МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РОССИЙСКОЙ ФЕДЕРАЦИИ

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Кафедра иностранного языка и филологии

А.В. ОРЛОВ

АНГЛИЙСКИЙ ЯЗЫК

Учебное пособие для студентов I курса УГСН 140000 «Энергетика, энергетическое машиностроение и электротехника»

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Настоящее учебное пособие предназначено для студентов I курса технического вуза УГСН 140000 «Энергетика, энергетическое машиностроение и электротехника». Целью пособия является формирование и развитие у студентов лингвопрофессиональной компетентности, позволяющей владеть различными техниками чтения для извлечения профессионально значимой информации по специальности; систематизировать знание грамматических структур и явлений, характерных для научно-технической литературы; осуществлять общение на английском языке в сферах профессиональной и бытовой коммуникаций.

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Рецензенты:

к.т.н., доцент, зав. кафедрой ЭЭ РИИ Н.И. Черкасова
к.п.н., доцент, зав. кафедрой ИЯиФ И.Н. Языкова

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PREFACE

Настоящее учебное пособие предназначено для студентов технического вуза УГСН 140000 «Энергетика, энергетическое машиностроение и электротехника», изучающих английский язык на I курсе и имеющих базовую школьную подготовку по иностранному языку. Учебное пособие состоит из 6 уроков и рассчитано на 68 часов аудиторных занятий и 76 часов внеаудиторной самостоятельной работы студентов

Основной целью пособия является формирование и развитие у студентов лингвопрофессиональной компетентности, т.е. обучение различным видами чтения - изучающего, поискового и просмотрового; обучение современным приемам перевода научно-технической литературы; обучение как письменной, так и устной форме общения в сферах профессиональной и бытовой коммуникаций.

Учебное пособие разработано на основе оригинальных технических текстов по изучаемой специальности. Логическая последовательность и содержание учебного материала формируют начальные представление о будущей профессии и соответствуют принципам профессионально-ориентированного обучения иностранным языкам. Каждый текст информативен, содержит необходимые словарные единицы и техническую терминологию, отражающие специфику будущей профессии, что повышает мотивацию изучения языка.

Разнообразные по содержанию лексические упражнения способствуют закреплению и расширению словарного запаса студента. Каждый урок базируется на определенной грамматической теме и включает дидактические единицы, соответствующие содержанию изучаемых учебных модулей по данному направлению подготовки.

Дискуссии, ролевые игры и другие приемы интерактивного обучения затрагивают сферу профессионально-личностных интересов студентов и расширяют область применения полученных знаний.

Содержание настоящего учебного пособия соответствует ФГОС ВПО УГСН 140000 «Энергетика, энергетическое машиностроение и электротехника».

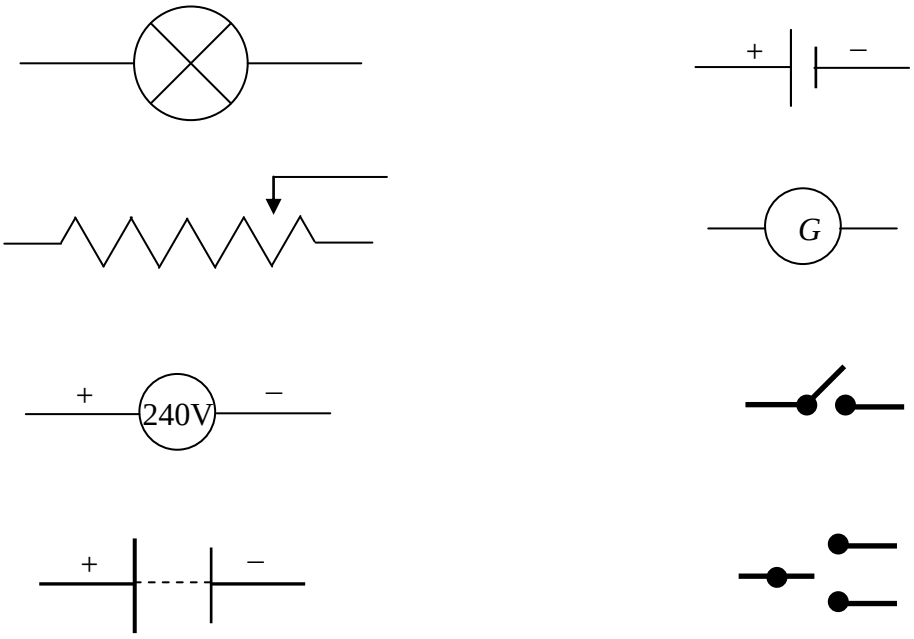
LESSON 1

Text A. THE CONCEPT OF ELECTRICITY

Mankind has been interested in electricity though out the ages.

Thrilled and mystified by lightning people have tried to learn about the force behind it for hundreds of years.

Electricity is invisible, and it is difficult to comprehend something you cannot see. It took scientists and researches a lot of time and effort to find out and state the basics of electrical phenomena in order to obtain a sound knowledge of electrical theory based on characteristics and behavior of electricity.



At present the nature of electrification is explained by the electron theory. The most essential point is that electrical current is a flow of electrons, which are negatively charged particles that orbit the nucleus of an atom.

Normally, an atom has the same number of protons (positively charged particles in the nucleus) as electrons (negatively charged particles), so they balance each other out.

But if an electron is taken away by a chemical reaction, magnetic induction, or friction, the atom becomes a positive ion. When an electron is added, the atom turns into a negative ion. Electrons move from negative ions to positive ions thus filling the voids, and this movement is at nearly by the speed of light, which is 300,000 kilometres per second..

In fact, electricity can be defined as a means of moving energy from one place to another.

If you push one electron into wire, one will come out at the other end.

Electrical theory is mostly based on this major principle: Electrons are not created or destroyed when current is made and used; they just circulate.

Useful Terms and Phrases:

mankind	человечество
force	сила
lightning	молния
invisible	невидимый
to comprehend	понимать
phenomenon	явление
sound	прочный
behavior	поведение
electrical current	электрический ток
nucleus	ядро
number	число
to add	добавлять
void	пустота

I. Find in the text:

1. international words;
2. electrical terms.

II. Find the English equivalents in the text to the following:

на протяжении веков, со скоростью света, заполнять пустоты, прочные знания, электрические явления.

III. Translate into Russian the following word combinations:

thrilled and mystified by lightning, the nature of electrification, characteristics and behavior of electricity.

IV. Which word is odd here?

- to understand, to confuse, to comprehend, to grasp;
- unseen, invisible, imperceptible, apparent;
- weakness, force, strength, vigor;
- manner, misconduct, behavior, line of action.

V. Answer the following questions:

1. What has mankind been interested in for ages?
2. Why is it so uneasy to understand electrical phenomena?
3. What theory is used to identify the nature of electrical current?
4. What happens to an atom if an electron is taken away and vice versa?
5. How can electricity be defined?

VI. Make up sentences observing the word-order rules:

1. to, breakfast, I, after, the, Institute, go.
2. I, in, now, must, am, morning, the, and, get up, student, early, a, and.
3. at 8:30 a.m., end, and, start, classes, at 3:20 p.m.

VII. Read and translate the sentences. Comment on the words in bold type:

1. *The news* doesn't surprise me.
2. *The scissors* are blunt.
3. *The goods* have arrived.
4. Your *advice* is very timely. Thank you.
5. *Physics* is my favorite subject.
6. There are many *fish* in this river.
7. *Fruit* is rich in mineral salts and vitamins.
8. Strange *phenomena* happen on that planet.
9. The *nuclei* of heavy metals are different.

VIII. Insert a proper verb form:

1. My friend (to be) a student.
2. Our lectures (to begin) at 8:30 a.m. tomorrow.
3. We (to get) these books from the library last week.

4. She (to be) in Italy last year.
5. Students (to have) five exams next summer.
6. When I (to come) home, my mother (to cook) dinner.
7. I (to lie) on the beach this time next summer.
8. I never (to be) to Great Britain.
9. She (to finish) the work by 5 o'clock tomorrow.
10. She (to translate) a very difficult text before he came.

IX. Put in the right answer:

1. Do you remember … facts from your school life?
   a) some b) any c) no

2. We don't have … information on this problem.
   a) some b) any c) no

3. … young men are students.
   a) This b) Its c) These

4. I read … article long ago.
   a) these b) that c) those

5. This is … watch and that is … .
   a) mine, her b) hers, my c) my, hers

6. There is … light in the sitting room.
   a) few b) a few c) little

7. He has … friends.
   a) a few b) little c) a little

8. Show … your new flat.
   a) themselves b) them c) they

Text B. TYPES OF CURRENTS

Current is a flow of electricity through a circuit. Let us consider two main types of current: direct and alternating. A direct current (d. c.) flows

through a conducting circuit in one direction only. It flows provided a direct voltage source is applied to the circuit.

An alternating current (a. c.) is a current that changes its direction of flow through a circuit. It flows provided an alternating voltage source is applied to the circuit. An alternating current flows in cycles. The number of cycles per second is called the frequency of the current. In a 60-cycle alternating current circuit the current flows in one direction 60 times and in the other direction 60 times per second.

It is easy to transform a. c. power from one voltage to another by a transformer. Transformers are also used to step down the voltage at the receiving point of the line to the low values that are necessary for use.

When necessary a. c. can be changed into d. c. but this is seldom necessary.

Useful Terms and Phrases:

flow	поток, течение
to flow	течь
to consider	рассматривать
circuit	цепь
alternating	переменный
direct	постоянный
cycle	цикл
direction	направление
per second	в секунду
frequency	частота

I. Please indicate which sentence corresponds to the text:

1. a) A d.c. is a current that changes its direction of flow.
   b) A d.c. is a current that flows in one direction.
   c) A d.c. is a current that never flows in one direction.

2. a) An a.c. flows provided a direct voltage source is applied.
   b) An a.c. flows provided an alternating voltage source is applied.
   c) An a.c. flows provided a combined voltage source is applied.

3. a) In an alternating current circuit a current flows 60 times per second in one direction.
   b) In an alternating current circuit a current flows 60 times in one direction and in the other direction 60 times per second.
   c) In an alternating current circuit a current flows 60 times in one direction and fails to flow in the other direction.

II. Find the English equivalents in the text to the following:

при условии, количество циклов, частота тока, понижать напряжение, рассмотрим.

III. Translate into Russian the following word combinations:

when necessary, the receiving point of the line, the frequency of the current, through a circuit.

IV. Match the words in both columns:

to change	необходимый
source	низкий
voltage	применять
low	источник
necessary	напряжение
to apply	величина
value	изменить

V. Answer the following questions:

1. What is current?
2. What types of currents do you know?
3. When does a direct current flow?
4. What type of current is called an alternating current?
5. What type of current is called a direct current?

VI. Determine the main idea of the text:

1. A double-current nature of electricity.
2. The application of specific voltage sources.

3. Transformation of a.c. into d.c.

VII. Fill in the articles “a” or “the”:

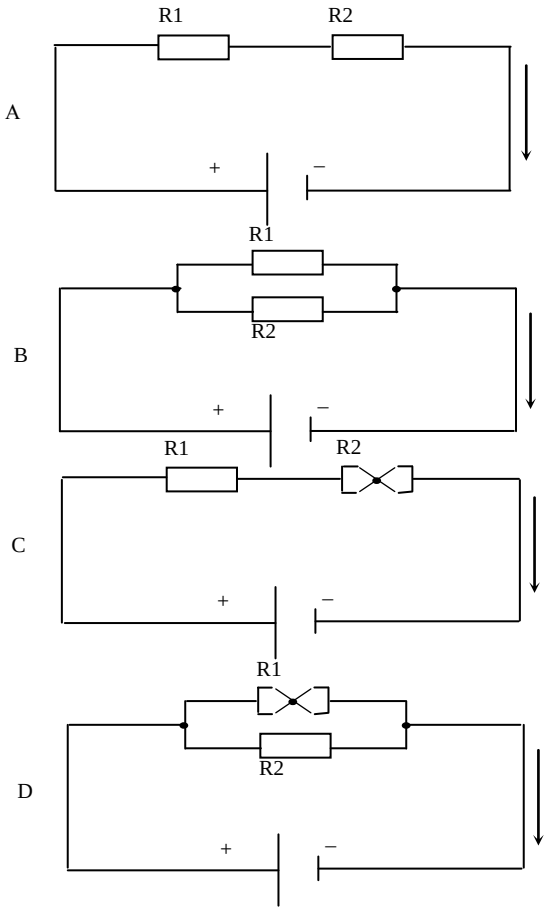
1. Russia is … greatest country in … world.
2. I am studying to become … engineer.
3. I liked … film I saw yesterday.
4. … Earth is millions of kilometers from … Sun.
5. Rubtsovsk is not … small town in Siberia.
6. I’ll be back in … hour.
7. She is such … clever student.
8. … water in this river is very cold today.
9. This is … most interesting book I have read on this subject.
10. As … rule I do homework in … evening.

