

**ГОСУДАРСТВЕННОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ
ВЫСШЕГО ПРОФЕССИОНАЛЬНОГО ОБРАЗОВАНИЯ
«САМАРСКИЙ ГОСУДАРСТВЕННЫЙ АЭРОКОСМИЧЕСКИЙ
УНИВЕРСИТЕТ имени академика С.П. КОРОЛЕВА»**

РАДИОТЕХНИКА

Учебные задания по английскому языку

Самара 2006

ФЕДЕРАЛЬНОЕ АГЕНТСТВО ПО ОБРАЗОВАНИЮ

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РАДИОТЕХНИКА

Часть 1

Учебные задания по английскому языку

Самара 2006

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Данные учебные задания составлены в соответствии с требованиями программы по английскому языку для неязыковых специальностей вузов. Целью учебных заданий является повторение основных грамматических явлений и развитие навыков и умений чтения и перевода литературы по специальности «Радиотехники».

Предназначены для студентов 1 курса дневного отделения ф-та «Радиотехника». Подготовлены на кафедре иностранных языков.

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Рецензент Н. Г. С т е п н о в а

Unit 1. Faculty of Radioengineering

Topic: Faculty of Radioengineering

Grammar: The Active Voice. Simple Tenses.

Vocabulary:

- | | |
|----------------------------|----------------------------|
| 1. be founded v | быть основанным |
| 2. assistant professor n | доцент |
| 3. facilities n | удобства |
| 4. be equipped with v | быть оборудованным |
| 5. device n | аппарат, прибор, схема |
| 6. advanced students n | хорошо успевающие студенты |
| 7. postgraduate students n | аспиранты |
| 8. term n | семестр |
| 9. research n | исследование |
| 10. graduate n | выпускник |

Read the following international words and try to guess their meaning:

Assistant professor, automated control system, multichannel, manufacture, higher mathematics, social sciences, technique, analogue, apparatus, design.

TEXT A. *Read and translate the text:*

Faculty of Radioengineering

The Department of Radioengineering was founded as the base of the Radioengineering Faculty in 1962. It trains radio, electronic, computer, control, systems engineers who are working now in different fields of science and engineering.

More than 900 students are currently studying there. The teaching staff consists of professors, Doctors of Sciences, assistant professors, Candidates of Sciences and experienced teachers.

The Faculty has all the necessary facilities for teaching including computers, a well stocked library.

The students master such specialities as radioengineering, automated control systems, computer systems, automatic and multichannel communication, designing and manufacture of radioelectronic devices.

The first-year students study physics, higher mathematics, descriptive geometry, technical drawing, social sciences. Later they acquire profound knowledge in electronics, computing machinery etc. Special attention is given to such subjects as impulse technique, analogue and digital computers, theoretical foundations of electroengineering. The students get practical skills in different laboratories equipped with modern apparatus and devices. Advanced students carry out their research under the guidance of supervisors.

The course of study lasts for five years. The academic year is divided into two terms. The first term runs from September to February, the second – from February to July. Terminal examinations are held in January and June.

The students take an active part in social life of the University.

The postgraduate students carry out independent research working in close contact with the teaching staff.

The University provides good engineering education. The graduates of the Radioengineering Faculty work at computing centers, design offices, industrial enterprises, research laboratories.

Exercise 1: Answer the following questions:

1. When was the Radioengineering Faculty founded?
2. How many students study there?
3. What facilities is this faculty equipped with?

4. What specialities do the students master?
5. What subjects do the students study?
6. Where do the students get practical skills?
7. How long does the course of study last?
8. When do the students take their exams?
9. Where do the graduates work?

Exercise 2: *Say whether the statements are right or wrong. Use the following phrases: you are quite right; I'm afraid you're mistaken; you're wrong, etc.*

1. Radioengineering faculty trains only electronic engineers.
2. There aren't any facilities for training.
3. The first-year students study physics and mathematics.
4. Advanced students carry out their research under the guidance of postgraduate students.
5. The course of study lasts for five years.

