ДОНСКОЙ ГОСУДАРСТВЕННЫЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ

УПРАВЛЕНИЕ ДИСТАНЦИОННОГО ОБУЧЕНИЯ И ПОВЫШЕНИЯ КВАЛИФИКАЦИИ

Кафедра «Научно-технический перевод и профессиональная коммуникация»

Учебное пособие

по английскому языку

«Электроэнергетика и электротехника»

Автор

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Ростов-на-Дону, 2016

Аннотация

Пособие отвечает основным целям обучения английскому языку и направлено на взаимосвязанное развитие различных видов речевой деятельности на основе профессионально-ориентированных текстов. В него включены разделы, наиболее важные для профессиональной коммуникации и работы с техническими текстами на иностранном языке по направлению «Электроэнергетика и электротехника».

Пособие предназначено студентам, обучающимся по направлению «Электроэнергетика и электротехника».

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Оглавление

Module 1

Pre-reading

1. Check that you know the meaning of the following words. Use the dictionary where necessary.

movement	refer	property	lightning	domestic	determine
force	ability	nucleus	charge	attract	condition
particle	generate	conduct	origin	create	commonly
interaction	transmit	allow	influence	flow	provide
store	excess	essential	current	area	experience

Reading

2. Read the text.

ORIGIN OF ELECTRICITY

Electrical energy is the result of the movement of an electrical charge, and is commonly referred to as "electricity." Actually, it finds its origin in the electromagnetic force. This force determines the special characteristics of electrically charged objects. Electricity results from the interaction of subatomic particles with this force. Electrical energy is found in natural phenomena such as lightning. Electricity has become an essential part of our daily lives. Modern technology, industry and domestic life are critically influenced by the ability to generate, store and transmit electrical energy.

There are positive and negative types of electrical charge. Two electrically charged objects brought close to one another experience a force. On condition that the charges are the same (no matter if they are both positive or both negative) the force will push the objects away from one another. Providing that they have different charges, they will attract one another. This property is known as the electromagnetic force, and it is used to create a flow of electrical particles.

Atoms consist of positively charged protons containing in the nucleus and negatively charged electrons orbiting around it. Protons normally stay put in the nucleus, but electrons can move from atom to atom, allowing them to flow through materials, such as metals, that

conduct electricity. A place with an excess of electrons over protons has a negative charge. As for a place with a deficit of electrons, it has a positive charge. As opposite charges attract one another, electrons flow from a negatively charged area to a positively charged one. This process is known as electric current.

Vocabulary Practice and Grammar Revision

3. Find the following expressions in the text and learn them by heart:

1. электрический заряд
2. обычно называется
3. фактически
4. брать своё начало в чём-л.
5. определять особенности
6. сила электромагнитного взаимодействия
7. элементарные частицы
8. природные явления
9. существенная часть
10. повседневная жизнь
11. при условии, что
12. проводить электричество
13. избыток электронов
14. по отношению к протонам
15. недостаток электронов
16. отрицательный заряд
17. положительный заряд
18. притягивать друг друга
19. содержащиеся в ядре
20. вращающиеся вокруг него
21. оставаться на месте
22. противоположные заряды притягиваются
23. электрический ток

4. Answer the following questions.

1. What is this text about?
2. What does electrical energy result from?
3. Where does electrical energy originate?
4. Where can we find electricity in nature?
5. What applications of electrical energy can you remember?
6. What is the result of two electrically charged objects brought close?

7. What creates a flow of electrical particles?
8. What do atoms consist of?
9. What place has positive/negative charge?
10. What is electric current?

5. Translate into English:

1. В быту электрическую энергию называют электричеством.
2. Взаимодействие элементарных частиц определяется электромагнитным полем.
3. Способность производить, хранить и передавать электричество существенно влияет на наш повседневный быт.
4. Электрические заряды могут быть положительными и отрицательными.
5. Противоположно заряженные частицы притягиваются.
6. Участок с недостатком электронов имеет положительный заряд.
7. Электроны движутся из положительно заряженного участка в отрицательно заряженный.
8. Атомы состоят из положительно заряженных протонов и атрицательно заряженных электронов.

6. Revise the material on type 1 conditionals (if-sentenses). What words and word combinations can we use instead of "if" in these sentences? Find such expressions in the text. Complete your own sentences with them.

7. Form nouns using the following suffixes and translate them into Russian:
- ty – useable, special, necessary, peculiar, electric;
- ion (ation, cion) – suggest, found, interact, depredate, accumulate, assume, compose, observe, predict, populate, investigate, determine, classify, appreciate, generalize;
- ist – nature, ecology, speciality, science;
- ance (ence) – differ, accept, occur, exist, depend;
- ment – settle, measure, develop, require;

8. Form the opposite of the following words by using the prefixes and translate them into Russian:

dis – order, advantage, appearance, integration;
non – renewable, stop, acid, sense, resistant;
in – efficient, human, essential, capable, attentive, directly;
un – usual, important, healthy, able, cultivated, known, explored, necessary, common;
de – to increase, to compose, formation;

9. Use the appropriate form of the verbs and translate the sentences into Russian:

1. He (to continue) his experiment unless he (to obtain) the necessary data,.
2. Providing that you (to carry out) this research, you (to be able) to suggest a new theory.
3. As long as the technology (to be applied), the quality of the experiment (to be improved).
4. Scientists (to obtain) good results on condition that they (to use) this method.
5. If this catalytic activity (not to stop) it (to open) potential risks in their interaction with biomaterials.
6. Supposing two electrically charged objects (to be brought) close to one another they (to experience) a force.
7. Unless we (to have) the password, we (not access) this website.

10. Fill in the gaps with appropriate prepositions and complete your own sentences:

of, by (3), to (5), on, at, in, from, into, with

1. to rely …
2. to apply …
3. to be connected …
4. to result …
5. to be appreciated …
6. to consist …
7. to be generated …
8. to be supported …
9. to be associated …
10. to be transported …
11. to refer …
12. to originate …
13. to be opposed …
14. to oscillate …
15. to lead …

11. Revise the material on Present Perfect Continuous.
Change the sentences into Present Perfect Continuous:

Model: She is making an experiment. – She has been making it for 2 hours (since 10 o'clock, since she came to the laboratory).

1. He is waiting for the results of his experiment.
2. Tom is making calculations in the laboratory.
3. Ann is working at her report at the library.
4. They are carrying out their research.
5. We are discussing the findings.
6. I am studying this subject.
7. Mr. Brown is talking on the topic of electricity.
8. The students are taking the exam.
9. John is listening to music.
10. Mary is doing her homework.

12. Answer the following questions:

Model: *How long have you been doing research in the field?*
I have been doing it for several years / since 2014.

1. How long have you been gathering the data for your research?
2. How long have people been employing these technologies?
3. How long has Nick been working with this organsation?
4. Since what time have you been making your observations?
5. Since what time have modern applications in the field been developing?
6. How long have you been dealing with nanoelectronics?
7. How long have the students been working at this problem?
8. How long has the teacher been explaining this material?
9. Since what time have you been studying electricity?
10. How long have they been completing the test?

13. Ask questions:

Model: *Man for thousands of years has been changing the world.*
How long has man been changing the world?