VIII. Fill in the proper verb:

1. There (is/are) 12 students in our group.
2. There (was/were) little snow last winter.
3. (Are/is) there a good cinema in your town?
4. There (was/were) a big sofa and four arm-chairs in the sitting room.
5. There (has/have) been a steep rise in prices recently.

LESSON 2

Text A. SERIES CIRCUITS AND PARALLEL CIRCUITS



Compare circuits A and B. Circuit A consists of a voltage source and two resistors. The resistors are connected in series. Circuit A is a series circuit.

Circuit B consists of a voltage source and two resistors. The resistors are connected in parallel. Circuit B is a parallel circuit. A parallel circuit has the main line and parallel branches.

In circuit B the value of voltage in RI equals the value of voltage in R2. The value of voltage is the same in all the elements of a parallel circuit while the value of current is different. A parallel circuit is used in order to have the same value of voltage.

In circuit A the value of current in RI equals the value of current in R2. The value of current is the same in all the elements of a series circuit while the value of voltage is different. A series circuit is used in order to have the same value of current. In circuit C a trouble in one element results in no current in the whole circuit. In circuit D a trouble in one branch results in no current in that branch only. A trouble in the main line results in no current in the whole circuit.

Useful terms and Phrases:

to compare	сравнивать
value	величина
series	последовательный
to equal	равняться
in order to	для того, чтобы
main	главный
the same	тот же самый
line	линия

voltage drop	падение напряжения

I. Make up sentences from the following phrases:

1. A series circuit …	has	a. from a trouble in the main line.
2. A parallel circuit …	is used	b. in order to have the same value of current.
3. No current in a parallel circuit …	results	c. the main line and parallel branches.
4. In a parallel circuit a trouble in one branch …		d. in no current in that branch only.

II. Fill in the blanks with missing words given in brackets:

1. Resistors connected … have different values of … , while resistors … in parallel have … value of voltage. (the same, voltage, connected, in series)
2. A … in one element of a series circuit results in no … in the whole circuit, while a trouble in one element of a … circuit results in no current in that … only. (parallel, trouble, branch, current)
3. … to have the same value of current in all elements a … circuit is used, while in order to have the same … in all elements a … circuit is used. (value of voltage, series, parallel, in order)
4. No current in a parallel … results from a trouble in the main … while no current in a … circuit results from a trouble in … element. (one, series, circuit, line)

III. Find the translation of the words in the right column:

to connect	цепь
to consist	различный
value	источник напряжения
current	соединять
circuit	состоять
different	величина
voltage source	ток

IV. Find the English equivalents in the text:

соединены параллельно, ответвления, равняться, величина напряжения, величина тока, во всей цепи.

V. Answer the following questions:

1. What type of circuit has the main line and parallel branches?
2. What type of circuit is used in order to have the same value of current in all the elements?
3. What type of circuit is used in order to have the same value of voltage in all the elements?
4. What does a trouble in the main line result in?
5. What does a trouble in a branch result in?
6. What does no current in a series circuit result from?
7. What is the difference between series and parallel circuits?

VI. a) Discuss advantages and disadvantages of a series circuit.

b) Discuss advantages and disadvantages of a parallel circuit.

VII. Find out which sentence corresponds to the text:

a) The circuit consisting of a voltage source and two resistors is a parallel circuit.
b) The circuit consisting of a voltage source and two resistors connected in parallel is a parallel one.
c) The circuit consisting of a voltage source and two resistors connected in series forms a parallel circuit.

VIII. Put in the right answer:

1. She is the … student of our group.
   a) best b) better c) good

2. Socrates was … Greek of all.
   a) a wiser b) the most wise c) the wisest d) more wise

3. That was … day in my life.

a) worse b) the worst c) the baddest d) the most worst

4. Let's discuss … news a little bit … , shall we?
   a) the last, late b) the lastest, later c) the latest, later

5. This is … building in our town.
   a) an older b) the eldest c) the most old d) the oldest

6. He is … son in the family.
   a) the oldest b) the eldest c) the most old d) an older

7. To my mind Pushkin is … talented than Lermontov.
   a) more b) better c) least d) further

8. Ann is … to us than Maxim.
   a) the most friendly b) friendlier c) more friendly d) friendly

9. Do you speak English … German?
   a) better b) as good as c) as well as d) worse

10. He wants to buy … car.
    a) not so expensive b) a most expensive
    c) the expensive d) as much expensive

Text B. PRACTICAL UNITS

The main units in electrical engineering are those relating to current, pressure or voltage, resistance, power and energy. As we know an electrical current is a flow of electrons along specified conductors. It is an electrostatic force that pushes current around a circuit.

You can call it voltage potential, or the difference in the pressure on the electrons between the two ends of the circuit.

One volt (named after the Italian scientist and Count Alessandro Volta, 1745-1827) is the force needed to push one ampere through one ohm. Or, one volt equals the difference in electrical potential between two points on a wire carrying a constant one-ampere current when the power dissipated between the points is one watt.

An ampere (which appellation commemorates the French mathematician A.M. Ampere, 1775-1836), commonly referred to as an “amp”, is cuolomb per second. A cuolomb is a charge of six quintillion electrons (that is, a six followed by 15 zeros). To put it another way, it is the quantity of electricity that is moving, somewhat like the number of litters or gallons a water hose can supply per second.

One ohm (from the German physicist Georg Simon Ohm, 1787-1854) is the resistance to electron flow that is present if moving one ampere through the resistor and produces a one-volt drop. In other words, one ampere requires one volt to be forced through one ohm. To continue our hydraulic illustration, it can be likened to a restriction in a water hose.

Watts (after Scottish engineer James Watt, 1736-1819) are similar to horse power. In fact, one horse power translates into 745 watts. One watt is a unit of power equal to one joule per second, a joule being a unit of energy equal to the work done when one ampere is passed through one ohm for one second. You can get watts by multiplying volts times amps. So, a five ampere bulb on twelve volts is burning 60 watts.

In a circuit in which a steady direct current is flowing there is a direct relation between the current, voltage, and resistance, temperature remaining constant, and this is expressed by what is known as Ohm’s law.

The law is represented by the following equation:

$I = E/R$ I – current in amps
R – resistance in ohms
E – pressure in volts

You can calculate the ohms or resistance in the load by using the formula ohms equal volts divided by amperes.

Useful Terms and Phrases:

unit	единица измерения
to relate to	относиться к
resistance	сопротивление
power	мощность
force	сила
pressure	давление
scientist	ученый
point	точка
to dissipate	распределять, рассеивать

to commemorate	служить напоминанием
to refer to	обозначать, ссылаться
cuolomb	кулон, единица количества эл. заряда
charge	заряд
water hose	водяной шланг
physicist	физик
drop	падение
to liken	сравнивать
a restriction	помеха, препятствие
horsepower	лошадиная сила
joule	джоуль
to multiply	умножать
relation	зависимость
equation	уравнение

I. Find in the text:

a) international words;
b) mathematical terms and units.

II. Translate into Russian the following word combinations:

relating to, the force needed, the power dissipated between, commonly referred to, to put it another way, a direct relation.

III. Find the English equivalents in the text to the following:

именно электростатическая сила перемещает ток в цепи, разница электрических потенциалов, другими словами, можно сравнить с, одна л.с. равна, выражается уравнением.

IV. Answer the following questions:

1. How can an electrical current be defined?
2. What pushes current around a circuit?
3. What is an ampere? Whom is it named after?
4. What is a volt? Whom is it named after?
5. What is an ohm? Whom is it named after?

6. What is a watt? Whom is it named after?
7. How can you get one watt?
8. What equation is used to demonstrate Ohm's law?

V. Find out whether these sentences are true, false or have nothing to do with the text:

1. The water hose analogy is often used to help people visualize what happens in a circuit.
2. A hydraulic illustration seems to aid understanding electricity as a volume of water in liters or gallons supplied per second by a water hose.
3. The hydraulic explanation fails to give a sound knowledge of the electricity behavior.

VI. Choose the right answer:

1. He … his job last month and since then he … out of work.
   a) lost, has been b) lost, was c) lost, had been d) had lost, was

2. When I … at school, I often … on case studies.
   a) studied, had worked b) had studied, worked
   c) studied, worked d) has studied, had worked

3. Jane … from Jim for a long time, but yesterday she … to see him in the street.
   a) has not heard, had happened b) has not heard, happened
   c) not heard, has happened d) hear, happens

4. He … some money last week. But I am afraid he already … it all.
   a) has earned, has spent b) earned, spent
   c) had earned, had spent d) earned, has spent

5. John … a very interesting article yesterday but Jane … not … it yet.
   a) read, has read b) has read, read
   c) had read, has read d) read, read

VII. Discussion.

You continue learning English at the Institute. As you have already realized the institute's course of English is different from what you studied at school. To a greater extent it is based on your future profession, it deals with technical terms and engineering phenomena. Why do you think it is important for a modern engineer to study a foreign language?

a) Read pros and cons given in the table. Think and give your reasons.

For	Against
1. I can learn more about my future speciality and keep in touch with latest technological innovations by reading scientific journals and papers. 2. I am sure to get a well-paid job in a good company. 3. A good knowledge of English ensures steady promotion. 4. I can travel world-wide and communicate freely with various people.	1. It takes a lot of time and effort to learn any foreign language. 2. Learning a foreign language is just a waste of time since I may find anything I need translated into Russian in Internet. 3. There are a lot of professional translators who can do this work. 4. Hi-tech gadgets have come to the market. They are able to translate any language.

b) Discuss the problem in groups of 3-5 students.

The following expressions may help you

to speak up your opinion:

As far as I am concerned…
I think …
To my mind …
I'd like to point out …
To begin with …
I have a remark …

to agree with somebody:

Yes, I agree (with you).
You are quite right.

I believe so.
It makes sense to me.

to disagree with somebody:

I don’t get the point.
It’s not (entirely) true.
I cannot agree with you.
I don’t think so.

c) Fill in the chart and give your reasons for your decision.

	Group 1	Group 2	Group 3
A future engineer should study a foreign language.			+
A future engineer should not study a foreign language.		-	

LESSON 3

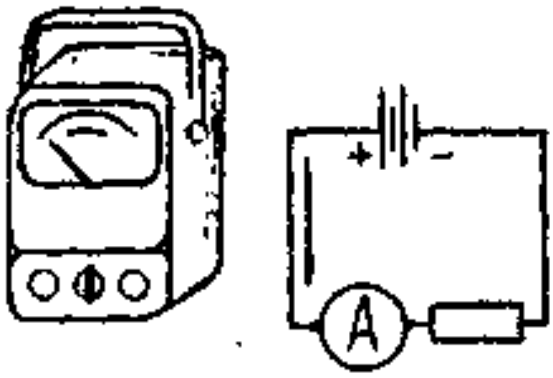
Text A. METERS

Any instrument which measures electrical values is called a meter. An ammeter measures the current in amperes. The unit is named after Andre Marie Ampere, a French scientist, who discovered a great number of facts about electricity over a hundred years ago. The abbreviation for the ampere is amp. A voltmeter measures the voltage and the potential difference in volts. The volt is named after Alessandro Volta, an Italian scientist.

