reality, realize, really.

**VII. Find synonyms and antonyms.**

Below – above; useful – useless; easy- difficult; field – sphere; to meet demands – to meet requirements (needs); full- complete; to use – to apply; to get – to obtain; moreover – besides; sufficient – enough; likely – unlikely; to continue – to discontinue; conductivity – nonconductivity; to vary – to change; to lead to – to result in; recent – latest; advantage – disadvantage; low – high; believable – unbelievable;

to lose – to find; tiny – huge; liquid – solid; unexpected – expected; common – ordinary.

**VIII. Read the text without a dictionary. Make up 6 questions on it.**

The ancient Greeks are known to have been great watchers of the sky and also great thinkers. As they watched the sky night after night, it was natural for them to think that Earth stood and the stars, planets, sun and moon were moving round the earth in space. They thought the sun to be between Venus and Mars. To explain the movement of the planets, however, was very difficult. Then one day a young scientist named Copernicus at Krakow University in Poland supposed that the sun and not the Earth should be the centre of everything. He was the first to explain properly our solar system. The ancient Greeks had made the mistake of thinking that because the stars and planets seemed to move as they looked at the sky, the Earth must stand. If you sat in a train and looked out at the trees, it would be easy to understand their mistake. The trees seem to be moving backwards, but really it is the train that is moving forwards.

**IX. Speaking practice. Answer the questions.**

1. What field of science studies the phenomenon of superconductivity? (physics)
2. What can a nation have if it is the first to master this new field of science? (prestige, scientific advantage, economic and military benefits)
3. What is superconductivity? (the loss of electrical resistivity by a material on being cooled to temperatures near absolute zero)
4. What is absolute zero? (0 Kelvin or 273°C)
5. What scientists worked in the field of superconductivity research? (Dutch physicist K. Onnes, Russian physicists L. Landau and V. Ginzburg, and a number of American scientists)
6. What materials are the best super conductors? (ceramic materials)
7. What are the potential technical uses of superconductivity? (nuclear research, power generation, electronics, etc.)

**X. Make a sentence out of the two parts.**

1. Recent achievements in superconductivity research are	1. fundamental theory to explain this unexpected phenomenon.
2. They may be compared with	2. found the electrical resistivity of mercury to disappear when cooled to the temperature of 4 Kelvin.
3. Superconductivity is known to	
4. While carrying out his low	3. to the development of

temperature research he	superconductivity theory.
5. For 50 years after the discovery there was no	4. have been discovered by a Dutch physicist.
6. In the 1950s Russian and American physicists made a great contribution	5. of great importance for science and technology.
7. Research in the field of superconductivity became especially active	6. since the discovery of a superconductive metallic ceramics.
	7. physics discoveries that led to the development of electronics and nuclear power.

### **XI. Read the text and name it.**

Superconductivity is a state of matter that chemical elements, compounds and alloys assume on being cooled to temperatures near to absolute zero. Hence, a superconductor is a solid material that abruptly loses all resistance to the flow of electric current when cooled below a characteristic temperature. This temperature differs for different materials but generally is within the absolute zero ( $-273^{\circ}\text{C}$ ). superconductors have thermal, electric and magnetic properties that differ from their properties at higher temperatures and from properties of nonsuperconductive materials.

Now hundreds of materials are known to become superconductors at low temperature. Approximately 26 of the chemical elements are superconductors. Among these are commonly known metals such as aluminium, tin, lead and mercury and several less common ones.

Most if the known superconductors are alloys or compounds. It is possible for a compound to be superconducting even if the chemical elements constituting it are not.

### **XII. Read the text and find information about the usage of superconductors in future. Retell the text.**

## **NEW HOPE FOR ENERGY**

Recently some ceramic materials have been found to be superconductors. Superconducting ceramics are substances which can transmit electric currents with no loss of energy at temperatures much higher than conventional superconductors (that is, at the temperature of liquid nitrogen).

One use for the new superconductors would be to replace those that need the extreme cold of liquid helium – huge superconducting electromagnets used in nuclear magnetic resonance research, atomic particle acceleration and research reactors.

Other types of electromagnets made with superconductors could be used to lower the cost of electric generation and storage. Such uses may take 10 years of research, a quicker use will probably be in electronics.