1. Mr. Brown has been doing research in the field for 2 years.
2. We have been gathering these data since last summer.
3. She has been working at her presentation since Tuesday.
4. John has been investigating the problem since he joined our laboratory.
5. They have been trying to solve this problem for nearly a year.
6. The students have been discussing this matter for an hour.
7. Mr. Smith has been delivering his lectures on electricity since last year.
8. This laboratory has been engaged this experiment since last September.
9. I have been studying physics for six years.
10. Ann has been playing the piano for half an hour.

Language Development

14. Discuss:

- the natute of electrical energy;
- its applications in all fields of human activity.

15. Explain the meaning of the following words and word combinations:

1. electric current
2. electrical energy
3. electrically charged objects
4. the electromagnetic force
5. electrons

16. Read the text again. Write out the keywords of the text.

17. Think of the most suitable headings for each paragraph. Put them down. Complete your writing plan of the text using these headings.

18. Ask as much questions to the text as you can.

19. Translate the text in writing.

20. Present the information of the text oraly in 7-8 sentences according to your plan.

21. Complete a brief abtract of the text in writing.
Make use of the following phrases:

- The title of the text/paper/article is….
- The main idea of the text/paper/article is…
- The text/paper/article deals with….
- The text/paper/article touches upon….
- The aim of the text/paper/article is to provide the reader with information on…
- The author starts with…
- The text/paper/article describes …
- According to the text/paper/article...
- Further the author reports…
- It is important to stress (note, underline)…
- The author comes to the conclusion that…
- I find the text/paper/article to be interesting/important because…

Scanning reading

22. Read the following text without a dictionary. What are its main ideas?

ELECTRICITY

Electricity is the set of physical phenomena associated with the presence and flow of electric charge. Electricity gives a wide variety of well-known effects, such as lightning, static electricity, electromagnetic induction and electric current. In addition, electricity permits the creation and reception of electromagnetic radiation such as radio waves. In electricity, charges produce electromagnetic fields which act on other charges. Electric charge is a property of some subatomic particles, which determines their electromagnetic interactions. Electrically charged matter is influenced by, and produces, electromagnetic fields. Electric field is an especially simple type of electromagnetic field produced by an electric charge even when there is no electric current. The electric field produces a force on other charges in its area. Electric current is a movement or flow of electrically charged particles, typically measured in amperes. Electric currents generate magnetic fields, and

changing magnetic fields generate electric currents. The rapid expansion in electrical technology has transformed industry and society. Electrical power is now the backbone of modern industrial society.

Module 2

Pre-reading

1. Consider and discuss the following questions.

1. What applications of electricity do you know?
2. How do people use electricity in their everyday lives?
3. What can be advantages and disadvantages of its application?

Reading

2. Read the text.

USING OF ELECTRICITY

Electricity can be used not only in itself but also in transferring energy over distances. It is applied in many industrial processes, televisions, the Internet and telecommunications, computers and many other devices. Converted into other forms of energy it comprises a wide range of other applications.

While flowing through a conductor an electric current emits some amount of heat. This amount depends on the conductivity of a certain material. Being a good conductor copper, for example, produces very little heat. That is why copper cables or wires are widely applied to transmit electrical energy. Because of heat generation, energy is lost, therefore a good conductor minimizes this loss. Materials which conduct electricity not so well and as a result produce more heat can be useful, for example, in electric cookers, ovens and heaters.

Electrical energy can be converted into light. In the case of arc lamps, light is produced by an electric (or voltage) arc between electrodes in air. Electrical discharge heats the air to the point where it glows. The same principle is used in lightning. Later, the filament

bulb was designed. This type of bulb is relied on the current causing a thin, coiled wire to glow white-hot. Nowadays energy-saving light bulbs are applied. They pass a high voltage current through a thin gas causing it to emit ultraviolet light. As a result, a fluorescent coating produces light.

There is a significant property of conducrors that experience a magnetic field. A current is generated when a conducting material is moved under this condition. Vice versa, if a current flowing through a conductor experiences a magnetic field, it will produce movement. This principle is used in electric motor. These devices consist of an arrangement of magnets and coils of copper wire. When a current flows through the wire, a turning motion is produced. Electric motors are widely used in industry and in the home, for example in washing machines and DVD players.

Vocabulary Practice and Grammar Revision

3. Find the following expressions in the text and learn them by heart:

1. передача энергии на расстояние
2. преобразованное в другие формы энергии
3. охватывает широкий спектр других применений
4. проходя через проводник
5. испускать некоторое количество тепла
6. зависеть от проводимости
7. определённый материал
8. так как медь хороший проводник
9. медный кабель или проволока
10. широко применяются
11. электроплиты, духовки и нагреватели
12. дуговые лампы
13. электрическая (или вольтова) дуга
14. с помощью электрического разряда
15. до момента свечения
16. лампа накаливания
17. проволочная спираль
18. до белого каления
19. лампа ультрафиолетового излучения
20. люминисцентное покрытие
21. магнитное поле
22. напротив

23. компановка магнитов и спирали медной проволоки
24. производится вращение

4. Explain the principle of operation of the following devices:

1. arc lamp
2. filament bulb
3. energy-saving light bulb
4. electric motor

5. Answer the following questions.

1. What are the examples of applications of electricity?
2. How can the conductivity of certain materials be used?
3. How can electricity be converted into light?
4. What is a significant property of conducrors that experience a magnetic field?
5. Where is this property used?
6. What components does electric motor consist of?
7. What are the examples of applications of electricity in the home?

6. Translate the following phrasal verbs (two-part verbs). Complete your own sentences with them:

to bring about,
to look through,
to carry out,
to account for,
to bring out,
to look for,
to make up,
to bear on,
to keep to,
to make up,
to give up,
to deal with.

7. Study the following model and find similar constructions in the text:

- *Being* *in a hurry he cannot talk to them*. – Он не может

поговорить с ними, так как он спешит.

- ***While*** *carry**ing** out my research I usually look through new papers on the topic in scientific jornals*. – Выполняя исследования, я обычно просматриваю новые статьи по теме в научных журналах.
- ***Being*** *on business he cannot attend our meetings*. – Будучи в командировке, он не может посещать наши заседания.
- ***When*** *in Rome do as Romans do*. – Когда ты в Риме, поступай, как римляне (*экв. русс. посл.*: Со своим уставом в чужой монастырь не ходят).

8. Read and translate the following sentences using model of ex. 7:

1. While having lunch I always watch TV.
2. Being busy he cannot help you with your research.
3. Reading much on the topic he is aware of the latest technological advances in the field.
4. Not having time, I cannot get ready to speak on the topic.
5. Being unwell he cannot meet us.
6. While cooking breakfast my sister often listens to the latest news on the radio.
7. When preparing her work Mary often discusses all the problems with her scientific advisor.
8. Living not far from the university I always go there on foot.
9. Going home I often meet her near the library.
10. While cleaning her room she usually opens the window.

9. Change the following sentences as in the model:

Model: *When I have time I often visit this laboratory. –*
(When) having time I often visit this laboratory.

1. He should not take this exam because he is not ready.
2. Ann can carry out her research as she has all necessary things.
3. When Tom is free he is happy to help us in the laboratory.
4. When Mr. Brown comes home he always looks through his e-mail.
5. Nick cannot help you as he is on business.
6. I don't work at my article because I have no time.
7. This student must not enter the classroom because he is late.