The most common meters used are the ohmmeter, the ammeter and the voltmeter. The ohmmeter is used to measure the value of resistance. It consists of a milliammeter calibrated to read in ohms, a battery and resistors. The meter is connected in parallel and the circuit is not opened

when its resistance is measured. The readings on the scale show the measured value.

The ammeter is used to measure the value of current. When the ammeter is used the circuit should be opened at one point and the terminals of the meter should be connected to it. One should take into



consideration that the positive terminal of the meter is connected to the positive terminal of the source; the negative terminal – to the negative terminal of the source.

The ammeter should be connected in series. The readings on the scale show the measured value.

Useful Terms and Phrase:

meter	измерительный прибор
abbreviation	сокращение
to measure	измерять
scale	шкала
take into consideration	принять во внимание
readings	показания
terminal	клемма

I. 1) Find out which sentence is not true:

a) The ammeter is a common meter.
b) The ammeter is a multi-purpose meter.
c) The ammeter is easy to use.

2) Find out which sentence is true:

a) In order to measure the value of current the ohmmeter is used.

b) In order to measure the value of current the voltmeter is used.
c) In order to measure the value of current the ammeter is used.

3) Find out which sentence is not from this text:

a) When the ammeter is used the circuit should be opened.
b) The ammeter should be connected in series.
c) Digital ammeters are becoming common place now.

II. Complete the sentence using the following endings:

1. The ohmmeter is used to measure the value of resistance …	a. while the ohmmeter should be connected in parallel.
2. The ammeter is connected in series …	b. and the circuit should be closed when the ohmmeter is used to measure the value of resistance.
3. When the ammeter is used to measure the value of current the circuit should be opened …	c. while the ammeter is used to measure the value of current.

III. Match the words given in columns:

to measure	ученый
common	соединять
in series	клемма
scientist	измеряемая величина
terminal	обычный
to connect	измерять
measured value	последовательно

IV. Which word is odd here:

- common, typical, rare, wide-spread;
- scholar, scientist, a man of learning, amateur;
- to handle, to employ, to apply, to use, to neglect;
- to disconnect, to join, to put together, to link.

V. Answer the following questions:

1. What instrument is used to measure voltage?

2. What instrument is used to measure current?
3. What instrument is used to measure resistance?
4. How many terminals has a meter?
5. How should an ammeter be connected with other devices in a circuit?
6. How must the voltmeter be connected with the load to be measured?
7. Must electrical power be disconnected when using an ohmmeter?

VI. Name the major idea of the text:

1. Application of various meters to measure electrical values.
2. How to measure the value of current.
3. How to connect different meters in order to measure electrical values.

VII. Insert a proper modal verb given below:

1. Who says A … say B.
2. I know you … do it because you have the courage.
3. Warm thoughts … fill the day with sunshine.
4. I told him that he … go home.
5. Law makers … not be law breakers.
6. She … be bad at music.
7. You … learn to tolerate those of us who are rather more incompetent.
8. I … find my purse anywhere.
9. You … hurry. There is plenty of time.
10. … I ask you a question?

---

may, can, might, should, must, cannot, must, can, needn't, must

Text B. WATTMETER AND RHEOSTAT

A wattmeter is used to measure the value of power. It is connected to the circuit directly. A wattmeter consists of coils: two fixed coils and a coil which moves in the magnetic field produced by the fixed coils. Wire used for the coils must have a high resistance; the fixed coils are in series with the load, the moving coil is connected across the line in series with a resistance. When a wattmeter is used, the readings on its scale show the value of power being used.

A rheostat is a resistor whose resistance value may be varied. Thus, a rheostat is a variable resistor.

It is used to change the resistance of circuits, and in this way to vary the value of current.

A rheostat consists of a coil and a switch. Take into consideration that wire used for the coil must have a very high resistance. When a rheostat is used its terminals are connected in series with the load. The switch is used to change the length of the wire through which the measured current passes. The resistance may be changed to any value from zero to maximum.

The longer the rheostat wire used in the circuit is, the greater the resistance is.

Useful Terms and Phrases:

coil	катушка
magnetic field	магнитное поле
wire	провод, проволока
power	мощность
resistance	сопротивление
to vary	менять

I. Translate into Russian the following word combinations:

a wattmeter is used to measure, take into consideration, to any value from zero to maximum, the measured current, in this way.

II. Find the English equivalents in the text:

показания на шкале, применяется для изменения сопротивления цепей, величина тока, длина провода, последовательно с нагрузкой.

III. Match the words in both columns:

high resistance	постоянная катушка
terminals	поле
a fixed coil	наконечники, клеммы
a load	высокое сопротивление

a field	нагрузка

IV. Make up sentences from the following phrases:

1. A wattmeter …	is to change	a. in series with the load.
2. The purpose of the rheostat …	consists of	b. to measure the value of power.
3. A rheostat …	connected	c. a coil and a switch.
4. The terminals of a rheostat …	is used	d. the resistance of circuits.

V. Answer the following questions:

1. Why do we use a wattmeter?
2. What does it consist of?
3. How is it connected?
4. What is a rheostat?
5. What does it consist of?
6. How can the resistance be changed by using a rheostat?
7. What kind of readings appear on the scale of a rheostat?

VI. Find out whether these sentences are true, false or have nothing to do with the text:

1. A rheostat is designed to regulate electrical current.
2. When using a rheostat its terminals are always connected in parallel with the load.
3. The application of a rheostat is intended for a trouble shooting job in electric circuits.

VII. Sum up what the text says about:

1. the wire in both the wattmeter and rheostat;
2. the function of a switch.

VIII. Read and translate the following sentences. Comment on the use of tenses:

1. The train arrives at 10 o’clock tomorrow.

2. I will call you as soon as I get home.
3. We are having guests tonight.
4. He is going to take part in a conference.
5. He will be reading a newspaper when we come back from work.
6. This time next year we shall be lying on the beach in Spain.
7. He will have finished his novel by end of this year.
8. I will have been playing tennis for two hours by the time he comes.
9. They will have moved to a new flat by March.
10. What are you going to do when you leave the university?

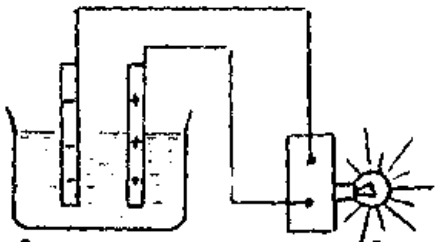
LESSON 4

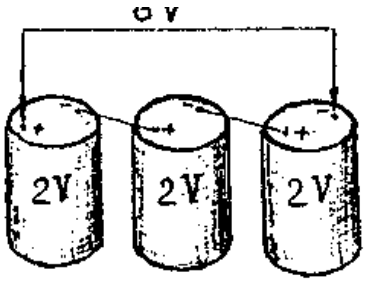
Text A. ELECTRIC CELLS

An electric cell is used to produce and supply electric energy. It consists of an electrolyte and two electrodes. Electrodes are used as terminals, they connect the cell to the circuit – current passes through the terminals and the bulb lights.

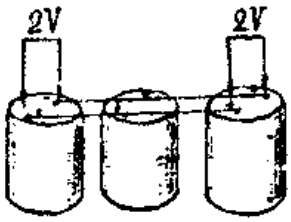
Cells can be connected in series, in parallel and in series- parallel. In order to increase the current capacity cells should be connected in parallel. In order to increase the voltage output cells should be connected in series. In case a battery has a large current capacity and a large voltage output, its cells are connected in series – parallel.

When cells are connected in series the positive terminal of one cell is connected to the negative terminal of the second cell, the positive terminal of the second cell- to the negative terminal of the third … and so on.





When cells are connected in parallel their negative terminals are connected together and their positive terminals are also connected.



In case a cell has a trouble it stops operating or operates badly. This cell should be substituted by another one.

Useful Terms and Phrases:

cell	электрический элемент
to increase	увеличивать
to substitute	заменять
output	выход
in case	в случае

I. Translate into Russian the following word combinations:

to produce and supply electric energy, it stops operating, should be substituted by another one, a large current capacity.

II. Find the English equivalents in the text:

электрический элемент, применяется, для увеличения номинальной емкости, в случае возникновения неисправности.

III. Which word is odd here:

- to pass, to go, to freeze, to move;
- to break up, to connect, to join, to link up;
- to replace, to substitute, to remove, to take the place of.

IV. Fill in the blanks with the missing words given below:

1. A … is used … electric energy.
2. The terminals of a cell are … to conduct … .
3. When cells are connected … the … terminal of one cell is connected to the negative … of the second cell.

4. Cells are … in series in order to increase … .

_____

to supply, in series, cell, connected, voltage output, positive, terminal, used, current

V. Answer the following questions:

1. What is used to produce and supply electric energy?
2. Which elements does a cell consist of?
3. What is the function of the terminals?
4. How must the cells be connected in order to increase the voltage output?
5. How must the cells be connected in order to increase the current output?

VI. Find out which sentence corresponds to the text:

a) In order to increase the current capacity cells are connected in series.
b) Cells should be connected in series- parallel in order to increase the current capacity.
c) To obtain a higher current output care is taken to connect the cells in parallel.

VII. Determine the chief idea of the text:

1. Types of cell connections.
2. The purpose and function of an electric cell.
3. The importance of various connections.

VIII. Put in the correct answer:

1. The first diesel engine (was invented / has been invented) in the end of the 19^{th} century.
2. Football is a very popular game. It (will be played / is played) in all the corners of the world.
3. At present she (is being interviewed / had been interviewed) for a new job.
4. How can the problem (be solved / is solved)?
5. New software (was installed / has been installed) on my PC this week.

6. Then we came to know that the house (was built / had been built) by a famous architect.
7. A scientific conference (will be held / has been held) next month.
8. I think his novel (will be finished / will have been finished) by next year.
9. Why (have he given / has he been given) a promotion?
10. The car (is being serviced / had been serviced) at present.

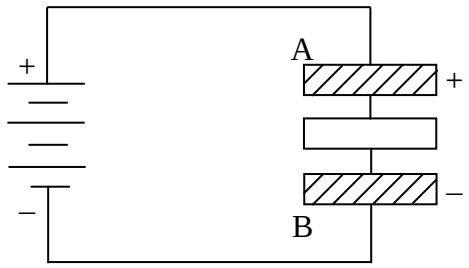
Text B. CAPACITORS

A capacitor is one of the main elements of a circuit. It is used to store electric energy. A capacitor stores electric energy provided that a voltage source is applied to it.

The main parts of a capacitor are metal plates and insulators. The function of insulators is to isolate the metal plates and in this way to prevent a short.

In the diagram one can see two common types of capacitors in use nowadays: a fixed capacitor and a variable one.

The plates of a fixed capacitor cannot be moved; for this reason its capacity does not change. The plates of a variable capacitor move; its capacity changes. The greater the distance between the plates is, the less the capacity of a capacitor is. Variable capacitors are commonly used by radiomen; their function is to vary the frequency in the circuit. Fixed capacitors are used in telephone and radio work.



Fixed capacitors have insulators produced of paper, ceramics and other materials; variable capacitors have air insulators. Paper capacitors are commonly used in radio and electronics; their advantage is their high capacity; it may be higher than 1,000 picofarad.

Besides, electrolyte capacitors are highly in use. They also have a very high capacity; it varies from 0.5 to 1.000 microfarad. Their

disadvantage is that they change their capacity when the temperature changes. They can operate without a change only at temperatures not lower than –40°C.

Common troubles in capacitors are an open and a short. A capacitor stops operating and does not store energy in case it has a trouble. A capacitor with a trouble should be substituted by a new one.