Researchers now estimate that tiny but immensely powerful high speed computers using superconductors may be three to five years away. Further off are 300 m.p.h. trains that float on magnetic cushions which now exist as prototypes but may take at least a decade to perfect. Power lines that can meet a city's electric needs with superconductor cables may be even further in the future.

Meanwhile, scientists around the world are trying to turn the new materials into useful products. Among the most notable is a micron-thin film to transmit useful amounts of electric current without losing superconductivity. The film could be used in the microscopic circuitry of advanced computers as high-speed pathway (маршрут, соединение) between computer chips.

Several nations are known to be very active in superconductor research. For example, the United States is spending millions of dollars on such research, much of it for military uses: projectile accelerators, lasers, ship and submarine propulsion.

### **XIII. Read the text and tell about Massachusetts Institute of Technology.**

#### **MASSACHUSETTS INSTITUTE OF TECHNOLOGY**

MIT is an independent university located in Boston area. It was founded in 1861 by William Barton Rogers, a distinguished natural scientist, who believed professional competence to be best fostered (воспитывать) by the combining of teaching, research, and the application of knowledge to real-world problems. MIT held its first classes in 1865 after having delayed opening because of the Civil War. There were approximately 15 students enrolled at that time.

Today MIT has about 9,700 students, a faculty (профессорско-преподавательский состав) of approximately 1,000 and several thousand research staff. The total teaching staff numbers more than 1,800. The institute is broadly organized into five academic Schools – Architecture and Planning, Engineering, Humanities and Social Science, Management and Science – and a large number of interdisciplinary programs, laboratories, and centers, including the Whitaker College of Health Science, Technology and Management. A unique feature of MIT is that undergraduates join with graduate students, faculty, and staff to work on research projects throughout the institute.

Most academic activities take place in a group of interconnected buildings designed to permit easy communication among the Schools and their 22 departments. Across the street from this set of buildings there are athletic fields, the student center, and many of the dormitories.

The main purpose of the academic program at MIT is to give students a sound command (прочное усвоение) of basic principles, the habit of continued learning and the confidence that comes from a thorough and systematic approach to learning. This results in continued professional and personal growth, especially in today's rapidly changing world.

The two essential parts of all MIT educational programs are teaching and research. Both of these activities carried on together have greater potential than either performed alone. They provide experience in theory and experiment for both students and teaching staff.

Each student pursues a degree (стремиться получить степень) in one of the departments. Undergraduate courses at MIT lead to the degree of Bachelor of Science (S.B.). The academic programs require four years of full-time study for the Bachelor of Science. Degrees are awarded on the basis of satisfactory completion of general institute and departmental requirements (общеинститутские и кафедральные требования) in each program.

There is enough flexibility (гибкость), however, to allow each student, in collaboration with the adviser, to develop an individual program in accordance with his or her own interests and preparation.

## UNIT 3

### Text 1

#### I. Pre – reading tasks

##### A. Find Ukrainian or Russian equivalents to these expressions.

One thing is certain, public transport, the time is coming, from home to office, a modern vehicle, in common use, to get into a car, a pack of cigarettes, how far one can drive, various objects ahead, directly above the bumper, to get out of a car.

Различные объекты впереди, общественный транспорт, современное транспортное средство, приходит время, сесть в машину, пачка сигарет, от дома до работы, одно явно, в повсеместном использовании, выйти из машины, сколько (как далеко) можно проехать, непосредственно над бампером.

##### B. Translate the following expressions.

To go out into the street, a usual means of transport, to get information, to get the best economy, a decade ago, to play a part, the size of a pack of cigarettes, the vehicle's carburetor, an electronic instrument panel, the car's position on a road, objects ahead of the vehicle, stationary objects ahead, ten miles an hour.

#### II. Words and phrases to remember.

adjust	регулировать
angle	угол
apply	применять
avoid	избегать
axis	ось
current	современный, текущий
destination	пункт назначения
detect	обнаруживать
guidance	управление, наведение
ignition	зажигание
indicate	указывать, показывать
mount	монтировать, устанавливать
directly	прямо, непосредственно
engine	двигатель
ensure	обеспечивать, гарантировать
equip	оборудовать
exceed	превышать



exhaust	ВЫХЛОП
place	помещать
select	выбирать
sophisticated	сложный
valve	клапан
warn	предупреждать
withstand	выдерживать
in many respects	во многих отношениях
to look like	быть похожим
to turn on/off	включать/выключать

### III. Read and translate the text. Answer the questions after it.

#### TRANSPORT FOR TOMORROW

One thing is certain about the public transport of the future: it must be more efficient than it is today. The time is coming when it will be quicker to fly across the Atlantic to New York than to travel from home to office. The two main problems are: what vehicle shall we use and how can we plan our use of it?