Exercise 3. *Complete the sentences:*

1. The Department of Radioengineering was founded ...
2. The teaching staff consists of ...
3. The students master such specialities as ...
4. The academic year is divided ...
5. The postgraduate students carry out ...

Grammar: Active Voice

	Simple	Continuous	Perfect	Perfect Continuous
Present	V1(Vs) (Do; does)	To be (am, is, are) + Ving	Have (Has) + V3	Have (has) been Ving
Past	Ved(V2) (Did)	To be (was/were) + Ving	Had + V3	Had + been + Ving
Future	Will + V1	Will+ be+Ving	Will+have+V3	will+have been+Ving
Future-in-the-past	Would+V1	Would+be+ Ving	Would+have+ V3	Would+have+ been+Ving

Времена группы Simple обозначают факт совершения действия в настоящем, прошедшем и будущем.

The Present Simple Tense выражает обычное, повторное действие.

Утвердительная форма глагола совпадает с **инфинитивом** без частицы *to*:

To study – I (we, you, they) study

В 3-м лице единственного числа к глаголу добавляется окончание **–s (-es)**:

He (she, it) studies

Вопросительная и отрицательная формы образуются с помощью вспомогательного глагола *to do* (*do* и *does* (для 3-го лица ед.ч.)).

NB!: глагол *to be* и модальные глаголы не требуют вспомогательного глагола при образовании отрицания и вопроса.

They don't read (he doesn't read).

Where do you go? (where does she go?)

The Past Simple Tense выражает действие, законченное в прошлом.

Правильные глаголы образуют утвердительную форму путем прибавления окончания **—ed** к инфинитиву без частицы *to*.

To translate – I translated

Неправильные глаголы имеют особую форму, которая приведена в таблице неправильных глаголов.

To begin – he began

Вопросительная и отрицательная формы образуются с помощью вспомогательного глагола *to do* в форме *did*.

She didn't work.

When did you come?

The Future Simple Tense выражает будущее действие.

Утвердительная форма образуется при помощи вспомогательного глагола **will** и инфинитива без частицы *to*.

They will leave

What will he read?

Exercise 1: Write the following sentences in interrogative and negative forms:

1. I'm very busy today. 2. They are in the reading-room now. 3. We are students of one of the universities of Samara. 4. You are late for the lecture. 5. Mary is a good student. 6. Students have four exams in January. 7. Today they have time to go to the cinema. 8. We have some English magazines. 9. The book has many diagrams. 10. I have good news.

Exercise 2. Open the brackets using the correct form of the verb:

1. My brother (study) mathematics and physics at the university.
2. These scientists (work) abroad next year.
3. As a rule I (go) to the university by bus, but yesterday my father (give) me a lift because I (be) late.
4. The conference (take) place last month and we (not attend) it as we (not be) invited.
5. At present my colleague (not work) at this factory.
6. In some years we (graduate) from the university.
7. They (pass) all exams last month?
8. You (go) to the library tomorrow?
9. She (attend) this lecture every week?
10. I (leave) school three years ago.

Exercise 3: Write the following sentences in the Past or Future Simple :

1. We study six days a week. 2. I go to the institute every day. 3. My friend lives in a hostel. 4. Usually I get up at 7 o'clock. 5. My classes begin at half past eight. 6. We have four lectures every day. 7. After lectures we go to the library. 8. We do our home-work for the next day. 9. At night I read and watch TV. 10. On Sunday I visit my friends.

Exercise 4: Write the following sentences in interrogative and negative forms:

1. Today our lectures begin at 9 o'clock in the morning. 2. We were school-children last year. 3. We had four entrance exams in summer. 4. Yesterday the first-year students saw the institute laboratories. 5. We took all the necessary books from the library. 6. I got excellent marks for my entrance exams. 7. He knows the meaning of the word "engineering". 8. The students of our group will meet in the laboratory. 9. The librarian gave us all the necessary books.

TEXT B. *Skim through the text and give a title.*

The second half of the 19th century was a period of rapid growth of electrical engineering. Among those who founded this branch of knowledge and contributed to its further development are P. N. Yablochkov and A. N. Lodygin — two great Russian scientists and inventors.