8. Jane uses the Internet when she looks for information on the topic.
9. They can carry out their research together as they work at the same topic.
10. When I clean my room I often listen to music.

Language Development

10. Agree or disagree with the statements given below. Use the following phrases:

- *That's right;*
- *I don't think so;*
- *I partly agree with you;*
- *Exactly;*
- *I am afraid, I can't agree with you;*
- *I entirely agree with you;*
- *You are wrong there;*
- *I am completely in favor for;*
- *I am all for it;*
- *I am completely opposed to it.*

1. More attention ought to be paid to new technologies.
2. With application of electricity man has violated laws of nature and is going to pay for it.
3. Application of new technologies does not affect human health and safety in any way.
4. Economic and technical progress is the more important field than ethical and moral matters.

11. Consider and discuss the matters:

- How can achivements in the field of electrical energy impact modern industry?
- Do you believe that technologies are able to find solutions to whatever problems are arisen? What is the basis of your opinion?

12. Read the text again. Write out the keywords of the text.

13. Think of the most suitable headings for each paragraph. Put them down.

14. Translate the text in writing.

15. Complete the plan of the text in writing.

16. Present the information of the text oraly in 7-8 sentences according to your plan.

17. Complete a brief abtract of the text in writing.
Make use of the following phrases:

- *The text/paper/article is about…*
- *The text/paper/article provides information on …*
- *The text/paper/article under discussion reports on…*
- *The main objective/purpose/aim of the text/paper/article is…*
- *The text/paper/article discusses/considers/analyses/deals with/emphasizes…*
- *The text/paper/article explores common problems…*
- *Light is thrown onto…*
- *The text/paper/article concentrates on…*
- *A detailed (brief) description is given to…*
- *Much attention is given to…*

Scanning reading

18. Read the text without a dictionary. What are its main ideas?

ELECTRICITY MEASURING

Energy is measured in joules, a term named after the physicist James Prescott Joule. One joule is roughly the amount of energy required to lift a one pound (0.45 kilogram) weight a vertical distance of nine inches (22.9 cm). It is, however, usually more convenient to think of electricity in terms of power, which is energy divided by time, or the rate at which it flows. This gives the possibly more familiar unit of the watt, named after the scientist James Watt. One watt is equivalent to one joule per second.

There are a number of other units that relate to electricity. The coulomb is the unit of electrical charge. It can be regarded as a quantity of electrons — 1.6 x 10^{19} — since all electrons have the same, very small, charge. The ampere, usually abbreviated to "amp", is the unit of electric current, or the number of electrons that flow in a given amount of time. One amp is equivalent to one coulomb per second.

The volt is the unit of electromotive force, or the amount of energy that is transferred per unit of charge, or coulomb. One volt is equivalent to one joule of energy being transferred for each coulomb of charge. Power, in watts, is equivalent to volts multiplied by amps, so a five amp current at 100 volts would be equivalent to 500 watts.

Module 3

Pre-reading

1. Check that you know the meaning of the following words. Use the dictionary where necessary.

reverse	gravity	compound	efficient	conversion
fossil	nuclear	split	voltage	raise
fuel	direction	provide	constantly	relatively
reduce	though	envolve	hence	terminal
steam	supply	increase	circuit	burn

Reading

2. Read the text.

ELECTRICITY GENERATING

Devices converting rotational motion into electrical energy generate most electricity. These devises use the same principle as an electric motor, but in reverse. An electric current is produced by the movement of coils of wire experienced a magnetic field. Heat, emitted by the burning of fossil fuels, is commonly used to produce steam that powers a turbine to provide the rotational motion. In a nuclear power plant, the heat is provided by nuclear energy. In the case of

hydroelectric power the movement of water under gravity is used to drive the turbine.

The electrical energy generated by power plants generally has the form of alternating current. This means that the current is constantly reversing its direction, many times per second. In many cases alternating current works well and in this form electrical energy reaches the home. Some industrial processes require direct current, though. In this form electrical current flows in one direction only. A good example is the manufacture of some chemicals. This envolves electrolysis where compounds are split into elements or simplified by the means of electrical energy. This process requires direct current, hence these plants either require alternating current to direct current conversion or have their own direct current supply.

More efficient way of transmition of electrical energy is one through power lines at higher voltages. For this reason, generating plants use transformers to increase the voltage for transmission. This does not increase the energy or power: when the voltage is raised, the current is reduced and vice versa. Long distance transmission of electricity takes place at many thousands of volts; however, it cannot be used in homes at these voltages. Local transformers reduce the voltage to around 110 volts in the USA, and 220-240 volts in Europe, for domestic supplies.Electrical energy for low power devices is often supplied by batteries. These use chemical energy to produce a relatively small electric current. They always generate a direct current, that is why they have a negative and a positive terminal. Electrons flow from the negative to the positive terminal when a circuit is completed.

Vocabulary Practice and Grammar Revision

3. Find the following in the text:

1. природное топливо
2. вращательное движение
3. наоборот
4. атомная электростанция
5. под действием силы тяжести
6. переменный ток
7. постоянный ток
8. расщипление соединений на элементы
9. посредством
10. высоковольтные электрические линии

11. по этой причине
12. цепь замкнута
13. положительный полюс батареи
14. устройства малой ммощности
15. поставка электроэнергии для бытовых целей

4. Give definitions of the terms according to the text.

alternating current
direct current
electrolysis
transformer
battery

5. Answer the following questions according to the text.

1. What way is most electricity generated?
2. What is the principle used in devices converting rotational motion into electrical energy?
3. How is heat provided in a nuclear power plant? in the case of hydroelectric power?
4. For what reasons do generating plants use transformers?
5. Why is it more efficient to transmit electricity through power lines at higher voltages?
6. What voltage is used for domestic supplies?
7. What form of current is generated by batteries?

6. Give all possible variants of word combinations and translate them into Russian:

to consider (a problem, data, the results)
to make (observations, calculations, analyses, a conclusion, a discovery, an experiment, an investigation, measurements, a mistake, a suggestion, a summary, a contribution to)
to gain (knowledge, weight, recognition, experience)
to receive (an award, education, a degree, a diploma, news, one's training, a prize, a telegram, a medal, a letter)
to do (experimental work, theoretical studies on, research in smth, exercises)
precise (values, observation, measurements)

to obtain (a result, data, information, evidence, knowledge)

7. Form adjectives by adding suffixes and translate them:

- al – nation, policy, environment, biology, globe, region;
- able – sustain;
- ful – beauty, meaning;
- ant (ent) – to ignore, to depend, to resist, to differ;
- ous – nerve, danger, marvelous, advantage, fame;
- y – water, milk, health, sand, grass, wind, bush, ice.