Useful Terms and Phrases:

capacitor	конденсатор
frequency	частота
insulator	изолятор
to prevent from	препятствовать
to store	хранить, накапливать
reason	причина
to apply	применять
for this reason	по этой причине
to move	двигаться
air	воздух
part	часть

I. Match the words in columns:

при условии	a fixed capacitor
типичная неисправность	a capacitor with a trouble
недостаток	provided
неисправный конденсатор	a variable capacitor
изменение	a change
конденсатор постоянной емкости	disadvantage
конденсатор переменной емкости	common trouble

II. Find out which sentence corresponds to the text:

a) A capacitor is used to supply voltage.
b) A capacitor is used to increase a voltage output.
c) A capacitor is used to store energy.

III. Find out which sentence doesn’t correspond to the text:

a) The main parts of a capacitor are metal plates and insulators between them.
b) The plates of a variable capacitor can be moved.
c) The capacity of a capacitor depends on the material of insulators.

IV. Name the main idea of the text:

a) The design of a variable capacitor.
b) Materials used for manufacture of both capacitors.
c) The design and application of capacitors.

V. Answer the following questions:

1. What is one of the main elements of the circuit?
2. What is the purpose of a capacitor?
3. What is the function of a capacitor?
4. What effects the capacity of a capacitor?
5. How does a fixed capacitor differ from a variable one?
6. How is the capacity of a capacitor regulated?
7. What insulators is a variable capacitor made up of?
8. When should a capacitor be replaced?

VI. Choose the right answer:

1. Our Institute … in 1946.
   a) was founded b) is being founded
   c) has been founded d) founded

2. The mail … yet.
   a) hasn't received b) wasn't received
   c) hasn't been received d) has been received

3. When a student takes a book from a library, the book must … by a specific date.
   a) to be returned b) be returned
   c) to return d) will be returned

4. The negotiations … from 3 till 4 p.m. yesterday.

a) were held b) had been held
c) had been held d) were being held

5. Some children … to by their parents every night.
   a) read b) were reading c) have been read d) are read

6. The contract was signed after the terms of payment and delivery … .
   a) are discussed b) had been discussed
   c) have been discussed d) were being discussed

7. He told me not to worry as the letter … by 6 o'clock.
   a) will have been sent b) will be sent
   c) would have been sent d) has been sent

8. He … President last month.
   a) was elected b) has been elected
   c) will be elected d) elected

LESSON 5

Text A. BATTERIES

Batteries as sources of electrical energy are the result of a long series of experiments which started with the discoveries of Alessandro Volta, an Italian scientist, more than one hundred years ago. Today battery cells are manufactured in two common forms: (1) dry cells, used in flashlights, portable radios, etc., and (2) wet cells, used in automobiles, airplanes, boats, etc. The voltaic cell is composed of three parts, a pair of dissimilar metal plates called electrodes, a dilute acid solution called the electrolyte, and a nonconducting container called the cell.

In a glass container filled with sulphuric acid there are two plates: one copper and the other zinc. If the two plates are connected by a copper wire, electricity will flow through it from the copper plate to the zinc plate. This may be shown by the wire becoming hot. If an ammeter is connected between the plates or electrodes, as they are now called, it will indicate that an electric current is flowing.

The electrode from which electricity flows is termed the positive electrode and the receiving electrode is termed the negative electrode.

Thus for the voltaic cell the copper plate is the positive electrode and the zinc plate the negative electrode. A copper wire will convey electricity and is called an electrical conductor. Copper, aluminium and silver are outstandingly good conductors. Conductors must be surrounded by protective material which does not conduct electricity and prevent it to leak away. Materials which do not conduct electricity are called electrical insulators; there are many common examples – glass, wood, rubber, some plastics, "insulation" tape.

Remember that faulty insulation is dangerous and leads to unwanted electrical flow and probably to local overheating.

If two or more cells are connected together, they form what is called a battery.

For example, the battery is composed of four dry cells connected in series. By series connection it is meant that the (+) terminal of one cell is connected to the (–) terminal of the next. The purpose in connecting two or more cells in series is to obtain a higher emf than that available with one cell alone.

The common flashlight contains several dry cells connected in series.

Useful terms and Phrases:

to convey	проводить
to surround	окружать
rubber	резина
to prevent	предотвращать
available	имеющийся в наличии

I. Translate into Russian the following word combinations:

in two common forms, filled with sulphuric acid, called electrical insulators, faulty insulation, obtain a higher emp.

II. Find the English equivalents in the text to the following:

состоит из трех компонентов, демонстрируется нагреванием провода, называется электрическим проводником, обычный фонарик, чем имеется в одном элементе.

III. Find in the text:

a) areas where various cells may be applied;
b) materials which serve as good conductors;
c) the method of connection in batteries.

IV. Answer the following questions:

1. Whose discoveries made it possible to create a battery?
2. What common types of batteries are used nowadays?
3. How many parts is the voltaic cell composed of?
4. In what direction does electricity flow when the two plates are connected by a copper wire?
5. What metals are considered to be perfect conductors?
6. Why is faulty insulation dangerous?
7. Where can batteries be used?

V. Role-play:

You are going to buy a new storage battery for your car. You come to a shop and ask a shop-assistant to present information:

1. on the batteries available in the shop;
2. the price range of the batteries;
3. the electrical characteristics of a storage battery you got interested in;
4. the service life of a storage battery;
5. how to test and charge a storage battery.

Regarding the most important aspects of storage battery maintenance the shop assistant sends you to a garage electrician who is expected to instruct you on maintenance tips for your storage battery.

The garage electrician will answer all your questions on the maintenance procedures including ampere-hour rating, battery testing, battery charging, charging current and charging systems.

Discussion. You have some doubts about buying a traditional storage battery. To make a good choice you need to visit some garages and shops. Which storage battery will best suit your requirements?

a) Read the following arguments. Add your own ones:

A traditional storage battery

For	Against
1. A traditional storage battery is less expensive than a maintenance-free battery. 2. You can do testing and charging by yourself. 3. You can replace the faulty battery if you find damaged.	1. It requires the periodic addition of water to the electrolyte solution. 2. Testing and charging takes a lot of time. 3. It is a costly procedure to test and charge a storage battery in the commercial garage.

A maintenance-free battery

For	Against
1. No need to periodically add water to the electrolyte solution. 2. There is a visual aid to control a state of charge.	1. It is more expensive than a traditional storage battery. 2. The service life seems to be shorter if not properly handled.

b) Discuss the problem in groups of 3-5 students in order to come to your own conclusion.

c) Fill in the table and give you reasons:

	Group 1	Group 2	Group 3
A traditional storage battery will better suit my purpose.			
A maintenance-free storage battery is all I need.			

Text B. CONDUCTORS

Conductors are materials having a low resistance, so that current easily passes through them. The lower the resistance of the material is, the more current can pass through it.

The most common conductors are metals, and silver and copper are the best of them. The advantage of copper is that it is much cheaper than silver. Thus copper is widely used to produce wire conductors. One of the common functions of wire conductors is to connect a voltage source to a

load resistance. Since copper wire conductors have a very low resistance, a minimum voltage drop is produced in them. Thus, all of the applied voltage can produce current in the load resistance.

It should be taken into consideration that most materials change the value of resistance when their temperature changes.

Metals increase their resistance when the temperature increases while carbon decreases its resistance when the temperature increases. Thus, metals have a positive temperature coefficient of resistance while carbon has a negative temperature coefficient. The smaller the temperature coefficient is or the less the change of resistance with the change of temperature is, the more perfect the resistance material is.

Useful Terms and Phrases:

an advantage	преимущество
cheap	дешевый
perfect	совершенный, идеальный
carbon	углерод
widely	широко
a load resistance	сопротивление нагрузки

I. Translate into Russian the following word combinations:

the lower resistance of the material, one of the common functions, it should be taken into consideration, since copper wire conductors.

II. Find the English equivalents in the text for the following:

медь широко применяется для изготовления, чем ниже сопротивление материала, самые распространенные проводники, величина сопротивления.

III. Find out which sentence corresponds to the text:

a) A low resistance is essential for conductors.
b) Conductors are materials having a high resistance.
c) Silver and copper are poor conductors.

IV. Find out which sentence doesn't correspond to the text:

a) Current passes through conductors easily.
b) Silver and copper are good conductors.
c) A temperature charge has no effect on a material conductivity.

V. Answer the following question:

1. What is a conductor?
2. What are the most common conductors in electrical engineering?
3. What is the most common function of wire conductors?
4. What is a relationship of resistance to a temperature rise?

VI. Render the text "Conductors" using the following scheme:

1. The title of the text is … .
2. The text is given in the textbook … .
3. The authors of the textbook are … .
4. The main idea of the text is … .
5. The text deals with … .
6. In the beginning of the text … .
7. The text goes on to say … .
8. According to the text … .
9. In conclusion … .
10. I found the text … .

VII. Choose the right answer:

1. Becket … sell pencils because he had no other means to earn a living.
   a) must b) had to c) had d) must to

2. Economics … to have the closest connection with economy.
   a) is b) must c) can b) are

3. We … to do that work.
   a) must b) unable c) were unable d) could not

4. But he … to finish this story.
   a) couldn't b) must not c) be allowed d) was not allowed

5. I hope you will … to consider our papers next week.
   a) be b) be able c) are able d) are allowed

6. Tomorrow we … to meet our relatives from Moscow.
   a) is b) must c) are d) can

7. Will she … to use this method in her research?
   a) be allowed b) is allowed c) will be allowed d) will allow

8. They will … to start at once next week.
   a) can b) be able c) to be able d) are able

9. The experiment … to be conducted at 5 o'clock.
   a) must b) are c) is d) has to

10. I … to do it because there was no other way out.
    a) had b) have c) had to d) must

LESSON 6

Text A. TRANSFORMERS

A transformer is used to transfer energy: due to the transformer electric power may be transferred at a high voltage and reduced at the point it must be used to any value. Besides, a transformer is used to change the voltage and current value in a circuit.

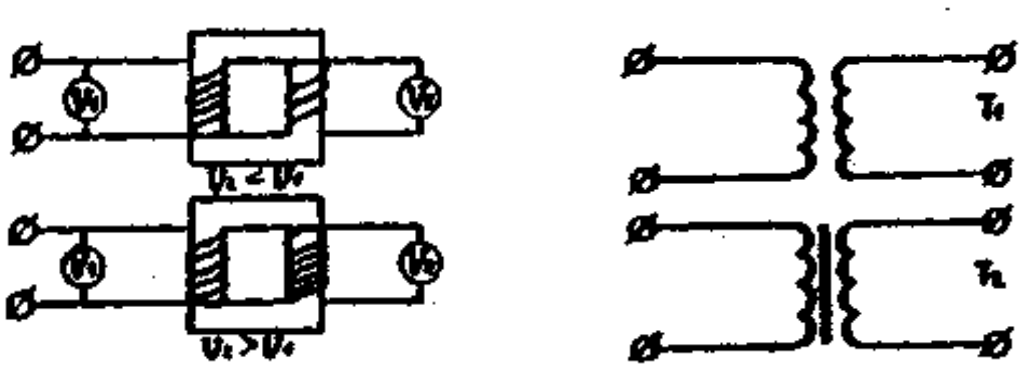
A two-winding transformer consists of a closed core and two coils (windings). Each coil consists of a number of loops of round or rectangular wire. Several strands may be used in parallel but electrically insulated from each other, from the core and from the other coil.

The core consists of thin sheets of high-grade silicon steel. The thickness depends somewhat on the frequency at which the transformer is to operate. The thickness commonly used for 60 cycles is approximately 0.014 in.

The primary winding is connected to the voltage source. It receives energy. The secondary winding is connected to the load resistance and supplies energy to the load.

The value of voltage across the secondary terminal depends on the number of turns in it. In case it is equal to the number of turns in the primary winding the voltage in the secondary winding is the same as in the primary.