Yablochkov invented the electric candle which became known all over the world under the name of "Russian Light".

At the time when the direct current was in universal use, he realized the advantages of alternating current.

The first incandescent lamp for practical use was produced in Russia in 1873 by the great Russian scientist Alexander Lodygin. In his lamp he fixed a small carbon rod of about 2mm in diameter between two copper conductors. In order to protect the lamp from burning through, the lamp's air had been evacuated. Vacuum at the time being far from perfect, the first lamp was short-lived. Its life was measured in hours.

In 1890 Lodygin made his first lamps with a metal filament using metals with high melting points, such as tungsten, molybdenum, osmium. Today the filament of the incandescent lamp is twisted into a spiral. The melting point of tungsten being 3,300°, it can be heated to 3,000°. At this temperature, however, tungsten begins to evaporate. In order to avoid evaporation of tungsten, today lamps are filled with chemically inert gas, i.e. argon or cripton. In a gas-filled incandescent lamp the ends of a filament are connected to the two wires passing through the bulb and attached to the metal base. One of the wires is attached to the base and the other — to the base contact insulated from the base.

The modern tungsten filament lamp in its present form is the result of the efforts of many inventors, but it is to Lodygin that it owes the principal feature of its design: the tungsten filament placed in an evacuated glass bulb and heated by electric current.

Exercise 1: *Put five questions to the text.*

Exercise 2: Discuss the inventions of Yablochkov and Loyigin.

Exercise 3. Translate the given words into Russian paying attention to the suffixes:

- 1.ER/OR — teacher, writer, reader, actor, doctor, professor
2. IST - scientist, artist, biologist, novelist, materialist
- 3.MENT - development, government, appointment, movement
4. ESS - actress, fortress, hostess
- 5.IAN - musician, politician, technician
- 6.ANCE - appearance, distance, importance
- 7.(T)ION - examination, operation, revolution, translation
- 8.ITY/TY - ability, complexity, honesty, majority, reality, unity
9. HOOD - brotherhood, girlhood, childhood, neighbourhood
10. Y - assembly, energy, poultry

Exercise 4. Translate into Russian paying attention to the numerals:

1. The tenth of February nineteen seventy two. 2. The fifth of April eighteen sixty five. 3. The second of May nineteen hundred and three. 4. The first of June thirteen hundred. 5. The third of October seventeen forty eight. 6. In eighteen thirty seven. 7. In twelve hundred and four. 8. The twenty fifth of December nineteen ninety one. 9. In eighteen twelve. 10. On the ninth of May nineteen forty five. 11. On the eleventh of July twenty hundred and one. 12. In twenty hundred. 13. On the sixth of November nineteen ninety. 14. In seventeen zero eight.

Exercise 10. Translate into English:

- 1) 7 ноября 1990 года, 2) 3 сентября 1984 года, 3) двадцать второго апреля 1907 года, 4) 25 марта 2000 года, 5) двенадцатого декабря 2001 года, 6) 23 июня 12

1112 года, 7) в 1749 году, 8) третьего февраля 1002 года, 9) в 1608 году, 10) тридцать первого июля 1305 года.

Text C. *Translate the text in writing:*

Guglielmo Marconi (1874-1937) : turning on radio

Guglielmo Marconi is regarded as the grandfather of radio communication, who devised the first practical system of wireless telegraphy. Alongside innumerable awards, honours and doctorates, Marconi was jointly awarded the Nobel Prize for physics in 1909.



The son of an Italian father and Irish mother, he made the most of his family's wealth to experiment with physics and electronics on his father's Italian estate, where he successfully managed to send wireless (radio) signals over 1.5 miles.

He moved to England in 1897 to show off his new invention, and following its enthusiastic reception, set up 'The Marconi Wireless Telegraph Co. Ltd'. He continued with more demonstrations, each time increasing the distance covered by the wireless and established permanent wireless links in southern England.

In 1901 he proved that radio waves would bend around the curvature of the Earth, by broadcasting across the Atlantic. He went on to develop improvements to wireless transmission and reception equipment, long-range communications, microwave communication and laid the foundations for radar.