There are already some modern vehicles which are not yet in common use, but which may become a usual means of transport in the future. One of these is the small electric car: we go out into the street, find an empty car, get into it, drive to our destination, get out and leave the car for the next person who comes along. In fact, there may be no need to drive these cars. With an automatic guidance system for cars being developed, it will be possible for us to select our destination just as today we select a telephone number, and our car will move automatically to the address we want.

For young journeys in private cars one can also use an automatic guidance system. Arriving at the motorway, a driver will select the lane he wishes to use, switch over to automatic driving, and then relax – dream, read the newspaper, have a meal, flirt with his passenger – while the car does the work for him. Unbelievable? It is already possible. Just as in many ships and aircraft today we are piloted automatically for the greater part of the journey, so in the future we can also have this luxury in our own cars.

A decade ago, the only thing electronic on most automobiles was the radio. But at present sophisticated electronics is playing a big part in current automotive research. For example, in every gasoline-powered car that General Motors Corporation makes there is a small computer continuously monitoring the exhaust. The device, about the size of a pack of cigarettes, adjusts the vehicle carburetor fuel intake to get the best fuel economy. Ford cars are equipped with an electronic instrument panel that, among other things, will calculate how far one can drive on the

fuel left in the tank. It will also estimate the time of arrival at destination and tell the driver what speed he has averaged since turning on the ignition.

According to specialists these features made possible by microelectronics are only the beginning. Radar may control the brakes to avoid collisions, and a display screen may show the car's position on the road. Recently a radar to be mounted on lorries and cars has been designed in the USA. The radar aerial looks like a third headlight placed directly above the bumper. Having summed up the information about the speed and distance of various objects ahead, the computer detects all possible dangers and their nature. A third component in the system is a monitor on the instrument panel. The radar only observes objects ahead of the vehicle. It is automatically turned on when the speed exceeds ten miles an hour. The green light warns of stationary objects ahead, or something moving slower than the car. The red light and buzzer warn that the speed should go down. Another red light and sound signal make the driver apply the brakes.

A Japanese company is designing a car of a new generation. When completed, the new model will have a lot of unusual characteristics. The car's four-wheel control system will ensure movement diagonally and even sideways, like a crab, at right angles to the longitudinal axis. This is especially important when leaving the car in parking places. To help the driver get information while concentrating on the road, the most important data will be projected on the wind screen. A tourist travelling in such a car will not lose his way even in Sahara with its impassable roads: a navigation Earth satellite will indicate the route.

A new ceramic engine has been developed in Japan. Many important parts as pistons, pressure rings, valves and some others have been made of various ceramic materials, piston rings made of silicon materials being in many respects better than those of steel. They withstand temperatures up to 1,000° C. Therefore, the engine does not need a cooling system.

### *Notes to the text*

1. *lane* – ряд
2. *gasoline*-powered – с бензиновым двигателем
3. **fuel intake** – впрыск топлива
4. *among other things* – кроме всего прочего
5. *what speed he has averaged* – какова была его средняя скорость
6. *pressure ring* – уплотнительное кольцо
7. *piston ring* - поршневое кольцо

### **IV. Look through the text again and answer the questions:**

1. What is the text about?
2. What kind of a car may be in common use in the near future?
3. How will a public electric car operate?
4. How will it operate on a motorway?

5. What electronic devices are there in a modern car?
6. What electronic devices does General Motors Corporation offer for a car?
7. What electronic are Ford cars equipped with?
8. Can a radar be used in a car? What will its functions be?
9. What functions will a Japanese car of a new generation have?
10. What materials do the Japanese offer to use for car motors?

**V. Decide yourself if the following statements refer to the text.**

1. An automatic guidance system was developed for the electric car.
2. Small electric cars are in common use.
3. Many ships and aircrafts are piloted automatically for the greater part of the journey.
4. Usually having arrived at a motorway, a driver switches over to automatic control and relaxes.
5. A decade ago there were many electronic things in the cars.
6. There is no future for microelectronics in automobiles.
7. Recently a radar to be mounted on lorries and cars has been designed in the USA.
8. A new ceramic engine has been developed in France.