In case the secondary has more turns than the primary the output voltage is greater than the input voltage. The voltage in the secondary is greater than the voltage in the primary by as many times as the number of turns in the secondary is greater than the number of turns in the primary. A transformer of this type increases or steps up the voltage and is called a step-up transformer.



In case the secondary has fewer turns than the primary the output voltage is lower than the input. Such a transformer decreases or steps down the voltage, it is called a step-down transformer.

Compare T1 and T2 in the diagram. T1 has an iron core. For this reason it is used for low frequency currents. T2 has an air core and is used for high frequencies.

Common troubles in transformers are an open in the winding, a short between the primary and the secondary, and a short between turns. In case a transformer has a trouble it stops operating or operates badly. A transformer with a trouble should be substituted.

Useful Terms and Phrases:

transformer	трансформатор
strand	жгут
to transfer	передавать
to receive	принимать
to step up	сердечник
silicon	углерод
winding	обмотка
to step down	понижать

primary winding	первичная обмотка
frequency	частота
due to	благодаря чему-либо

I. Translate into Russian the following word combinations:

to any value, a two-winding transformer, high-grade silicon steel, by as many times as, should be substituted.

II. Find the English equivalents in the text to the following:

тонкие пластины, источник напряжения, количество витков, повышающий трансформатор, низко частотный ток, неисправность.

III. Find out which sentence corresponds to the text:

a) A transformer is used to transfer energy.
b) A transformer is used to change the load resistance.
c) A transformer is used to operate for 60 cycles.

IV. Find out which sentence doesn’t correspond to the text:

a) Electric power is transferred at a high voltage and reduced to any value by capacitors.
b) Transformers receive a high voltage electric power and reduce it to any value.
c) Due to resistors electric power is transferred at a high voltage and reduced to any value.

V. Find out which sentence has nothing to do with the text:

a) A transformer consists of the primary and the secondary windings.
b) A transformer is a common name for creative toys.
c) A transformer is widely used in electrical engineering.

VI. Match the words in columns:

передавать энергию	an iron core
первичная обмотка	the value of charge
вторичная обмотка	high frequency current
понижать	to transfer energy
железный сердечник	the secondary
величина заряда	the primary
ток высокой частоты	to decrease
понижающий трансформатор	a step-down transformer

VII. Complete the sentences using the endings in the right column:

1. A step-down transformer decreases the primary voltage …	a. whereas the secondary winding supplies energy to the load.
2. The primary winding receives energy …	b. while an iron-core transformer is used for low frequency currents.
3. An air core transformer is used for high frequency currents …	c. but a step up transformer increases the secondary voltage.

VIII. Answer the following questions:

1. What is a transformer used for?
2. What does a transformer consist of?
3. What two types of transformers do you know?
4. What type of a transformer is used for high frequency currents?
5. What type of a transformer is used for low frequency currents?
6. What are common troubles in a transformer?
7. What should be done in case a transformer has a trouble?

IX. Discussion.

You are studying to be an electrical engineer. It is a profession that is always in great demand. You are sure to get necessary training for a lifelong occupation. State why it is important to become a skilled electrician nowadays:

Topic 1. Theoretical preparation

The future profession is so closely related to the technical and theoretical concepts of electricity that only a trained person can do the job.

The electrical industry constantly introduces new and improved devices and materials. The knowledge obtained at the Institute helps the student to achieve a solid understanding of electrical theory and its application to devices, circuits and materials. Is life-long training a must for an electrical engineer? Express your point of view.

Topic 2. Areas of employment

The modern home, office and factory require a higher degree of proficiency in electrical work. The constant increase in new types of construction, power generation and management, new electrical equipment offer increasing employment opportunities for qualified electricians. One should also bear in mind available employment in the field of cable installation, electric motor maintenance and repair. Due to the increased needs of our society new opportunities are developing rapidly. What other employment opportunities may be found nowadays in electrical engineering? Express your own point of view regarding this matter.

Topic 3. Personal features

Electrical workers are judged by the quality of their work and their attitude toward fellow workers, employers and the public.

The electrical trade is a trade in which individual ability and skill are recognized and rewarded.

This job requires a high degree of responsibility because it covers complex electrical systems which may pose danger to community.

A student should be able and eager to learn the skills and technical knowledge in order to be successful in his occupation.

What other personal qualities to your mind may be needed to make a smart electrician?

Text B. ELECTRIC MOTORS

There is a wide variety of d. c. and a. c. motors. There are shunt motors, series motors, synchronous motors, induction motors, single-, two-, and three-phase motors. They are used to drive various machines. A ball-bearing fully enclosed fan-cooled direct-current motor is shown in Fig. I.

Direct-current motors are of three principal kinds, and are named according to the manner in which their field coils are connected to the armature. They are named respectively: series, shunt and compound.

In the series motors the field windings and armature are connected in series with each other. All the current passes through the field coils. The field windings are therefore composed of a few turns of thick wire. Starting under heavy load, a series motor will take a large current to provide the huge torque required.

The field coils of shunt motors are connected direct across the brushes, hence they have the full voltage of the mains applied to them. The shunt motor may be called a constant speed motor, and is suitable for driving machine tools, lathes, woodworking machines and any machines requiring a steady speed.

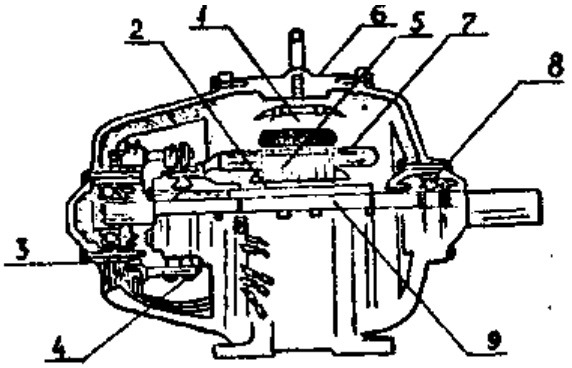


Fig. I. A ball-bearing fully-enclosed fan-cooled direct-current motor:

1 – field coil; 2 – armature spider; 3 – brush yoke; 4 – brush holder; 5 – armature laminations; 6 – frame; 7 – armature coils; 8 – ball bearing; 9 – armature key

A compound motor has both shunt and series field windings and therefore partakes of the nature of both types of motors.

Useful Terms and Phrases:

a shunt motor	шунтовый электродвигатель
armature	якорь
a series motor	электродвигатель с последовательным возбуждением
a compound motor	электродвигатель смешанного типа
torque	крутящий момент

brush	щетка
the mains	электросеть
a field coil	полюсная катушка

I. Translate into Russian the following word combinations:

the full voltage of the mains, the huge torque required, named respectively, heavy load, a large current.

II. Find the English equivalents in the text to the following:

используется для, соединяются последовательно друг с другом, постоянные обороты вращения, существует широкий, закрытый.

III. Complete the sentences using the following endings given in the right-hand column:

1. In practice electric motors are used …	a. to provide the huge torque required for operation.
2. The shunt motor is …	b. to drive various machines.
3. A series motor is designed to take a large current in order …	c. suitable for driving machine tools requiring a steady speed.
4. The field windings are made of …	few turns of thick wire.

IV. Determine the main idea of the text:

1. The existence of a great line of electric motors for industrial use.
2. The most common types of d. c. electric motors.
3. The design of a ball-bearing fully enclosed fan-cooled direct-current motor.

V. Find out which sentence does not correspond to the text:

1. The manner of connection of field coils to the armature determines a particular kind of a d. c. motor.
2. In the series motors a current flows though the field coils.
3. A shunt motor is similar in construction to an induction motor.

VI. Answer the following questions:

1. Does there exist a wide variety of electric motors?
2. What there principal kinds are direct-current motors divided into?
3. What is a field winding and how is made?
4. What is a series motor?
5. What is a shunt motor?
6. What is the design of a compounds motor?

VII. Choose the right answer:

1. The teacher explained to us that the Sun (rises / rose) in the east.
2. John says he (is reading / was reading) an article now.
3. The secretary told us (not to speak aloud / do not speak aloud) in the office.
4. The teacher told the students that the telephone … in America by A. Bell.
   a) invented b) has been invented c) was invented d) had been invented
5. The financial adviser warned the Vice-President that the new project … a failure.
   a) would be b) will be c) is d) would have been
6. Could you tell her where … ?
   a) the nearest cinema was b) the nearest cinema is
   c) is the nearest cinema d) was the nearest cinema
7. My English teacher wanted to know … doing in my spare time.
   a) what did I enjoy b) what I had enjoyed
   c) what I enjoyed d) what enjoyed I
8. Jane was mistaken when she said that Maggie … to her new flat the month before.
   a) was moving b) has moved c) would move d) had moved
9. He said that the students of our group were studying in the library.
   a) Он сказал, что студенты нашей группы будут заниматься в библиотеке.
   b) Он сказал, что студенты нашей группы занимались в библиотеке.
   c) Он сказал, что студенты нашей группы занимаются в библиотеке.
10. Она поинтересовалась, поедет ли он летом в Москву.
    a) She wondered whether he would go to Moscow in summer.

b) She wondered whether would he go to Moscow in summer.
c) She wondered if he will go to Moscow in summer.

VIII. Discussion.

The academic year is coming to an end. It's time now to evaluate the knowledge and understanding acquired in the study of the Concepts of Electricity:

1. Please say whose law established the basic electrical relationships of current, voltage and resistance.
2. Explain what is created by electrons moving through wires. What will happen to current if voltage remains constant and resistance increases.
3. Take a series circuit and say whether the current is the same through each device or not. Will the sum of the voltage drops be equal to the total voltage?
4. Do you agree that in a parallel circuit the voltage is the same across each branch, and the sum of the branch currents equals to the total current?

IX. Please demonstrate your knowledge by inserting the proper word or symbol:

1. Electrical pressure is measured in … .
2. Electrical current is measured in … .
3. An electrical current is the movement of … .
4. The symbol for source voltage is the letter … .
5. Resistance is measured in … .
6. The symbol for current is the letter … .
7. Electrical power is measured in … .
8. The symbol for electrical power is the letter … .
9. Electrical resistance is measured with an instrument known as … .
10. The most frequently used conductor of electricity is … .

Thank you. Have a good time in summer vacations. See you next year at English classes.

SUPPLEMENTARY READING

Text 1. IMPORTANCE OF ENERGY

From the very outset energy has played a vital role in the development of civilization. There has been a universal basic drive towards better living through expanded utilization of energy. The history of civilization shows a close relationship between the utilization of energy and the process of mankind. The degree of utility of energy is the symbol of the progress of a country.

Energy consciousness in the people has created interest in them to tap new sources of energy from time to time. Of the various forms so far discovered the electrical energy has contributed a lot to the world's energy requirements.

Text 2. ADVANTAGES OF ELECTRICAL ENERGY

Electrical energy is the most refined form of energy. The advantages derived from electrical energy are many in number. Some of its important advantages over other forms of energy are:

1. It can be generated in large quantities at comparable cost with other types of energy.
2. It can be conveniently transmitted over long distances.
3. It can be utilized efficiently in a number of processes requiring energy.
4. It has got maximum flexibility and has most sensitive susceptibility control.

Text 3. SOURCES OF ELECTRICAL ENERGY

The energy requirements have also increased due to rapid growth of the world's population. Therefore, it has become essential to harness more power resources with utmost economy so as to keep pace with the requirements of the world's population.

The main resources of generating power on large scale are steam, water, diesel, oil and nuclear energy. Other possible sources of electrical power are solar radiation, tidal and wind power. Magnetohydrodynamic

(MHD) generation of power by direct conversion of heat energy to electrical energy is drawing a great attention of experts in recent times. The choice of a particular method of generating power largely depends upon the technical and economical considerations. The generation of power by steam is common at places where there is abundance of supply of coal, oil or natural gas. Diesel power stations are preferred in countries rich in oil. Hydroelectric generation of power is adopted in hilly areas where water resources are in abundance and the rainfall is heavy. In countries where other resources are limited nuclear power generation has to be adopted.