Unit 2. Radio

Topic: What is Radio?

Grammar: The Active Voice. Continuous Tenses.

Vocabulary:

- | | |
|----------------------|--|
| 1. receiver n | радиоприёмник, телефонная трубка, получатель |
| 2. transmitter n | (радио) передатчик |
| 3. pick up v | захватывать, подбирать, принимать |
| 4. discharge n | разряд |
| 5. thunder-storm n | гроза |
| 6. indicator n | индикатор |
| 7. dots and dashes n | точки и тире |
| 8. wireless adj | беспроводной |
| 9. transmit v | передавать |
| 10. measure v | измерять |

Say what parts of speech the following words belong to:

invent – invention – inventor – inventive

receive – receiver – reception – receptive

light – lighten – lighter – lightning

charge – charger – discharge

transmit – transmission – transmitter

communicate – communication - communicator

Text A. Read and translate the text:

Radio

Radio was invented in Russia. The world's first receiver was built in 1895 by the great Russian scientist Alexander Popov. There were no transmitters then, therefore his receiver could only pick up signals produced by lightning dis-

charges during a thunder-storm. Popov demonstrated a device called a storm indicator at a meeting of scientists in St. Petersburg on May 7, 1895. This day is marked now as a Radio Day.

Soon A. Popov found a way of transmitting Morse code signals. In 1896 he sent the world's first wireless telegram over a distance of 250 m, and four years later the range of transmission was increased to 50 km. Since then, the methods of transmission and reception have been constantly improved. Nowadays radio communication has no limits.

The very first apparatus for radio communications was called wireless telegraph or wireless telephone. Later a shorter word "radio" (from latin "radius" — ray) was taken. The word is used because electromagnetic or radio waves travel from a radio station along radii, just as rays of light at the speed of 300,000 km/sec.

Radio is a special kind of long-distance electrical communications. It makes possible to send different signals such as dots and dashes of the Morse code (radio-telegraphy), speech and music (radio telephony), images of objects and films (television). Radio helps us to maintain contact with ships, with aircraft in flight or a spacecraft. Radio helps us to detect an aircraft flying high above the clouds (radio location, or radar) and measure the distance to it. Space stations photographed, on a command transmitted by radio from the Earth, the hidden side of the Moon and sent its pictures back to the Earth.

Daily radio programmes include lectures, reports, and concerts. Radio is a powerful means of spreading knowledge.

Exercise 1. Answer the following questions:

1. Where was radio invented?
2. What was A.Popov?
3. What device did A.Popov invent?
4. What device did A.Popov demonstrate?
5. When was the world's first wireless telegram sent?
6. When was a storm indicator demonstrated to a group of scientists?

7. What day is marked as a Radio Day?
8. What are Morse code signals?
9. How does radio help us in everyday life?

Exercise 2. Say whether the statements are right or wrong. Use the following phrases: you are quite right; I'm afraid you're mistaken; You're wrong.

1. Radio was invented in Russia.
2. A. Popov's receiver could only pick up and transform signals produced by lightning discharges during a thunder-storm.
3. In 1898 A. Popov sent the world's first wireless telegram over a distance of 250m.
4. Radio is a special kind of short-distance electrical communications.
5. Radio helps us to see an aircraft flying high above the clouds.

Exercise 3. Complete the sentences:

1. The world's first receiver was built ...
2. Popov demonstrated a storm indicator...
3. The very first apparatus for radio communications was called ...
4. Radio is ...
5. Radio helps us to ...

Grammar

Времена группы Continuous употребляются для выражения действия, происходящего в какой-то определенный момент времени в настоящем, прошедшем и будущем.

Времена группы Continuous образуется с помощью вспомогательного глагола **to be** в соответствующем времени, лице и числе и причастия I (глагола с окончанием **-ing**).

The Present Continuous Tense

I am (he (she, it) is; we (you, they) are writing;

Отрицательная форма образуется путем добавления частицы **not** к глаголу *to be*; вопросительная форма – путем инверсии.

They are not translating. Are they sleeping?