**VI. Find *participle* and translate the sentences.**

1. Studying Newton's work "Principia", a young physicist discovered a mistake in the calculations.
2. Having designed a car radar, the engineers started complex tests.
3. While driving a car one should be very attentive.
4. A new electronic instrument will calculate how far one can drive on the fuel left in the tank.
5. The engine tested showed that it needed no further improvement.
6. Scientists are experimenting with a system allowing drivers to see better after dark.
7. The system being tested will increase the safety and fuel efficiency of a car.
8. Having been tested, the computer system was installed at a plant.
9. Soon the night-vision system designed will be available.
10. The synthetic magnet has a lot of valuable qualities that can be changed, if desired.
11. Recently there have appeared battery-powered cars.
12. The radar used was of a completely new design.
13. Having been heated, the substance changed its properties.
14. Being provided with batteries an electric car can develop a speed of 50 miles an hour.
15. When mass produced, electric cars will help solve ecological problems of big cities.
16. A defect undetected caused an accident.

17. Though first developed for military purposes, radar can be used in modern cars.

## **VII. What parts of speech do these words refer to?**

Dangerous, automotive, longitudinal, automatically, present, nature, motorist, enrol, enrolment, guidance, average, current, ignition, diagonally, calculate, impossible, graduate, village, public, garage, useful, usefulness.

## **VIII. Give Ukrainian/Russian equivalents to the following words paying attention to suffixes -er /- or**

Driver, sensor, starter, monitor, microprocessor, detector, transistor, carburetor, user, transmitter, lecturer, generator.

## **IX.**

### **A. Find synonyms:**

Regulate, modern, want, select, use, current, wish, average, adjust, choose, mean, apply;

### **B. Find antonyms:**

unbelievable, cooling, continuous, passable, heating, believable, discontinuous, impassable.

## **X. Translate the sentences and remember different meanings of the word *since***

1. Since 1770 there were many brilliant inventions in the automobile industry.
2. The production of motor cars in Great Britain was stopped since there were severe speed limits.
3. In early days many of the cars broke since transmissions were still unreliable and often went out of operation.
4. Since conventional headlights are not very effective, a new system has to be developed.
5. Since the French engineer Gugnot invented the first self-propelled vehicle in 1770, the automobile industry developed very rapidly.
6. The number of chemical elements known to science has grown considerably since Mendeleev created his Periodic Table in 1871.

## **XI. Complete the following sentences with the words *only* or *the only*, translate them.**

1. The Earth is ... planet having liquid water.

2. It is useful to remember that the industrial revolution began ... at the end of the 18<sup>th</sup> century.
3. ... way to achieve good results is to apply one's knowledge to practical work.
4. The revolution in science and technology affects not ... economically developed countries, but also developing countries.
5. Multi-cylinder engines came into use ... after World War II.
6. The motor car has not ... brought mobility to millions of people, but also has polluted the atmosphere.
7. Weightlessness can be created on Earth, but ... for a few seconds.
8. ... requirement for plastic steel is that it must be rich in carbon.
9. The Library of Congress serves not ... to Members of the Congress, but also to libraries throughout the US and the world.

**XII. Complete the sentences using the appropriate form of the verb *to have* (*has, have, had, hasn't, haven't, hadn't*).**

"I ... a good car for sale. It ... many extra parts. It ... a good speedometer and four new tires. It ... a new spare tire too." "...it its original paint ?" "No, it ... its original paint. It ... new paint on it. It looks new." "I ... a good offer for it yesterday, but the man ... very little cash. I want cash." "... it a good engine?" " Yes, it ... an excellent engine. It ...any weak places in it. Engines that ... weak places in them are always in the garage." "I ... an idea you will sell your car." "I ... two good offers yesterday. One man ... all cash. But he doesn't look like an honest man. I ... no desire to do business with him."

**XIII. Read and translate the text without a dictionary.**

A new vacuum-controlled constant velocity carburetor developed by an American company offers several advantages over ordinary carburetors, including 25 per cent gasoline economy, improved engine performance and easier starting. The device having only 54 parts compared with some 300 in conventional carburetors has no choke (дроссель). It constantly adjusts the mixture of fuel and air, which cannot be done in usual carburetors. Provided with special mechanism the carburetor helps the engine turn on at once in cold weather. Though developed quite recently, it is already being used by cars and other kinds of public transport. With diesel engine becoming almost standard equipment, the vacuum carburetor will never be used on new cars. It may be said that present-day carburetor are dinosaurs and in 20 years there won't be any more. But there are some countries which are interested in importing the device as a replacement for existing carburetors.