8. Explain the meaning of the following prefixes and translate the words into Russian:

sub – subdiscipline, subdivide, subtropical;
pre – pre-establish, precaution, prehistorical, precursor, preface;
uni – uniform, unification, universal, unicellular.
mis – misconception, misprint, misspell, misunderstand;

9. Match English participles with Russian equivalents:

a) absorbed	1. увеличенный
b) modified	2. отобранный
c) selected	3. применённый
d) generated	4. развитый
e) increased	5. высвобожденный
f) cleaned	6. поглощенный
g) developed	7. видоизменённый
h) suggested	8. очищенный
i) released	9. предложенный
j) applied	10. произведённый
k) reduced	11. сокращенный

10. Revise the material on Passive Voice. Fill in the gaps:

1. A patient ... when I came.
   a. had being examined
   b. was being examined
   c. had been examined
   d. had been examining
2. The letters must ... by him at once.
   a. sent

b. be sent
c. send
d. will send

3. He ... for a long time.
a. hasn't been seen
b. hasn't seen
c. hasn't being seen
d. hasn't been seeing

4. Whose report ... now?
a. is discussed
b. is discussing
c. is being discussed
d. discussed

5. This book ... by everybody.
a. loves
b. is loved
c. love
loved

6. The children ... by the dog.
were frightened
frightened
frighten
be frightened

7. The book ... by the end of the next year.
will have published
will have being published
will have been published
will been published

8. This work can ... tomorrow.
do
done
be done
will do

Language Development

11. Comment on one of the statements:

- Consumption of is an important indicator of economical development of a nation.
- Electrical energy has become universal.

12. In pairs, discuss the possible positive and negative effects of using electrical energy. Give examples for and against using electricity from environmental point of view. Make use of the following linking words:

- *to start with/ first of all/ firstly*
- *secondly*
- *at first sight*
- *apparently*
- *the greatest advantage/ disadvantage*
- *however /yet*
- *what is more/ moreover*
- *on the one hand/ on the other hand*
- *in my opinion/ view*
- *personally I believe*
- *I feel strongly that*
- *I am concerned*
- *according to/ with reference to*
- *therefore/ thus/ as a result/ as a consequence*
- *in fact/ actually/ as a matter of fact*
- *finally*
- *to sum up*

13. Translate the text in writing.

14. Write a short (in 100-120 words) composition on the matters of impact of electricity on the economy.

Scanning reading

15. Read the text without a dictionary. What are its main ideas?

INDUCTION MOTOR

Before Faraday did his inventions in the field of electrical energy and magnetism, the galvanic battery had been the only source of electricity. The use of electricity had been reduced to several practical applications such as electric telegraph or lighting. Developing generators, electromagnetic machines and transformers made it possible to use electrical energy on larger scale.

The most significant technical achievement in the field is regarded to be the invention of induction motor. With its appearance, power cables replaced gears. The first alternating-current commutatorless induction motors have been independently invented by Galileo Ferraris and Nikola Tesla.

The speed of the first induction motor was unchangeable and constant. A motor with two speeds appeared two years latter. Since those times the design of induction motor has been substantially improved. As a result, its power has increased. However, its principle of work has not changed.

Module 4

Pre-reading

1. Think of as many words as possible related to the theme "environment". How do electricity and environment link? What environmental influence of electricity can you imagine? Try to guess the meaning of the term "green power"? What can be aims of green power?

Reading

2. Read the text.

GREEN ENERGY AND GREEN POWER

Green energy includes natural energetic processes that can be used with the little pollution. Green power is electricity generated from renewable energy sources. Renewable energy is generally defined as energy that is collected from resources which are naturally reprodused

on a human timescale. Their examples are sunlight wind, rain, tides, waves and geothermal heat. Renewable energy often provides energy in four important areas: electricity generation, air and water heating / cooling, transportation, and energy services.

Public seat with solar panel in Singapore
Anyone can sit and plug in their mobile phone.

Anaerobic digestion, geothermal power, wind power, small-scale hydropower, solar energy, biomass power, tidal power, wave power, and some forms of nuclear power which are able to "burn" nuclear waste through a process known as nuclear transmutation, such as an Integral Fast Reactor, and therefore belong to the "Green Energy" category.

Some scientists believe that although green energy contributes a lot to solving the world's increasing energy consumption, it must be accompanied by a cultural change that encourages the decrease of the world's appetite for energy.

In several countries electricity retailing arrangements make it possible for consumers to purchase green electricity (renewable electricity) from either their utility (an organization that provids a public service) or a special green power provider.

When energy is purchased from the electricity network, the power reaching the consumer will not necessarily be generated from green energy sources. The local utility company, electric company, or state power pool buys their electricity from electricity producers who may be generating from fossil fuel, nuclear or renewable energy sources. In many countries green energy currently provides a very small amount of electricity, that generally contributs less than 2 to 5% to the overall pool.

In some countries such as the Netherlands, electricity companies guarantee to buy an equal amount of 'green power' as is being used by their green power customers. The Dutch government frees green power from pollution taxes, which means green power is hardly any more expensive than other power.

The World Wide Fund for Nature and several green electricity labelling organizations have created special energy standard under which the national green electricity certification schemes can be accredited to new green energy resources.

Vocabulary Practice and Grammar Revision

3. Find the following expressions in the text and learn them by heart:

1. возобновляемые источники энергии
2. за период человеческой жизни

3. геотермальное тепло (тепло земной коры)
4. анаэробное генерирование (получение метана из органических отходов)
5. гидроэнергия небольших объёмов
6. солнечная энергия
7. энергия биомассы
8. энергия приливов
9. волноэнергетика (энергия морских волн)
10. радиоактивные отходы
11. ядерное превращение элементов
12. интегральный ядерный реактор на быстрых нейронах
13. договоры о поставке электричества
14. создают возможность потребителям
15. покупать электричество, вырабатываемое природосберегающими методами
16. государственная энергосистема
17. вносит менее 2-5% в общую энергосистему
18. налоги на загрязнение окружающей среды
19. Всемирный фонд дикой природы
20. маркирующие (контролирующие) организации

4. Give definitions:

green energy
green power
renewable energy
utility
pollution taxes

5. Answer the following questions:

1. What is this text about?
2. What are examples of renewable energy?
3. What areas are provided with renewable energy?
4. What kinds of power belong to the "Green Energy" category?
5. What measures does the Dutch government provide to promote greem energy?
6. What measures do the World Wide Fund for Nature and several green electricity labelling organizations provide for these porposes?

6. Translate into English:

1. Электричество, вырабатываемое с помощью природосберегающих методов, производится из возобновляемых источников энергии.
2. К категории «чистой энергии» принадлежат некоторые формы ядерной энергии.
3. Использование «чистой энергии» должно сопровождаться снижением потребления энергии.
4. Во многих странах вклад «чистой энергии» в общую энергосистему очень невелик.
5. Голландское правительство освобождает потребителей «чистой энергии» от налогов на загрязнение окружающей среды.

7. Revise the material on all the conditionals (if-sentenses). Put the verbs in appropriate form:

1. If I were you, I (*to read*) more.
2. I (*to take*) a taxi yesterday, if I had had enough money.
3. If I (*to meet*) Jack, I will ask him about his research.
4. If he (*to be*) wise enough, he would not tell about it.
5. If they hadn't called the police, they (*to have*) problems.
6. If he respected her, she (*to be*) happy.
7. If I (*to be*) not very tired, I will come to your party.
8. The boy would have been glad, if his parents (*to buy*) him a new laptop.
9. If the weather is bad, I (*to stay*) home.
10. I would have helped you with your presentation, if I (*to have*) time.