Text 4. ALTERNATING CURRENT (AC) POWER SYSTEM

Large amount of power is generated at the generating stations. It is, then, transported by means of transmission lines to load centres which are usually situated at great distances from the generating stations. Since the long distance transmission at high voltages is cheap and low voltages are required for utility purposes, the voltage level goes on decreasing from the transmission system to the distribution system.

Text 5. SUPPLY SYSTEMS

An electric power system may be divided into three main components, namely – the generating system, the transmission system and the distribution system. A transmission line is that part of an electric power system which transports electrical energy in bulk from the generating station to the distribution system.

The new thermal stations are usually sited near the coal mines because of the higher cost of transportation of coal. The nuclear plants are also situated remote from the centres of consumption due to safety reasons. Hydro-power station sites are governed by the availability of the water resources. Thus, the difficulty of getting power station sites near the consuming centres make it inevitable to transfer bulk of electrical energy through longer distances. Long-distance bulk power transfer is only possible by high voltage transmission systems. Extra high voltage (EHV) transmission systems were developed in most of the countries for transporting energy from remote hydro stations. By EHV is meant the

voltage above 220 kV.

The system voltage very much affects the capital cost of a transmission line. The weight of conductor material, the efficiency of the line, and the voltage drop in the line depend upon the system voltage. The choice of voltage, therefore, becomes a major factor in the line design.

Some of the important factors considered for a good power system design are reliability and flexibility of service, constant frequency, good voltage regulation, simplicity of equipment with regard to installation, operation maintenance, safety to equipment and personnel, efficiency and economy.

Text 6. CONDUCTORS

The important factors taken into account in the selection of a conductor for a particular line are conductivity, tensile strength, fatigue strength, corona loss, local conditions and cost. The conductor materials mainly used are copper, aluminium and their alloys.

The conductors are usually stranded. Stranded conductors have not only greater flexibility but also greater mechanical strength than have single wires of the same cross-sectional area. Usually a central wire is surrounded by successive layers of wires containing 6, 12, 18, 24, … wires. In practice the consecutive layers are spiraled in opposite directions to prevent unwinding.

Hard-drawn copper, hard-drawn aluminium, and steel-cored aluminium conductors are most commonly used. In addition to these, various other materials are used for making conductors but their use is limited.

Copper for overhead lines is hard-drawn to give a relatively high tensile strength. It has a high electrical conductivity, long life, and high scrap value.

The tensile strength of copper is increased by approximately 50 per cent by adding about 0.7 to 1.0 per cent cadmium to it. The conductivity is, however, reduced by about 15 to 17 per cent. Like hard-drawn copper this alloy possesses the advantage of easy jointing, more resistance to atmospheric corrosion, better resistance to wear, easy machinability etc. The temperature at which copper anneals and softens is also increased and temperature effects on stresses are less.

Copper is welded on to a steel wire by hot rolling and cold drawing a

billet of steel coated with copper. It is ensured that the uniform thickness of copper is welded. The conductivity of copper wire conductor varies from 30 to 60 per cent of that of a solid copper conductor with the same diameter. The conductivity of the standard grade is about 40 per cent.

Text 7. POWER CABLES

Cables form the system for the transmission and distribution of electrical energy. The residential and industrial loads today have a trend towards their growing density. This requires rugged construction, greater service reliability, increased safety, and better appearance. The interference from external disturbances like storms, lightning, ice, trees, etc., should be reduced to a minimum. These difficulties are easily overcome by the use of underground cables and a trouble-free service is achieved under a variety of environmental conditions.

Earlier underground cables were mainly used in or near densely populated areas and were operated at low or medium voltages only, but the present day requirements seek to use them even at extra high voltages for longer distances.

The possibility of supply interruption due to lightning or other external influences is lesser with underground cables, but if a fault occurs due to any reason it is not easily located.

A power cable consists of three main components, namely, conductor, dielectric, and sheath. The conductor provides the conducting path for the current. The insulation or dielectric withstands the service voltage, and isolates the conductor with other objects. The sheath does not allow the moisture to enter, and protects the cable from all external influences like chemical or electrochemical attack, fire, etc.

Copper and aluminium are used as conductor materials in cables. As pointed out earlier, aluminium occupies a greater space than copper. Both copper and aluminium have been favoured for the conductor materials because of their high electrical conductivity.

Text 8. ELECTRICITY – THE FUEL OF THE FUTURE

At present, two-thirds of all electricity is consumed by the industrial and commercial sectors. As robots take over the factory and computers

come to dominate the office, electricity, the one form of energy ideally suited to high technology uses, will come to dominate as an energy source.

Electricity is the lifeblood of the industrialised world's economy, a magic fuel that is highly flexible and clean at the point of use, and that can be controlled to vary temperatures and speeds.

Electricity drives the motors that move assembly lines. It lights and heats offices and stores. And in an advanced economy, electricity is the medium of information as it flows through telecommunication lines and computer networks.

And now digital electronics promises to forge powerful new media that will merge the telephone and the cable television industries.

Many electrotechlonologies are so efficient that using them creates a competitive advantage. Here are some examples:

– Produce steel with an electric melter instead of a flame (Energy savings of 65 per cent)

– Dry paint with infrared electric heat rather than gas ovens (Energy savings of 90 per cent), and

– Cook in a microwave oven instead of a gas oven (Energy saving of 90 per cent).

Some people do not fully appreciate electricity's efficiency because they know about conversion losses – the energy lost in converting fuel into electricity. They are also aware of the energy losses that attend the movement of electricity along transmission lines. They then point out that further losses occur when the electricity is converted to do work. Yes, it is true there are losses.

But if you could run your television set or your computer on gasoline or woodchips, you might get some idea how efficient electricity is when compared with other fuels.

A few years ago, *USA Today*, the nationwide US newspaper, surveyed its readers to find out what people thought was the "greatest invention of all time". The overwhelming response was something we rarely think of as an invention: electricity.

No doubt, the importance that people attribute to electricity is that it makes possible so many other inventions.

Edison made only one purely scientific discovery regarding the strange force we call electricity. That discovery, appropriately called the Edison Effect, involves the flow of electricity across a vacuum. Edison patented the discovery but could find no use for it and went on to other things. The Edison Effect turned out to be the basis of what we now call

the electronics industry: radio, television, computers, and video cassette recorders.

Today electricity continues to occupy centre stage in the creation of new technologies.

In light of today's challenges, electricity is not simply a great invention. It is a miracle fuel: a highly efficient energy source that's clean at point of use, that helps cut atmospheric carbon dioxide, and that can be controlled to hairbreadth levels of precision.

Someone once said that efficiency means doing things right and effectiveness means doing the right thing. I say the key to both is electricity. The fuel of the future.

GRAMMAR MATERIAL

§1 Имя существительное (The Noun)

Именем существительным называется часть речи, которая обозначает предмет или объект.

Предметом в грамматике называют все, о чем можно спросить: what is this? что это?

Объектом в грамматике называют всех, о ком можно спросить: who is this? кто это?

Например: what is this? – a circuit *цепь*, current *ток*, voltage *напряжение*; who is this? – a boy *парень*, an electrician *электрик*, an electrical engineer *инженер-электрик*.

Имена существительные классифицируются как:

− исчисляемые (a load) и неисчисляемые (copper). Исчисляемые существительные имеют два числа: единственное и множественное (branch - branches);

− собственные (Oxford) и нарицательные (a flow, a battery);

− конкретные (a charge) и абстрактные (determination);

− одушевленные (a student) и неодушевленные (an application);

− простые (a drop), производные (production) и составные (a flashlight).

§2 Образование множественного числа имен существительных (The Plural of Nouns)

Исчисляемые существительные имеют два числа – единственное и множественное.

1. Множественное число имен существительных образуется путем прибавления к форме единственного числа окончания -s (или -es), которое произносится [s] после глухих согласных: map – maps, part – parts, rate – rates; [z] после звонких согласных и гласных: car – cars, boy – boys, bag – bags и [ɪz] после шипящих и свистящих: inch – inches, tax – taxes, class – classes.

Если существительное оканчивается на букву *y* с предшествующей согласной, то при образовании множественного числа *y* заменяется на *i* и прибавляется *-es*: reply – replies, city – cities.

Существительные с конечной буквой *-f* или *-fe* при образовании множественного числа меняют их на буквы *-ve* с прибавлением окончания *-s*: life – lives, knife – knives, leaf – leaves.

Не подчиняются этому правилу существительные, оканчивающиеся на *-oof*, *-ief* и *-iff*, и отдельные существительные на *-fe*: roof – roofs, chief – chiefs, cliff – cliffs, safe – safes.

2. Некоторые существительные образуют форму множественного числа путем изменения корневой гласной: man – men, child, children, tooth – teeth.

3. Имена существительные, заимствованные из греческого и латинского языков, сохраняют свои формы множественного числа: datum – data, phenomenon – phenomena, nucleus – nuclei, radius – radii, crisis – crises.

§3 Исчисляемые и неисчисляемые существительные (Countables and Uncountables)

Имена существительные нарицательные делятся на две группы: исчисляемые и неисчисляемые.

Исчисляемые существительные употребляются как в единственном, так и во множественном числе. Неисчисляемые существительные употребляются только в единственном числе.

К исчисляемым существительным относятся названия предметов, которые можно пересчитать:

I have a pencil. – У меня есть карандаш.
She has bought two pencils. – Она купила два карандаша.

К неисчисляемым существительным относятся названия предметов, с которыми не употребляются единицы счета.

К ним принадлежат существительные вещественные и отвлеченные, и они употребляются только в единственном числе:

Milk is useful for children. – Молоко полезно детям.
Time flies. – Время летит.

Существительные advice *совет, советы*; information *информация, сведения*; progress *успех, успехи*; knowledge *знание, знания* употребляются в английском языке только в единственном числе:

The teacher is satisfied with my progress. – Учитель удовлетворен моими успехами.

Названия наук, оканчивающиеся на *-ics* (mathematics, physics, statistics и т.д.) употребляются со значением единственного числа, хотя имеют форму множественного числа:

Statistics deals with study of numerical facts and data. – Статистика занимается изучением цифровых фактов и данных.

§4 Артикль (The Article)

Артикль – служебное слово, которое является определителем существительного. В английском языке имеется два артикля – неопределенный и определенный.

Неопределенный артикль *a* (или *an* – перед словами, начинающимися с гласной, – an apple) указывает на единственное число данного имени существительного. Он произошел от числительного one и иногда переводится *один*.

It is a desk. – Это стол (какой-то, один из многих).
He is absent for an hour. – Он отсутствует (один) час.

Перед неисчисляемыми существительными неопределенный артикль не ставится.

Определенный артикль *the* происходит от указательного местоимения *that* и употребляется с именами существительными как в единственном, так и во множественном числе. Определенный артикль употребляется:

1. Когда речь идет об определенном предмете или лице:

The man is an engineer. – (Этот) мужчина – инженер.

2. Перед существительным, если ему предшествует:
   a) порядковое числительное (the second *десятый*);
   b) прилагательное в превосходной степени.

This book is the most interesting I have ever read. – Эта книга самая интересная, которую я когда-либо читал.

3. Перед географическими названиями океанов, морей, рек, гор, некоторых стран, частей света и т.д.

The Pacific ocean – Тихий океан, the Volga – Волга, the Crimea – Крым, the United Kingdom – Соединенное Королевство, the West – Запад, the Netherlands – Нидерланды.

Без артикля употребляются:

1. имена собственные (London, Russia, Brown, но the Smiths семья Смитов)

London is the capital of Great Britain.

2. неисчисляемые существительные, к которым относятся:
   a) существительные, обозначающие абстрактные понятия: time *время*, love *любовь*;
   b) существительные, обозначающие названия веществ: juice *сок*, water *вода*, paper *бумага*;

3. названия наук: chemistry *химия*, economics *экономика*;

4. названия спортивных игр: chess *шахматы*, rugby *регби*;

5. названия дней недели: Monday *понедельник*, Tuesday *вторник*;

6. названия времен года и месяцев: March *март*, summer *лето*.