**XIV. Speaking practice**

**Exercise 1. Answer the questions.**

1. What are the main problems of public transport? (a new type of vehicle and its much more efficient use)
2. What type of modern vehicle may become a usual means of transport in the future? (a small electric car)
3. What is the possible development in private cars? (the use of an automatic guidance system)
4. What electronic devices are used in modern cars? (a computer, fuel adjusting devices, an electronic instrument panel for indicating the speed, time, distance covered and fuel left)
5. What is the main function of a radar for a car? (detecting all possible dangers ahead of the vehicle on a road)
6. What unusual feature will a new generation car have? (four-wheel control system ensuring diagonal and side movements)
7. What materials are used in current automotive design? (ceramics)

**Exercise 2. Make a sentence out of the two parts.**

- |   |   |
|---|---|
| 1. There are already some <b>modern</b> vehicles                                | 1. goes out into the street, finds an empty car, gets into it, drives to his destination, gets out and leaves the car for the next passenger. |
| 2. For example, a small electric car can solve                                  | 2. there may be no need to drive these cars.  |
| 3. A passenger  | 3. which may become a usual means of transport in the future.   |
| 4. With an automatic guidance system for cars,                                  | 4. increasingly wide use of modern microelectronics in cars.  |
| 5. It will be possible  | 5. many problems of public transport.   |
| 6. All these innovations will become possible because of                        | 6. an important part in current car design.   |
| 7. Computers, electronic instrument radars, adjusting devices, etc. are playing | 7. to switch over to automatic panels, driving, as we do in ships and aircrafts today.  |

**Exercise 3. Read and learn.**

## Bob's New Used Car

John: This is the car that Bob bought from Mr. Adams.

Bill: I didn't even know that he had bought a car. When did he tell you that he had bought a car. When did he tell you that he had bought it?

J: He told me yesterday that he had bought it two days earlier.

B: Do you know how much he paid for the car?

J: Well, he said he had paid 800 dollars for it.

B: I wonder why he bought an old car? I didn't think he needed a car.

J: Well, I suppose he will use it for his new job.

B: Do you think the car is in good condition?

J: He told me that the car was in perfect condition. The tires are practically new. The new generator works perfectly. Frankly, I think that it was a good bargain.

B: I believe you are right.

J: I haven't mentioned that the car had been driven only 25,000 miles. Also, the covers (чехлы) which are on the front seats are new. They are made of material that can be washed.

B: Now I want to see how well the car really runs.

J: O.K. Let's ask Bob when he is going for a ride. Then we can see whether or not the car runs well.

B: Do you know if Bob is going to come back here soon?

J: Yes, I'm sure he'll be back right away.

B: By the way, can you tell me where Bob is keeping his car?

J: He is using the garage of the people living next door.

### Exercise 4. Speak about:

1. *Public transport of the future.*
2. *The application of electronics in modern cars.*
3. *The latest innovations in car design.*

Use the following words and word combinations for your topic: *one thing is certain, to be much more efficient, to be in common use, to select a destination, to monitor, the size of a pack of cigarettes, to look like, to warn of objects ahead of the vehicle, to design, to get information, while driving, to make of.*

### Exercise 5. Comment on the following statement.

**It is natural that everybody should want to have a car.**

One point of view: It is convenient, saving time, avoiding crowded buses and other city transport, independent, comfortable, useful at weekends, contact with

nature, developing the sense of responsibility, improving the level of technological culture.

A contrary point of view: Expensive, traffic jams, difficulties with repairs and maintenance, pollution, lack of physical exercise, takes more time than it saves, road accidents, waste of energy resources, the unbearable situation in many cities, especially in supercities.

## **Exercise 6. Read and smile.**

### **On the Bus**

It was during the rush-hour. As usual, all the seats in the bus were occupied. When a good-looking young lady got in, an elderly man sitting near the door wanted to rise, but the lady at once pressed him to keep his seat. "Thank you", she said, "I don't mind standing." "But, madam, permit me ...". "I insist upon your sitting down," she stopped him, and putting her hands on his shoulders she almost forced him back into his seat.