8. Fill in the gaps with the verbs:

to do or to make; to receive or to obtain

1) Mr. Brown has succeeded in … some data of interest. He has got a lot of measurements …
2) This scientist has … the award for the discovery … by him.
3) I've … some experiments and let me … a summary.
4) When did you … your degree?
5) We've got a lot of work …

6) Ann … her education at University.
7) I sure the results … by you will help you to proceed with your work.
8) My brother … research in the field of electricity.

9. Explain the meaning of the following prefixes and translate the words into Russian:

in – invisible, inhuman, inequitable, incapable, inessential, injustice, inorganic, input, insoluble, inefficient;
self – self-sufficient, self-acting, self-recording, self-control, self-consistent;
out – outside, outdo, outstretched, outstanding, output;
re – renewable, recombine, recycle, recovery, restructure;
de – to decrease, , deformation, discoloration, to decompose, to delay.
non – nonsense, nonpaged, nondestructive, nonresistant, nonacid;

Language Development

10. Correct the wrong statements using the following as phrase openings:

- *On the country;*
- *I don't believe that;*
- *It is considered that;*
- *In my opinion;*
- *however according to the text;*
- *I don't think that;*
- *I'm afraid you are mistaken;*
- *Sorry I can't agree with you.*

1. Pollution taxes free you for environmental pollution.
2. Green electricity is a kind of electric power generated from trees.
3. Sunlight wind, rain, tides, waves and geothermal heat are not renewable resources.
4. Green electricity is the only way to protect environment.
5. Any form of nuclear power cannot belong to green power.
6. Utility is an organization that burns nuclear waste.

11. Comment on one of the statements:

- Humans' technologies have not only negative influence on environment.
- Science often faces the problem of the balance of priorities (economical and environmental).

12. Read the text again. Write out the keywords of the text.

13. Think of the most suitable headings for each paragraph. Complete your writing plan of the text using these headings.

14. Summarize the text in 7-8 sentences. Make use of the following phrases:

- *The text under discussion reports on…*
- *The main objective (purpose, aim) of the text is…*
- *The text discusses/considers/analyses/deals with/emphasizes…*
- *Much attention is given to…*

15. Complete a brief abtract of the text in writing.

16. Translate the text in writing.

Scanning reading

17. Read the text without a dictionary. What are its main ideas?

SUSTAINABLE ENERGY AND ITS TECHNOLOGES

Sustainable energy is energy obtained from non-exhaustible resources. By definition, sustainable energy serves the needs of the present without compromising the ability of future generations to meet their needs. Technologies that promote sustainable energy include renewable energy sources, such as hydroelectricity, solar energy, wind energy, wave power, geothermal energy, bioenergy, tidal power and also technologies designed to improve energy efficiency. Energy efficiency has the goal to reduce the amount of energy required to provide products and services.

Costs have fallen dramatically in recent years, and continue to fall. Most of these technologies are either economically competitive or close to being so. Increasingly, effective government policies support investor confidence and these markets are expanding. Considerable progress is being made in the energy transition from fossil fuels to ecologically sustainable systems, to the point where many studies support 100% renewable energy.

Renewable energy technologies are essential contributors to sustainable energy. Conceptually, one can define three generations of renewables technologies, reaching back more than 100 years.

First-generation technologies emerged from the industrial revolution at the end of the 19th century and include hydropower, biomass combustion and geothermal power and heat. Some of these technologies are still in widespread use. Second-generation technologies include solar heating and cooling, wind power, modern forms of bioenergy and solar photovoltaics. These are now entering markets as a result of research, development and demonstration investments since the 1980s. Many of the technologies reflect significant advancements in materials. Third-generation technologies are still under development and include advanced biomass gasification, biorefinery technologies, concentrating solar thermal power, hot dry rock geothermal energy and ocean energy. Advances in nanotechnology may also play a major role.

Module 5

Pre-reading

1. Find the odd word. Explain your choice.

1) radar, radio, computer, engineering, television;
2) electronics, control systems, signal processing, mechatronics, physicist, telecommunications;
3) made, produced, generated, referred, formed, shaped, created;
4) copper, silver, conductor, gold, mercury, lead.

Reading

2. Read the text.

ELECTRICAL ENGINEERING

Electrical engineering, sometimes referred to as electrical and electronic engineering, is a field of engineering that deals with the study and application of electricity, electronics and electromagnetism. The field now covers a range of subtopics including power, electronics, control systems, signal processing and telecommunications.

Electrical engineering may or may not include electronic engineering. In some countries electrical engineering is considered to deal with the problems associated with large-scale electrical systems such as power transmission and motor control, whereas electronic engineering deals with the study of small-scale electronic systems including computers and integrated circuits. Alternatively, electrical engineers are usually concerned with using electricity to transmit energy, while electronic engineers are concerned with using electricity to transmit information.

Electricity has been a subject of scientific interest since at least the early 17th century. The first electrical engineer was probably William Gilbert who designed the versorium: a device that detected the presence of statically charged objects. He was also the first to draw a distinction between magnetism and static electricity and is credited with establishing the term electricity. In 1775 Alessandro Volta's scientific experimentations devised the electrophorus, a device that produced a static electric charge, and by 1800 Volta developed the voltaic pile, a forerunner of the electric battery.

In 1827 Georg Ohm quantified the relationship between the electric current and potential difference in a conductor. Michael Faraday discovered electromagnetic induction in 1831, and in 1873 James Clerk Maxwell published a unified theory of electricity and magnetism. During these years, the study of electricity was largely considered to be a subfield of physics. It was not until the late 19th century that universities started to offer degrees in electrical engineering.

In 1882 Edison developed the world's first large-scale electrical supply network. In 1887 Nikola Tesla worked at a competing form of power distribution known as alternating current.

During the development of radio, many scientists and inventors contributed to radio technology and electronics. In 1934 the British military began to develop radar.

In 1941 Konrad Zuse presented the Z3, the world's first fully functional and programmable computer. In 1946 theENIAC (Electronic Numerical Integrator and Computer) of John Presper Eckert and John Mauchly followed, beginning the computing era.

The invention of the transistor in 1947 by William B. Shockley, John Bardeen and Walter Brattain opened the door for more compact devices and led to the development of the integrated circuit in 1958 by Jack Kilby and independently in 1959 by Robert Noyce. In 1968 Marcian Hoff invented the first microprocessor at Intel and thus ignited the development of the PC.

Vocabulary Practice and Grammar Revision

3. Answer the questions:

1. What does electrical engineering as a field of engineering deal with?
2. What is the difference in spicialisation of electrical engineers and electronic engineers?
3. What is the contribution to the field by Georg Ohm? Michael Faraday? James Clerk Maxwell? Edison? Nikola Tesla?
4. What are the stages of developing computers?
5. How did the appearance of the transistor influence the first microprocessor invention?