§5 Оборот there + to be

Настоящее (Present)	Прошедшее (Past)	Будущее (Future)
there is (ед. ч.) there are (мн. ч.)	there was (ед. ч.) there were (мн. ч.)	there will be

Предложения с оборотом *there + to be* указывают на наличие или отсутствие лица или предмета в определенном месте.

Этот оборот переводится на русский язык как *имеется, есть, находится, существует*. Предложения с оборотом *there + to be* следует переводить, начиная с обстоятельства. Слово *there* на русский язык не переводится.

There are three windows in our classroom. – В нашей аудитории имеется три окна.

В обороте со словом there могут употребляться и другие глаголы, например: to stand, to exist.

There stands a TV set in the corner of the room. – В углу комнаты стоит телевизор.

§6 Употребление many/much, a little/a few, few/little

Слова many, much соответствуют русскому много, a few и little мало.

Many и few употребляются с исчисляемыми существительными во множественном числе:

many students – много студентов,
few students – мало студентов.

Слова much и little употребляются с неисчисляемыми существительными в единственном числе:

much time – много времени,
little bread – мало хлеба.

Сочетание a few означает немного, несколько и употребляется с исчисляемыми существительными, сочетание a little означает немного.

He has a few English books. – У него есть несколько английских книг.
He speaks German a little. – Он немного говорит по-немецки.

Выражение a lot of употребляется как с исчисляемыми, так и с неисчисляемыми существительными. Например:

He has got a lot of friends. – У него много друзей.
They spent a lot of money in Italy. – Они потратили много денег в Италии.

§7 Глагол (The Verb)

Глаголом называется часть речи, которая обозначает действие или состояние лица или предмета.

My friend is a student. – Мой друг (является) студент.
He studies at an Institute. – Он учится в институте.

Глагол имеет личные и неличные формы. Личные формы обозначают время, лицо, число, наклонение, залог. Глагол в личной форме выполняет в предложении функцию сказуемого. К неличным формам глагола относятся инфинитив (The Infinitive), причастие (The Participle) и герундий (The Gerund). Они выражают действие без указания лица, числа и наклонения.
Глагол в английском языке имеет два залога: действительный (The Active Voice) и страдательный (The Passive Voice).
Действительный залог указывает на то, что действие совершается подлежащим:

We subscribe to newspapers. – Мы выписываем газеты.

Страдательный залог указывает на то, что действие совершается над подлежащим другим лицом или предметом:

These newspapers are subscribed by us. – Эти газеты выписываются нами.

Глагол имеет три основные формы: первая форма – инфинитив (The Infinitive), вторая форма – прошедшее неопределенное время (Past Indefinite) и третья форма – причастие прошедшего времени (Past Participle). Они служат для образования простых и сложных глагольных форм (в сочетании с вспомогательными глаголами).

I	II	III
Infinitive	Past Indefinite	Past Participle
do come report write	did came reported wrote	done come reported written

§8 Видовременные формы глагола. Таблица времен Indefinite, Continuous, Perfect (The Active Voice)

	Indefinite (инфинитив без to)	Continuous (to be + Participle I или V_1)	Perfect (to have + Participle II или V_3)
Present	I study. She studies	I am studying. She is studying. We are studying.	I have studied. She has studied.
	Do you study? Does she study?	Are you studying? Is she studying?	Have you studied? Has she studied?
	I don't study. She doesn't study.	I am not studying. She is not studying. We are not studying.	I haven't studied. She hasn't studied.
Past	I studied. (правильный) She wrote. (неправильный)	I was writing. We were studying.	I had studied. She had written.
	Did you write? Did she study?	Were you writing?	Had you written?
	I didn't write.	I wasn't studying. We weren't writing.	I hadn't written.

Future	I shall/will study. She will study.	I shall/will be studying. She will be studying.	I shall/will have studied. She will have studied.
	Will she study?	Will she be studying?	Will she have studied?
	I shan't/won't study.	I shan't/won't be studying.	I shan't/won't have studied.

С формой *Present Indefinite* употребляются временные индикаторы always, often, usually, seldom, sometimes, ever, every day (week, year и т.д.), as a rule и другие;

с формой *Past Indefinite*: yesterday, last week, last time, the other day, long ago, in 2006, в вопросах с when;

с формой *Future Indefinite*: tomorrow, next week, in a year, soon, two days later;

с формой *Present Continuous*: now, still, at present, nowadays, today:

с формой *Past Continuous*: the whole day, at that time, yesterday, from 3 till 6 o'clock, when he came;

с формой *Future Continuous*: at 5 o'clock tomorrow, this time next week, when he comes;

с формой *Present Perfect*: ever, never, already, just, yet, recently, lately, this week;

с формой *Past Perfect*: by 5 o'clock, before, when he came;

с формой *Future Perfect*: by next week, tomorrow by 5 o'clock.

§9 Местоимение (The Pronoun)

Местоимением называется часть речи, которая употребляется вместо имени существительного и прилагательного.

Местоимения подразделяются на: 1) личные, 2) притяжательные, 3) возвратные, 4) усилительные, 5) указательные, 6) вопросительные, 7) неопределенные, 8) относительные, 9) отрицательные.

Личные		Притяжательные		Возвратные
именительный падеж кто? что?	объектный падеж кого? кому?	зависимая форма чей?	абсолютная форма чей?	
I	me	my	mine	myself
you	you	your	yours	yourself
he	him	his	his	himself
she	her	her	hers	herself
it	it	its	its	itself
we	us	our	ours	ourselves
you	you	your	yours	yourselves
they	them	their	theirs	themselves

Указательные местоимения

Единственное число	Множественное число
this – этот, эта, это	these – эти
that – тот, та, то	those – те

This is an article. – Это статья.

That report is important. – Тот отчет важен.

Неопределенные местоимения some, any, no

Неопределенные местоимения some и any обычно определяют существительное, заменяя часто артикль.

Some, как правило, употребляется в утвердительных предложениях со значением: а) какой-нибудь, несколько, некоторые, немногие, какой-то; б) приблизительно, около.

Some articles are very interesting in this newspaper. – Некоторые статьи очень интересные в этой газете.

Pass me some salt, please. – Пожалуйста, передайте мне (немного) соли.

В вопросительных предложениях со значением немного: Can I have some juice?

Any со значением несколько, немного употребляется:

1) в вопросительных предложениях:

Are there any students in the classroom?

2) в отрицательных предложениях:

There aren’t any students in the classroom.

3) в утвердительных предложениях со значением «любой»:

Any student must know it.

No со значением несколько употребляется в отрицательных предложениях:

There are no students in the classroom.

Производные от местоимений some, any и no

some	Any	no
something – что-то, что-нибудь, что-либо	anything – что-нибудь	nothing – ничто, ничего
somebody – кто-то, кто-нибудь, кто-либо	anybody – кто-нибудь, кто-то	nobody – никто
someone – кто-то, кто-нибудь, кто-либо	anyone – кто-нибудь, кто-либо	no one – никто, никого
somewhere – где-то, где-нибудь, куда-нибудь	anywhere – где-либо	nowhere – нигде, никуда

§10 Порядок слов в предложении (The word-order)

Английское повествовательное предложение характеризуется твердым порядком слов: на первом месте (1) – подлежащее, на втором месте (2) – сказуемое, на третьем месте (3) – дополнение, на четвертом месте (4) – обстоятельство.

I	II	III	IV
подлежащее	сказуемое	дополнение	обстоятельство
We	study	English	at the Institute

§11 Отрицательные и вопросительные предложения (The Interrogative and Negative Sentences)

Отрицательные предложения строятся по общему правилу порядка слов: П.С.Д.О. При этом сказуемое отрицательного предложения всегда состоит из трех элементов:

1. связки – вспомогательного или модального глагола;
2. отрицания not;
3. смыслового глагола или именной части сказуемого.

Для образования отрицательной формы глагольного сказуемого в Present и Past Indefinite в качестве вспомогательного глагола употребляется глагол to do в формах: do, does для настоящего времени и did для прошедшего.

П.	С.	Д.	О.
Man	cannot fly		like birds.
You	may not smoke		in public.
Our students	do not study	French.	
He	does not watch	television	in the evening.
It	will not snow		in summer.
Copper	is not a liquid.		
We	did not go	to the theatre	last week.
He	has not read	the book	yet.

В английском языке есть четыре типа вопросов: общие, специальные, альтернативные и разделительные. Вопросительные

предложения имеют обратный порядок слов, который по своей структуре отличается от повествовательных предложений.

Общие вопросы (General Questions). Они относятся ко всему предложению и требуют ответа да или нет. Общие вопросы всегда начинаются с глагола:

Does he live in London? – Yes, he does. No, he doesn't.

Специальные вопросы (Special Questions). Это вопросы, относящиеся к какому-либо члену предложения. Они начинаются с вопросительного слова who? *кто?*; whom? *кого? кому?*; what? *что? какой?*; when? *когда?*; where? *где? куда?*; why? *почему?*; how long? *сколько времени?* и др. и требуют полного ответа.

What are you doing now? – Что вы сейчас делаете?
I am reading a newspaper. – Я читаю газету.

При вопросе к подлежащему или его определению сохраняется прямой порядок слов. Вместо подлежащего ставятся вопросительные местоимения who *кто* или what *что, который*.

Who speaks English in your family? – Кто говорит по-английски в вашей семье?
What makes you think so? – Что заставляет вас так думать?

Альтернативные вопросы (Alternative Questions). Это вопросы, состоящие из двух общих вопросов, соединенных союзом *or*, и предполагают возможность выбора:

Do you or does your friend study at the Institute? My friend studies at the Institute. – Вы или ваш друг учится в институте? Мой друг учится в институте.

Разделительные вопросы (Tail, or Disjunctive Questions). Разделительный вопрос требует подтверждения (утвердительного или отрицательного) того, о чем говорится в первой части вопросительного предложения.

Во второй части повторяется тот вспомогательный или модальный глагол, который входит в состав сказуемого первой части. На русский язык он переводится словами: не так ли? не правда ли?

She left for Moscow yesterday, didn't she? – Она вчера уехала в Москву, не так ли?

You don't get up early on week-days, do you? – Вы не встаете рано в выходные дни, не правда ли?

§12 Временная пара Present Perfect / Past Indefinite

Образуется – to have + Participle II / V_3.

	I	've (have)	found	a good job.	время совершения действия не указано
	She	has	brought	this beautiful vase from Italy to her cottage in the country.	результат совершенного действия в прошлом налицо в настоящий момент
	We	've (have)	signed	a contract this morning (week, month, today, etc).	действие окончилось, но период времени, к которому оно относится, продолжается
	They He	haven't hasn't	seen been	each other for long. to London since 2002.	
Have How long Who	they have has	You you ever	have been been been	seen him, haven't you?	

С Present Perfect могут употребляться временные индикаторы already, yet, never, ever, so far, just, often, always, lately, recently и т.д., а также предлоги for и since.

Past Indefinite

	Ted She	made came	his report home	after he returned from his trip to India. late at night.	действие завершилось в определенный момент в прошлом
	He	bought	a book	opened it and began to read.	перечисление последователь-ных действий в прошлом
	She	didn’t come	home	late at night.	
Did When did	she Who Ted	come came make	home home his report	late at night? late at night? on India?	

Past Indefinite употребляется с такими временными индикаторами как yesterday, the day before yesterday, last year (week, month), last time, last night, the other day, two days ago, during the holiday (vacations, summer, etc.), а также в вопросе с when.