The man tried again to stand up and said, "Madam, will you allow me to ...". But once more the lady said, "I don't wish to take your seat, sir!" and forced him back with another push.

With a great effort the man finally pushed her aside. "Madam", he called out, "I don't care whether you take my seat or not. The bus has already taken me two stops beyond my destination, and now I wish to get out."

-----  
A policeman stepped out on the road in front of her and forced her to stop. "What have I done?" she asked. "You were travelling forty miles an hour", replied the policeman. "Forty miles an hour!" cried the lady-motorist in surprise, "I left my house only 20 minutes ago".

## **Text 2**

### **I. Read the text and complete the table**

Car design innovations since 1770	The latest car electronic systems	Their advantages	Their disadvantages
1.			
2.			
...			
...			

**II. Using the table speak about the most important car design innovations; the latest car electronic systems: their advantages and disadvantages.**



## **CAR OF FUTURE**

Ever since Nicolas Cugnot, a Frenchman, invented the first self-propelled road vehicle in 1770, there has been no shortage of companies willing to make a better automobile. Over years their efforts have given users the gasoline engine (дизель), the electric starter, tubeless tires (бескамерная шина), fuel-injected engines and anti-lock brakes (тормоз с антиблокировочным устройством) these are only a few innovations. What is next? Here are some examples of what the car designers are working at in the world today.

Engineers are experimenting with a state-of-art (the newest) system that enables drivers to see better after dark. This “night vision” system uses infrared sensors that can detect a human figure at night more than 1,600 feet away. That’s five times the distance at which conventional headlights are effective. The sensors pick up infrared rays emitted by any object that gives off heat. An image-processing system scans the information from the sensors, creating different images for different objects. The images are then displayed on a cathode-ray screen built in a car’s instrumental panel. It is like black-and white photograph of an object ahead. And the system is passive, which means no lights are needed to illuminate the object in front of the vehicle. But the biggest problem will be reducing costs and the other one is the size of the sensor mechanism which is too big now.

One of the latest applications of sophisticated electronics is the wheel-computerized system that not only monitors air pressure in automobile tires but adjusts it automatically. In addition this system enables a driver to set tire pressure while seated. The system developed consists of three separate modules. The first is the instrument panel display which houses the system’s main microprocessor, programming buttons (кнопка включения программы) and warning signals. The second component is the detector drive module (модуль привода) which is essentially four microchips attached, in one unit, to the chassis. The transistors within the module signal the third component – a programmable transducer (программируемый преобразователь). The transducer attached to each wheel changes the tire pressure accordingly.

However, some automobile experts think this system is too complicated and costly. The design has to be simple and of low cost.

### **Text 3**

#### **Read and retell the text**

#### **Talking Instrument Panels**

For a few years now some of the most advanced new automobiles have been equipped with instrument panels that can “speak” providing instrument readings or safety warnings from special electronic circuits.

In a polite female voice, the device will report on engine oil pressure, parking-brake and headlight operation, seat belt connection, totaling 14 different functions. The driver can even program the Voice Warning System to announce the time or to give a low-fuel warning for any preset gas tank level. The heart of the Voice Warning System is a microprocessor-based electronic speech module made by National Semiconductor Corp. (US). The device requires the connection of 18 wires, but it is simple enough to install in a car.

#### **Text 4**

**Read the text. Using words and expressions from the text describe your own emotional state before exams.**

### **Testing Times**

Exam stress doesn't occur strongly during the actual exams but in the few weeks just before them. The climax is usually the night before when last minute preparations confirm your worst fears. There are, however, some simple ways of dealing with the problem.

First, one must know that the night before is too late to do anything. Much better to go to a dance, for a walk, to the pictures or to play a game rather than increase stress by frantic efforts to plug in gaps (затыкать пробелы) in your knowledge.

The brain is a complex bio-electrical machine which, like a computer, can be overloaded. It does not work continuously. When you study, your brain reaches its maximum efficiency about five minutes you start work, stays at it for about ten minutes and then it is down. Indeed, after thirty minutes your attention wanders (отвлекаться), your memory shuts off, and boredom (скука) sets in.

For this reason, the best way experienced by Isaac Newton, the greatest mathematical genius, and by Einstein. Newton had a depression after his efforts of gravity.

Einstein had no such difficulty: he would break off and go sailing or play violin – not very well, he said, but it was very comforting.