4. Find in the text the definition of:

1. electrical engineering
2. versorium
3. electrophorus
4. voltaic pile

5. Give Russian equivalents for:

1. electrical engineering
2. referred to as
3. the field now covers
4. a range of subtopics
5. to be considered
6. large-scale electrical systems
7. motor control
8. integrated circuits
9. to be concerned with
10. statically charged objects
11. to draw a clear distinction
12. large-scale electrical supply network
13. a competing form of power distribution
14. ignite the development of the PC

6. Form adjectives from the following nouns by adding the suffix "al" and translate them into Russian:

logic
function
nature
evolution
addition
environment
centre
structure
observation
practice
origin
condition

7. Revise the material on Present and Past Participles. Form Present and Past Participles from the following verbs and use them in the sentences of your own.

to develop
to affect
to increase
to invent
to follow

to face
to result in
to reduce
to devise
to cause

8. Match the English Passive constructions with the Russian equivalents:

a) were devised	1. был разработан
b) was suggested	2. были изобретены
c) will be selected	3. обнаруживаются
d) has been developed	4. был предложен
e) was published	5. был опубликован
f) are being detected	6. будет спроектирован
g) will be designed	7. снижается
h) is being reduced	8. будет отобран

Language Development

9. Agree or disagree with the statements given below. The following phrases may be helpful.

- *You are right.*
- *Not quite.*
- *You are wrong there.*
- *Exactly.*
- *Quite the contrary.*
- *I am afraid. I can't agree with you.*
- *I entirely agree with you.*
- *That's right.*
- *Not at all.*

1. Electrical engineers usually deal with using electricity to transmit information, while electronic engineers are concerned with using electricity to transmit energy.
2. Electricity has been a subject of scientific interest since at least the early 15th century.

3. Michael Faraday developed the voltaic pile, a forerunner of the electric battery.
4. the relationship between the electric current and potential difference in a conductor was quantified by Georg Ohm.
5. Nikola Tesla worked at a competing form of power distribution known as direct current.
6. Radar was developed by the British military.
7. In 1991 Konrad Zuse presented the Z3, the world's first fully functional and programmable computer.
8. The first microprocessor at Intel was developed by Marcian Hoff.

10. Read the text again. Summarize the article in 7-8 sentences. Make use of the following phrases:

- *It is reported that…*
- *… is compared*
- *… is analyzed in detail*
- *The text under discussion reports on…*
- *The main objective (purpose, aim) of the text is…*
- *The text discusses/considers/analyses/deals with/emphasizes…*
- *Much attention is given to…*

11. Translate the text in writing

12. Prepare a report on the topic "Potential applications of electrical engineering".

Scanning reading

13. Read the text without a dictionary. What are its main ideas. Retell the text in English.

MECHATRONICS AND BIOMEDICAL ENGINEERING

Mechatronics is an engineering discipline which deals with the convergence of electrical and mechanical systems. Such combined systems are known as electromechanical systems and have widespread adoption. Examples include automated manufacturing

systems, heating, ventilation and air-conditioning systems and various subsystems of aircraft and automobiles.

The term mechatronics is typically used to refer to macroscopic systems but futurists have predicted the emergence of very small electromechanical devices. Already such small devices, known as micro electromechanical systems (MEMS), are used in automobiles to tell airbags when to deploy, in digital projectors to create sharper images and ininkjet printers to create nozzles for high definition printing. In the future it is hoped the devices will help build tiny implantable medical devices and improve optical communication.

Biomedical engineering is another related to electrical engineering discipline. It is concerned with the design of medical equipment. This includes fixed equipment such as ventilators, MRI scanners and electrocardiograph monitors as well as mobile equipment such as cochlear implants, artificial pacemakers and artificial hearts.

Module 6

Pre-reading

1. Read the title of the text. What do you think the text is about? What do you know on the topic?

Reading

2. Read the text.

PRACTICING ENGINEERS AROUND THE WORLD

In most countries, a Bachelor's degree in engineering represents the first step towards professional certification. After completing a certified degree program the engineer must satisfy a range of requirements (including work experience requirements) before being certified. Once certified the engineer is designated the title of Professional Engineer (in the United States, Canada and South Africa), Chartered Engineer (in India, the United Kingdom, Ireland and Zimbabwe), Chartered Professional Engineer (in

Australia and New Zealand) or European Engineer (in much of the European Union).

The advantages of certification vary depending upon location. For example, in the United States and Canada only a licensed engineer may provide engineering work for public and private clients. This requirement is enforced by state and provincial legislation such as Quebec's Engineers Act. In other countries, such as Australia, no such legislation exists. Practically all certifying organizations play an important role in maintaining ethical standards for the profession that they expect all members. In most countries engineers are subject to contract law. In cases where an engineer's work fails he or she may be punished. An engineer's work must also comply with numerous other rules and regulations such as building codes and legislation on environmental law.

Professional scientific centers for electrical engineers include the Institute of Electrical and Electronics Engineers and the Institution of Engineering and Technology. The Institute of Electrical and Electronics Engineers claims to produce 30% of the world's literature in electrical engineering, has over 360,000 members worldwide and holds over 3,000 conferences annually. The Institution of Engineering and Technology publishes 21 journals, has a worldwide membership of over 150,000, and claims to be the largest professional engineering society in Europe. Upgraiding of technical skills is a serious concern for electrical engineers. Membership and participation in technical societies, regular reviews of periodicals in the field and a habit of continued learning are therefore essential to maintaining proficiency.

The Institute of Electrical and Electronics Engineers is on the 17th floor of 3 Park Avenue in New York City

In countries such as Australia, Canada and the United States electrical engineers make up around 0.25% of the labor force. Outside of these countries, it is difficult to measure the demographics of the profession due to less reporting on labour statistics. However, in terms of electrical engineering graduates per-capita, electrical engineering graduates would probably be most numerous in countries

such as Taiwan, Japan, India and South Korea.

Vocabulary Practice and Grammar Revision

3. Find the following expressions in the text and learn them by heart:

1. инженер-практик
2. степень бакалавра
3. профессиональная аттестация
4. программа высшего образования
5. удовлетворять ряду требований
6. опыт работы
7. присваивается знание
8. дипломированный инженер
9. преимущества аттестации
10. разнятся в зависимости от места
11. обеспечиваться государственным и местным законодательством
12. субъекты договорного права
13. соответствовать многочисленным правилам и инструкциям
14. строительный кодекс
15. экологическое право
16. ежегодно проводит свыше 3000 конференций
17. членство и участие в технических обществах
18. регулярное изучение и анализ периодики по предмету
19. привычка постоянного обучения
20. являются существенными для поддержания профессионального уровня
21. составлять около 0,25% рабочей силы
22. с точки зрения количества электроинженеров на душу населения

4. Give Russian equivalents for:

1. maintaining ethical standards
2. building codes
3. represent the first step towards sth
4. per-capita
5. a certified degree program
6. a serious concern
7. satisfy a range of requirements

8. legislation on environmental law
9. reviews of periodicals in the field
10. work experience requirements
11. is designated the title
12. a habit of continued learning
13. labor force
14. Chartered Engineer
15. vary depending upon location
16. to be subject to contract law
17. Bachelor's degree
18. professional certification
19. advantages of certification
20. upgraiding of technical skills
21. be essential to maintaining proficiency
22. be enforced by state and provincial legislation
23. comply with numerous rules and regulations

5. Answer the questions:

1. What titles can the engineer be designated?
2. When may an engineer provide work for public and private clients under US legislation
3. In what cases may an engineer be punished?
4. What laws, rules and regulations must an engineer's work comply with?
5. What does an engineer have to do to maintaining proficiency?