§13 Степени сравнения прилагательных и наречий (The Degrees of Comparison). Имя прилагательное (The Adjective)

Виды прилагательных	Положительная степень	Сравнительная степень	Превосходная степень
Односложные прилагательные и двусложные прилагательные, оканчивающиеся на *–y,* и другие	large happy big clever	Larger happier bigger cleverer	the largest the happiest the biggest the cleverest

Двусложные и многосложные прилагательные	beautiful splendid active	more beautiful more splendid more active	most beautiful most splendid most active
Исключения	good bad many, much little far	Better worse more less farther	the best the worst the most the least the farthest

§14 Наречие (The Adverb)

Виды наречий	Положительная степень	Сравнительная степень	Превосходная степень
Односложные наречия (а также early)	soon fast late early	Sooner faster later earlier	soonest fastest latest earliest
Двусложные и многосложные прилагательные	brightly slowly	more brightly more slowly	most brightly most slowly
Исключения	well badly much little far	Better worse more less farther	best worst most least farthest

После прилагательных и наречий в сравнительной степени употребляется союз *than*; после прилагательных и наречий в превосходной степени часто употребляются предлоги *of*, *in*, относительное местоимение *that*, наречие *ever* и т.д.

§15 Имя числительное (The Numeral)

Образование и написание количественных и порядковых числительных:

Количественные			Порядковые
1-12	13-19	20-90	the first
1 one			
2 two		20 twenty	the second
3 three	thirteen	30 thirty	the third
4 four	fourteen	40 forty	the fourth
5 five	fifteen	50 fifty	the fifth
6 six	sixteen	60 sixty	the sixteenth
7 seven	seventeen	70 seventy	the seventieth
8 eight	eighteen	80 eighty	
9 nine 10 ten 11 eleven 12 twelve	nineteen	90 ninety	

Перед числительными hundred, thousand, million ставится неопределенный артикль *a* или числительное *one*: a (one) hundred *сто*, a (one) thousand *тысяча*. Числительные hundred, thousand, million не имеют множественного числа: 5 hundred *пятьсот*, 50 million *пятьдесят миллионов*, но они принимают окончание множественного числа -*s*, если употребляются в значении существительных.

Millions of people in the world stand for peace. – Миллионы людей в мире выступают за мир.

В английском языке разряды чисел отделяются запятой: 1,000 – a thousand; 1,000,000 – one million. Десятичные дроби отделяются точкой 1.5 – one point five. В простых дробях числитель выражается количественным числительным, а знаменатель порядковым: ½ - a (one) half; $^{2}/_{3}$ – two thirds; $4^{5}/_{6}$ – four and five sixths.

Существительное, следующее за числительным, употребляется без предлога: eight students *восемь студентов* и т.п.

Производные количественные числительные пишутся через дефис: 23 twenty-three; 45 forty-five; 736 seven hundred and thirty-six.

Годы обозначаются количественными числительными: 1994 – nineteen ninety-four; 2012 – two thousand and twelve.

§16 Способы выражения будущего времени (The Future Tenses)

В английском языке применяются следующие видовременные формы для выражения будущего действия:

1. Future Indefinite – действие произойдет в какой-то момент в будущем.

Временные индикаторы: tomorrow, the day after tomorrow, two days later, next week, in a year, soon, in spring, in 2012.

She will go to Spain next year. – Она поедет в Испанию в следующем году.

2. Present Indefinite, обозначает действие, которое обязательно произойдет в будущем по расписанию, составленному графику, в соответствии с планом или программой.

The train arrives at 10 o'clock tomorrow. – Поезд прибудет завтра в 10 часов.

Our next meeting is on Friday. – Наша следующая встреча состоится в пятницу.

3. Present Continuous в значении будущего обозначает действие, запланированное по личной договоренности или заранее принятому плану (чаще с глаголами движения, а также с глаголами meet, see, have, take, give, get, do, work).

We are going to the cinema tonight. – Мы идем в кино сегодня вечером.

4. Конструкция to be going to + Infinitive *собираться, намереваться* означает, что решение о выполнении действия принято заранее.

He is going to take part in the conference. – Он собирается принять участие в конференции.

5. В придаточных предложениях времени и условия после союзов if, when, as soon as, till, until, before, after, in case для обозначения будущего времени употребляется форма Present Indefinite.

He will pay back when he gets money. – Он рассчитается, когда получит деньги.

Но если придаточное предложение выполняет функцию дополнения и отвечает на вопрос «что? чего?», то оно сохраняет форму Future Indefinite.

I will tell you when she will come. – Я сообщу вам, когда она придет.

§17 Модальные глаголы (Modal Verbs)

Модальные глаголы *must*, *can*, *may* употребляются в сочетании с инфинитивом смыслового глагола без частицы *to*. Они не обозначают действие, а выражают отношение к действию. Модальные глаголы не имеют неличных форм глагола, не имеют всех временных форм, не изменяются по лицам и числам, не имеют форм повелительного наклонения.

Must выражает необходимость, долженствование или вероятность совершения действия:

You must do it today. – Вы должны сделать это сегодня.

The baby must be sleeping. – Ребенок, должно быть, спит.

I think he must have already finished this work. – Я думаю, что он уже должен был закончить эту работу.

Can выражает возможность, физическую или умственную способность совершения действия:

He can play tennis. – Он может (умеет) играть в теннис.

May выражает разрешение, а также возможность, вероятность совершения действия:

We may call you tomorrow. – Мы можем позвонить вам завтра.

He may have seen her between 10 and 10.30. – Он, возможно, встречался с ней между 10 и 10.30.

May I go out? – Можно выйти?

Глагол *must* имеет лишь форму настоящего времени.

Глаголы *can* и *may* имеют также форму прошедшего времени *could* и *might*.

I could do that work. – Я смог сделать эту работу.

These facts might throw some light on the problem. – Эти факты могли бы пролить некоторый свет на проблему.

Вопросительная форма образуется путем постановки модального глагола перед подлежащим, а отрицательная – постановкой частицы *not* после модального глагола.

May your friends wait for you? – Твои друзья могут тебя подождать?

They cannot change their plans. – Они не могут изменить свои планы.

В качестве модальных глаголов употребляются также глаголы *ought to* и *should*.

Ought to употребляется для выражения морального долга или совета, относящегося к настоящему или будущему времени:

They ought to helps him. – Они должны (им следует) помочь ему.

You ought to be ashamed of yourself. – Вам следует стыдиться.

Should выражает слабую степень долженствования (по сравнению с *must*) и переводится *следует, надлежит*:

You should sign this contract. – Вам следует подписать этот контракт.

§18 Страдательный залог (The Passive Voice)

Действие, совершаемое над лицом или предметом, выражается страдательным залогом.

В английском языке страдательный залог образуется по правилу:

to be + Participle II / V_3,

где глагол *to be* указывает на время действия и согласуется в лице и числе с подлежащим,

Participle II у правильных глаголов образуется добавлением окончания *-ed* к основе глагола, а для неправильных глаголов – смотрим таблицу неправильных глаголов.

Например: to be tested; to be done; to be written

Tenses	Indefinite	Continuous	Perfect
Present	Devices are tested. (always, often, every week)	The device is being tested in the lab. (at present)	The device has been tested in the lab. (just now, already)
Past	Devices were tested. (last week, a year ago)	The device was being tested in the lab. (when we came, at 5 o'clock yesterday)	The device had been tested. (by 7 o'clock yesterday)
Future	Devices will be tested. (tomorrow, next week)	–	The device will have been tested by Monday next week. (by 2 o'clock tomorrow)

На русский язык глаголы в страдательном залоге могут переводиться:

1. сочетанием глагола *быть* с краткой формой страдательного причастия:

The article was published in the local paper. – Статья была напечатана в местной газете.

2. личными формами глаголов на *-ся (сь)*:

English is studied by our students. – Английский язык изучается нашими студентами.

3. глаголом-сказуемым в составе неопределенно-личного предложения:

He was offered a good job. – Ему предложили хорошую работу.
That new film is much spoken about. – Об этом новом фильме много говорят.

Если необходимо указать лицо или предмет, совершающие действие, то употребляются существительные или местоимения с предлогами *by* или *with*:

The telephone was invented by A. Bell. – Телефон был изобретен А Беллом.

§19 Эквиваленты модальных глаголов (The Equivalents of Modal Verbs)

Модальные глаголы *must, can, may* не имеют всех временных форм,(*must* имеет только форму настоящего, а *can* и *may* формы настоящего и прошедшего времени). Отсутствующие видовременные формы дополняются их эквивалентами.

Наряду с *must* и взамен недостающих форм употребляется глагол *to have +Infinitive*.

I have to get up early on week-days.	В будничные дни я должен вставать рано.
When my mother was ill I had to look after my little sister.	Когда мама болела, мне пришлось заботиться о младшей сестре.

You'll have to do this task yourself.	Вы должны будете выполнить задание сами.

Эквивалентом глагола *can* является глагол *to be able (to).*

You will not be able to see him before Sunday.	Вы не сможете увидеть его раньше воскресенья.

Для глагола *may* в значении разрешения используется глагол *to be allowed to.*

We will be allowed not to attend lectures tomorrow.	Нам разрешат не посещать лекции завтра.

<table>
<tr><th>Verb tense</th><th colspan="2">must - to have to</th><th colspan="2">can - to be able to</th></tr>
<tr><td>Present</td><td>must</td><td>have to (I, you, we, they)

has to (she, he, it)</td><td>can</td><td>(I) am
(he, she, it) is
(you, we, they) are } able to</td></tr>
<tr><td>Past</td><td></td><td>had to</td><td>could</td><td>(I, he, she, it) was

(you, we, they) were } able to</td></tr>
<tr><td>Future</td><td></td><td>shall

will } have to</td><td></td><td>shall

will } be able to</td></tr>
<tr><th>Verb tense</th><th colspan="4">may - to be allowed to</th></tr>
<tr><td>Present</td><td>may</td><td colspan="3">(I) am
(he, she, it) is
(you, we, they) are } allowed to</td></tr>
<tr><td>Past</td><td>might</td><td colspan="3">(I, he, she, it) was

(you, we, they) were } allowed to</td></tr>
</table>

Future		shall will } be allowed to

§20 Прямая и косвенная речь (The Direct and Indirect Speech). Правила согласования времен (The Sequence of Tenses)

Прямая речь – это речь, принадлежащая говорящему.

Косвенная речь – это передача высказывания другого лица. В косвенной речи соблюдаются правила согласования времен.

Косвенная речь передается при помощи главного предложения и дополнительного, придаточного предложения. Они соединяются союзами и союзными словами *that, what, how, why, whether (if), when* или бессоюзно.

Прямая речь	Косвенная речь
The girl said “I am a student”.	The girl said (that) she was a student.
Jane said, “I was at the theatre”.	Jane said (that) she had been at theatre.
The professor said “The exam will be held tomorrow.	The professor said that the exam would be held the next day.

При передачи приказания в косвенной речи глагол *to say* меняется на *to tell.*

The chief said to the secretary, “Bring some tea”.	The chief told the secretary to bring some tea.

Если просьба, то глагол *to say* меняется на глагол *to ask.*

He said, “Give me the book, please”.	He asked me to give him the book.

Отрицательная форма заменяется на *not to + infinitive* соответствующего глагола.

She said, “Don’t go there with him.”	She asked me not to go there with him.

Общий вопрос передается в косвенной речи при помощи *whether* или *if*.

He asked me, “Have you packed your things?”	He asked me whether (if) I had packed my things.

Времена заменяются при передачи прямой речи следующим образом:

Present Indefinite – Past Indefinite – I do – I did
Present Continuous – Past Continuous – He is doing – He was doing
Present Perfect – Past Perfect – We have done – We had done
Past Indefinite – Past Perfect You did – You had done
Past Continuous – Past Perfect Continuous – I was doing – I had been doing
Future Indefinite – Future – in – the Past – They will do – They would do

Также меняются:

here – there; this – that; these – those; now – then; today – that day; tonight – that night; yesterday– the day before yester day; two days ago – two days before;
last night – the previous night; tomorrow – the next day; next week – the next week;
in a month – a month later.

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Орлов Александр Викторович

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