The lesson here is clear. To avoid exam stress, you have to tell that what you are doing is fun (забава) and the best way to do this is to treat revision as a game. If you stimulate your brain with short, snappy (энергичный) sessions, you will be surprised how quick and sharp you are. A laugh with friends or a walk through the country is really giving your mind the recreation it needs.

## UNIT 4

### Exercise 1.

Read the following expressions and give Ukrainian/Russian equivalents to the underlined words.

1. for long **journeys** in cars
2. **arriving** at the **motorway**
3. the fuel left in the **tank**
4. the radar **aerial**
5. the radar only **observes** objects **ahead of**
6. **stationary** objects
7. the red light and **buzzer** warn
8. satellite will indicate the **route**

Exercise 2. Match the words and expressions in column A with their meaning in column B

A	B
1. journey	a. container for liquid or gas
2. arriving	b. electrical device that produces a sound signal
3. motorway	c. way taken or planned from one place to another
4. tank	d. see, watch carefully objects in front of
5. aerial	e. not moving or changing
6. observe	f. reach a wide road for continuously moving fast vehicles
7. stationary	g. travel to a distant place
8. buzzer	h. antenna
9. route	
10. ahead of	

Exercise 3. Read the text and find the words and word combinations with the following meaning:

*A new idea of product, reduce, basis, joining, position, for each car, whole (complete), very great, large number (quantity), at a very high level (suddenly), put together or fit the parts of, take (send to), every year, the same, a person who takes part in a race for the first place.*

## MASS PRODUCTION

Car manufacturer Henry Ford laid the foundation for the revolutionary change in the entire motor vehicle industry.

The key for mass production was not the moving assembly line. It was the complete interchangeability of parts and the simplicity of attaching them to each other. These were the innovations that made the assembly line possible. Taken together, they gave Ford tremendous advantage over his competitors.

Ford's first efforts to assemble his cars, beginning in 1903, were to set up assembly stands on which a whole car was built. Each assembler performed many jobs on one car and had to get the necessary parts for it.

The first step Ford took to make this process more efficient was to deliver the parts to each work station. Now each assembler remained in the same place all day. Later in 1908 Ford decided that each assembler would perform only one task and move around the factory from car to car. In 1913 cars were placed on a moving assembly line. Each assembler performed one task only and remained stationary. This innovation cut cycle time from 2.3 minutes to 1.19 minutes, thus dramatically improving productivity.

Ford's discovery simultaneously reduced the amount of human effort needed to assemble an automobile. What is more, the more vehicles Ford produced, the more the cost per vehicle fell. In the early 1920s Ford produced 2 million identical vehicles a year.

Ford's mass production was adopted in almost every industrial activity in America and Europe.

**Exercise 4. Make up 6 questions to the text.**

**Exercise 5. Read the text and try to guess the meaning of the underlined words and expressions.**

There was a bad **accident** on one of the main **motorways** to Paris this afternoon. A big tourist coach **broke down** on the **inside lane** of the motorway, and the driver could not move it. It was about 5.30 in the afternoon, the middle of the **rush hour**, so it soon created a terrible **traffic jam**. A driver in a BMW doing about 60 mph tried to go round the coach. Unfortunately, another car was **coming in the opposite direction**. The driver **braked hard** and tried to stop, but he could not **avoid** the accident. The BMW **crashed into** the front of his car. The driver of the BMW died, the other driver was **badly injured**, and both cars were **badly damaged**.

**Exercise 6. Choose the best version.**

1. While turning a corner at high speed my car **hit** / **crashed** a lamp post.
2. The only means of **arrival** / **access** to the station is through a dark subway.

3. We managed to complete our journey ahead **of** / **in** front of schedule.
4. The police accused the driver of breaking the speed **limit** / **restriction**.
5. Sixty extra policemen were to **direct** / **control** the traffic outside the stadium.
6. When her car broke down, she had to **catch** / **take** a taxi.
7. There are road works in center streets and long **delays** / **intervals** are expected.
8. This car is an automatic, so you do not have to **adjust** / **change** gear all the time.
9. Only a mechanic could **realize** / **understand** the true **amount** / **extent** of the damage to the car.
10. Travelers who wish to visit the old city should travel in the two front **buses** / **coaches**.
11. The driver told his passengers to **fasten** / **fix** their safety belts.
12. You mustn't **ride** / **drive** a motorbike without a helmet.
13. The two buses collided (столкнуться), but luckily none was **injured** / **wounded**.