6. Revise the material on English Modal verbs and their equivalents. Match modal verbs and their equivalents with Russian phrases:

a) are able to carry out	1. возможно, повлияет
b) have to develop	2. должен начаться
c) must look for solution	3. могло бы привести к
d) have to hurry	4. в состоянии выполнить
e) may influence	5. возможно, приведет к
f) could result in	6. должны разрабатывать
g) is to begin	7. вынуждены поторопиться
h) might lead to	8. должны искать решение

7. Translate the following sentences into Russian:

1. This method should be looked upon as the most progressive one.
2. You have to make use of these facts to prove your theory.
3. One must be sure that maintaining proficiency is a serious concern for an engineer.
4. These different aspects of the theory must be taken into account.
5. The engineers should study the problem of using electricity.
6. The scientists have to develop new approaches in the field.
7. Mr. Brown is to make part in the scientific conference on the problems of electricity.
8. One should remember that science is a creative and dynamic activity.
9. We are to take care of the ethical and moral matters of our work.
10. One may watch more and more young people move into engineering.

8. Translate into English. Pay attention to the modals and their equivalents:

1. Никто не смог перевести эту статью.
2. Нам ответить на этот запрос?
3. Вчера мне пришлось подписать контракт.
4. Можно мне воспользоваться вашим компьютером?
5. Мы не сможем закончить эту работу вовремя.
6. - Мы обязательно должны выполнить это задание?
   - Нет, не надо.
7. Согласно контракту, мы должны закончить работу к 10 мая.
8. Эти студенты, вероятно, сейчас в лаборатории.
9. Не могли бы Вы объяснить мне это задание?
10. Вам следует подписать этот контракт.
11. Вам не надо класть сахар в чай. Он сладкий.
12. Мне перевести вопрос?
13. Вчера нам пришлось принять это предложение.
14. Можно мне участвовать в эксперименте?
15. Поезд должен прибыть через час.
16. Эта статья, возможно, для нас интересна.

17. Не могли бы Вы объяснить мне это задание?
18. Вам следует есть меньше соли.

Language Development

9. Agree or disagree with the statements given below. The following phrases may be helpful:

– *I doubt that (if) …*
– *Exactly. Quite so.*
– *It's hardly likely that …*
– *That's wrong, I can't agree that …*
– *Quite the contrary.*
– *I don't think so.*

1. In most countries, a Bachelor's degree in engineering represents the final step towards proficiency.
2. Upgraiding of technical skills is a serious concern for electrical engineers.
3. In the United States and Canada everybody may provide engineering work for public and private clients.
4. Certifying organizations play an important role in maintaining ethical standards for the profession.
5. The Institution of Engineering and Technology publishes 2 journals.
6. An engineer's work must comply with legislation on environmental law.
7. Regular reviews of periodicals in the field and a habit of continued learning are essential to maintaining proficiency.
8. In countries such as Australia, Canada and the USA electrical engineers make up around 25% of the labor force.

10. Read the text again. Render it according to the following scheme:

– *the title of the text is …*
– *the text tells/ runs about …*
– *the main/ central idea is …*
– *to put it in a few words …*
– *the aim of the text is to tell the reader about …*
– *according to the text …*

- *I support the author's idea …*
- *I don't quite agree with the author's point of view concerning …*
- *I'm going to add …*
- *I'd like to point out the following facts that were new to me …*
- *in conclusion I'd like to say …*

11. Translate the text in writing.

12. Prepare a report on the topic "Practicing Engineers in Russia".

Scanning reading

13. Read the following text once without a dictionary. Try to catch the main ideas. Retell the text briefly in English.

EDUCATION IN THE FIELD OF ELECTRICAL ENGINEERING

Electrical engineers typically possess an academic degree with a major in electrical engineering. The length of study for such a degree is usually four or five years and the completed degree may be designated as a Bachelor of Engineering, Bachelor of Science, Bachelor of Technology or Bachelor of Applied Science depending upon the university.

The degree covers physics, mathematics, computer science, project management and specific topics in electrical engineering. Initially such topics cover most, if not all, of the sub-disciplines of electrical engineering. Students then choose to specialize in one or more sub-disciplines towards the end of the degree.

Some electrical engineers also choose to pursue a postgraduate degree such as a Master of Engineering/ Master of Science (MEng/MSc), a Master of Engineering Management, a Doctor of Philosophy (PhD) in Engineering, an Engineering Doctorate (EngD), or an Engineer's degree. The Master and Engineer's degree may consist of eitherresearch, coursework or a mixture of the two. The Doctor of Philosophy and Engineering Doctorate degrees consist of a significant research component and are often viewed as the entry point to academia. In the United Kingdom and various other European countries, the Master of Engineering is often considered

an undergraduate degree of slightly longer duration than the Bachelor of Engineering.

Module 7

Pre-reading

1. What kind of work might electrical engineers do? Read the title of the text. What do you think the text is about?

Reading

2. Read the text.

TOOLS AND WORK

From the Global Positioning System to electric power generation, electrical engineers have contributed to the development of a wide range of technologies. They design, develop, test and supervise the deployment of electrical systems and electronic devices. For example, they may work on the design of telecommunication systems, the operation of electric power stations, the lighting and wiring of buildings, the design of household appliances or the electrical control of industrial machinery. Sattelite communications is one of many projects engineer might work on.

Fundamental to the discipline are the sciences of physics and mathematics as these help to obtain both a qualitative and quantitative description of how such systems will work. Today most engineering work involves the use of computers and it is commonplace to use computer-aided design programs when designing electrical systems. Nevertheless, the ability to sketch ideas is still invaluable for quickly communicating with others.

Although most electrical engineers will understand basic circuit theory (that is the interactions of elements such as resistors, capacitors, diodes, transistors and inductors in a circuit), the theories employed by engineers generally depend upon the work they do. For example, quantum mechanics and solid state physics might be relevant to an engineer working on VLSI (the design of integrated circuits), but are largely irrelevant to engineers working with macroscopic electrical systems. Even circuit theory may not be

relevant to a person designing telecommunication systems that use off-the-shelf components. Perhaps the most important technical skills for electrical engineers are reflected in university programs, which emphasize strong numerical skills, computer literacy and the ability to understand the technical language and concepts that relate to electrical engineering.

For many engineers, technical work accounts for only a fraction of the work they do. A lot of time may also be spent on tasks such as discussing proposals with clients, preparing budgets and determining project schedules. Many senior engineers manage a team of technicians or other engineers and for this reason project management skills are important. Most engineering projects involve some form of documentation and strong written communication skills are therefore very important.

The workplaces of electrical engineers are just as varied as the types of work they do. Electrical engineers may be found in the modern lab environment of a fabrication plant, the offices of a consulting firm or on site at a mine. During their working life, electrical engineers may find themselves supervising a wide range of individuals including scientists, electricians, computer programmers and other engineers.