**Exercise 7. Read the text and try to guess the meaning of the words *tube, poor and run*.**

Many of the world's major cities were built long before the car appeared and people realized the need to build efficient road systems. Current traffic management problems may be connected with old city planning.

The thing that saves some of these cities is an effective public transport system, usually below ground. London has an old but effective underground train system known as a **tube**, and a comprehensive bus and train system above the ground. Hong Kong has cheap, swift and effective public transport in the form of Mass Transit Railway, buses and ferries.

But there are newly built cities, such as, for example, Dallas, Baltimore and Los Angeles in America. Dallas is a wealthy city in Texas, which has grown up in an era when cars were considered to be essential to move about. It has an excellent road system, as does Baltimore, another new city with wise city leaders who insisted on building good roads. However, the public transport system in both Baltimore and Dallas is extremely **poor**. As a result, travel in these cities is easy except for peak hour, when a twenty minute **run** can take more than an hour in traffic jams. Los Angeles suffers from chronic highway blockages, despite efforts to encourage people to use public transport.

Cities with good road systems can use other methods to reduce the number of vehicles travelling together at peak hour. Flexible time is one good method: offices open and close at different times so people are travelling to and from work at different times. Vehicles carrying more than one person can use special priority lanes, which means they can travel more quickly. There are even systems to make peak hours car use more expensive, with electronic chips recording the presence of a vehicle in a given traffic area at a given time.

**Exercise 8. Look through the text again and find the words with the following meaning:**

1. demand
2. rich
3. journey in a car
4. fast
5. easily changed for new needs or conditions
6. full, including many kinds of
7. having experience, knowledge
8. main public road

**Exercise 9. Complete the sentences using antonyms of the underlined words.**

1. Public transport in Hong Kong is **cheap**, but in London it is ...
2. Paris has the Metro railway **below ground** and a large bus system ...
3. People should ... and **finish** work at different time to reduce peak hour traffic jams.
4. City administration try to encourage people to use ... transport, not **private** cars in the city center.
5. An electronic device can record the **absence** or ... of any person at the office.
6. The public transport available in Baltimore is very **poor**, while in Sidney it is ...

**Exercise 10. Complete the sentences using the words from the table.**

Reduce	transportation	advantage	car	per	traffic	public transport	source
study	average	routes	increase	symbol	atmosphere	number	motor vehicle
reduction	solve						

The private (1) ... has dramatically improved the comfort, speed and individual freedom of movement. The automobile has become a status (2) ... . The car brought people much closer to places of work, (3) ... and entertainment.

However, the use of private cars can also be a (4) ... of many most serious problems today. The car is a disadvantage as well as an (5) ... . It pollutes the (6) ..., may be involved in dangerous accidents, and by its very numbers blocks roads and chokes (душить) cities. In New York City, 2.5 million cars move in and out of the city each day. In this (7) ..., the average speed is sometimes 8.1 miles (8) ... hour. This speed could easily be reached by riding a horse instead of driving a (9) ... . But New Yorkers continue to drive, just as people in London where the (10) speed in certain particularly overcrowded (11) ... is only 2 miles per hour. Most people believe that the car is a necessary part of life in today's world. Car owners usually do not consider other methods of public (12) ... such as bus, train or bicycle.

The only way to (13) ... these problems is to reduce the use of private cars. How can we do it? We may (14) ... access to parking spaces in the cities and simultaneously (15) ... the quality and availability of public transport. Cars could not

be permitted in certain parts of the city, thus making people walk and use (16) ... . The cost of buying and running a car can be increased with a corresponding (17) ... in the price of public transport. The reduced (18) ... of cars on the roads means less pollution.

**Exercise 11. Word building. Complete the table.**

Verb	Noun	Person	Adjective
compete	...	...	...
...	action	...	...
...	...	transporter	...
...	...	...	productive
assemble	...	...	-----
...	manufacture	...	-----
found	...	...	-----
...	brive	...	-----
...	...	-----	reducible
...	...	...	indicative

**Exercise 12. Name 15 – 20 key words and expressions on the topic “Road transport”**

**Speak about:**

1. The **current public transport problems in your city or town, its safety, speed and** comfort.
2. The role and importance of a private car in your own life.
3. The changes in technology (manual assembly – mass assembly lines – robotics – computerized production).
4. Offer your own ideas on traffic management improvement in your area.

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