Vocabulary Practice and Grammar Revision

3. Find the following in the text:

1. Глобальная навигационная спутниковая система
2. производство электроэнергии
3. внедрение электрических систем
4. освещение и электрификация зданий
5. проектирование бытовых электроприборов
6. электрорегулирование промышленного машиностроения
7. получить как качественные, так и количественные описания
8. включает использование
9. обычным является использование
10. программы автоматизированного проектирования
11. всё ещё непереоценимо
12. общая теория схем
13. конденсаторы
14. квантовая механика
15. физика твёрдого тела

16. актуальна для инженера
17. СБИС (сверхбольшая интегральная схема)
18. электрические макросистемы
19. используют серийные (готовые) компоненты
20. прочные вычислительные навыки
21. отчёты о технической работе
22. составление графиков проекта
23. ведущие инженеры управляют коммандой специалистов
24. так же разнообразны, как и типы работы
25. в современной лабораторной среде
26. сборочного завода
27. на участке шахты
28. оказаться руководящими целым рядом лиц

4. Answer the questions:

1. What kind of technologies have electrical engineers contributed?
2. Why are the sciences of physics and mathematics fundamental to the discipline?
3. What do the theories employed by engineers generally depend upon?
4. What are the most important technical skills for electrical engineers?
5. What do the workplaces of electrical engineers depend on?
6. Why are management skills important for electrical engineers?
7. What kind of individuals may electrical engineers supervise?

5. Revise the material on Sequence of Tenses. Fill in the gaps:

1. Ann said that Jack and Mary ... month.
a. are getting married next
b. were getting married the following
c. have got married the following
d. will get married next

2. My friend says he ... that film but he didn't like it.
a. has seen
b. would see
c. had seen
d. sees

3. Tom asked if ... about the changes in the plan.
a. did the other know
b. the other knew
c. had the other known
d. do the other know

4. I asked why ... for a new job.
a. is he looking
b. he is looking
c. was he looking
d. he was looking

5. The examiner asked how long ... English.
a. I had been learning English
b. I have been learning English
c. had I been learning English
d. I am learning English

6. Mr. Bell asked when ... to London.
a. Mary will fly
b. Mary would fly
c. would Mary fly
d. will Mary fly

7. Peter said he ... month.
a. was taking his exam the following
b. was taking his exam next
c. is taking his exam the following
d. is taking his exam next

8. I didn't know that you ... that book.
a. have already read
b. had already read
c. already read
d. would already read

9. You did it better than I ... .
a. expect
b. expected
c. have expected

d. had expected

6. Translate the sentences into English:

1. Он рассказал мне, где он был вчера.
2. Том спросил, знаю ли я новость.
3. Мери спросила, бывал ли я в Лондоне.
4. Анна сказала своему другу, чтобы он её встретил.
5. Учитель сказал нам не опаздывать на занятия.
6. Она сказала, что она уезжает в Москву завтра.
7. Учитель сказал переводить предложения.
8. Мама спросила мальчика, почему он плачет.
9. Студенты говорят, что они будут сдавать экзамены в следующем месяце.

7. Make up the sentences of your own with these verb-phrases:

to be of interest (value, importance, significance)
to come into use (action, play, into being)
to go into play (service, practice, particulars)
to bring into action (use)
to put into (use, operation, practice)
to take (advantage of, care of, part in) place, into account of, into consideration
to give (consideration, mention, account)
to be in (excess, progress, a position, under way)
to be interested in (natural sciences, the problem, research)
to be under way (the study, programme, search, research)
to deal with (people, the problem, animals, the study)

8. Translate the sentences into Russian:

1. Research work and experimental investigation are constantly in progress to find materials with protections better than those in use.
2. So we are now in a position to determine these properties.
3. The study of space on a large scale with scientific instruments is under way.
4. The protection of seas from drift netting is of great significance.
5. We cannot say with certainty how the

solar system had come into being.
6. A new radar went into service last year.
7. When planning communication in space we must take into account the ionosphere.
8. The application of new methods let give an account of devastating effects on the environment.

9. Work with a partner. Make as many words as you can by adding prefixes (e. g. re, un, in, etc.) or suffixes (e. g. tion, ence, ic, etc) to the words below:

inform	important	acid
response	diverse	populate
science	depend	oxide
construct	act	protect
produce	number	new

10. Fill in the correct preposition, then choose any five of them and make sentences:

1. to account … sth/sb
2. to be important … sth/sb
3. to be optimistic/pessimistic … sth
4. to be available … sth/sb
5. investment … sth/sb
6. concentration … sth
7. a concentration … sth
8. to get benefit … sth
9. to have the benefit … sth
10. to depend … sth
11. to consist … sth
12. to be interested … sth/sb
13. a variety … sth
14. to be accurate … sth

11. Choose the correct future form:

1. Next month Ann ……. a conference in London on electricity.
2. A am taking part B will have been taking part C takes part

3. This time next Friday, we …… an experiment.
4. A will make B will be making C are going to make
5. We hope our assumption …… right.
6. A will be B will have been C is going to be
7. These observations …… by the end of the year.
8. A will be finish B will have been finished C are going to be
9. By the end of the year, Tom ……. at the laboratory for ten years.
10. A will work B will have been working C will be working
11. This time next Friday, we …… an experiment.
12. A will make B will be making C are going to make
13. She ……. an experiment in electricity this year.
    A will make B will be making C is making

Language Development

12. Comment upon the following problems, use the expressions given below:

- *I suppose you know that … .*
- *I hope you will find it of interest to learn (that) … .*
- *I would like to start by describing … .*
- *According to what I know … .*
- *It should be mentioned (that) … .*
- *I would like to emphasize (that) … .*
- *As to me, I am of the opinion (that) … .*
- *I wish to finish by emphasizing (that) … .*

1. Fundamental to the discipline are the sciences of physics and mathematics.
2. The most important skills for electrical engineers are strong numerical skills, computer literacy and the ability to understand the technical language and concepts.
3. Many senior engineers manage a team of technicians or other engineers and for this reason project management skills are important.

4. Most engineering projects involve some form of documentation and strong written communication skills are therefore very important.
5. The workplaces of electrical engineers are just as varied as the types of work they do.Discuss in groups of three one or more of the important questions raised in the text. Then present your ideas to the whole group.

13. Write an sabstract of the text in 100-120 words.
14. Translate the text in writing.
Scanning reading

15. Read the following texts once without a dictionary. Try to catch the main ideas. Retell the text briefly in English.

POWER

Power engineering deals with the generation, transmission and distribution of electricity as well as the design of a range of related devices. These include transformers, electric, generators, electric motors, high voltage engineering and power electronics. In many regions of the world, governments maintain an electrical network called a power grid that connects a variety of generators together with users of their energy. Users purchase electrical energy from the grid, avoiding the costly exercise of having to generate their own. Power engineers may work on the design and maintenance of the power grid as well as the power systems that connect to it. Such systems are called *on-grid* power systems and may supply the grid with additional power, draw power from the grid or do both. Power engineers may also work on systems that do not connect to the grid, called *off-grid* power systems, which in some cases are preferable to on-grid systems. The future includes Satellite controlled power systems, with feedback in real time to prevent power surges and prevent blackouts.

CONTROL

Control systems play a critical role in space flight. Control engineering focuses on the modeling of a diverse range of dynamic systems and the design

of controllers that will cause these systems to behave in the desired manner. To implement such controllers electrical engineers may use electrical circuits, digital signal processors, microcontrollers and PLCs (Programmable Logic Controllers). Control engineering has a wide range of applications from the flight and propulsion systems of commercial airliners to the cruise control present in many modern automobiles. It also plays an important role in industrial automation. Control engineers often utilize feedback when designing control systems. For example, in an automobile with cruise control the vehicle's speed is continuously monitored and fed back to the system which adjusts the motor's power output accordingly. Where there is regular feedback, control theory can be used to determine how the system responds to such feedback.

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