Exercise 1: Open the brackets using Simple or Continuous Tenses:

1. Our teacher (speak) several foreign languages.
2. Who (speak) now?
3. Where is Ann? She (play) the piano.
4. I (go) home when we met.
5. Listen, my daughter (sing).
6. They (translate) this text last lesson.
7. You (do) some exercises tomorrow.
8. It (rain) when I went for a walk.
9. We (discuss) your plan tomorrow at 10 a.m.
10. What she (do) here?
11. I (not smoke) at the moment.
12. The friends (translate) the article the whole evening yesterday.
13. He (come) here?
14. Our engineer (leave) for Moscow some days ago.
15. The train (leave) in some seconds.
16. When you (go) to visit your grandfather?
17. The delegation (arrive) next Monday.
18. You (know) this man?
19. Look, how quickly they (run).
20. As a rule I (go) to my work on foot.
21. I (phone) him tomorrow?
22. Everybody (work) in the lab now.
23. They (walk) from 9 till 12.

Exercise 2: Open the brackets using the Verb in the correct form. Put the verbs in the negative form.

1. It often snows here, but it (not snow) now. 2. You are always busy, and what you (do) at 10 tomorrow? 3. Yesterday I watched TV, but I (not watch) it the whole day. 4. Every term we write some tests, but the test I (write) at the moment is very difficult. 5. The students (translate) this text the whole lesson tomorrow? 6. This rain started in the afternoon and it (rain) now. 7. At whom she (look) when I came in? 8. The boys often play various games and now they (play) football. 9. My children took this book in the library and they (read) it the whole evening. 10. Don't close the lab, please, the students (work) here from ten till twelve.

Exercise 3: Choose the correct form

1. We ... a technical text now.
a) are translating b) translate c) translates
2. We usually stories.
a) are not translating b) do not translate c) is not translating
3. She through all the newspapers every evening.
a) does not look b) don't look c) is not looking
4. Hewhen the telephone rang.
a) looked b) look c) was looking
5. I television every day.
a) watches b) watch c) am watching
6. The studentsan interesting discussion when the teacher came in.
a) have b) had c) were having
7. The students often interesting discussions after lectures.
a) have b) has c) are having
8. When he comes theya test.
a) will be taking b) takes c) will take
9. They a test next week.
a) will took b) will be taking c) will take

Exercise 4: *Translate into English paying attention to the tense-forms of the predicate.*

1. Сейчас у нас урок английского языка. Преподаватель стоит у доски и объясняет новый грамматический материал. Студенты внимательно слушают и записывают. 2. Где вы были вчера после обеда? Я был дома весь день. Я писал письмо другу. 3. Что ты делал 5 минут назад? 4. На нашей улице произошел несчастный случай. Я смотрел в окно, когда он произошел. 5. Что будет делать твоя сестра в 8 часов вечера? Она будет выполнять домашнее задание? 6. Какие вопросы будут обсуждаться сегодня на собрании? – Приходите в 12 часов. Будет обсуждаться очень интересный вопрос. 7. Когда мы приехали в город, там строился новый спортклуб.

Text B. *Read and translate the text without a dictionary:*

The First Stations

In 1916 an amateur operator and engineer for Westinghouse Electric began broadcasting programs from his garage on amateur station 8XK in Wilksburg, Pennsylvania. The broadcasts were enthusiastically received by other Radio amateurs who liked hearing wireless music. The broadcasts resulted in a newspaper article which generated such interest, that Westinghouse decided to build a station for the purpose of broadcasting. The station, KDKA, was rushed to launch its first broadcast for the election returns of the Harding-Cox presidential race. It was the first programming to reach a sizable audience (perhaps 1,000 persons mainly ham and amateur Radio operators). The returns were read by Leo Rosenberg, who later claimed to be the first professional Radio announcer. KDKA also hired the first full-time announcer Harold W. Arlin, who became the first sportscaster to do play-by-play football. The newspapers (2,000 across the country) having not yet realized that they were promoting a competitor, were so enamored with the medium that they printed daily broadcast schedules. KDKA broadcast the first remote, the first religious service, the first broadcast from a theater, and the first prizefight, all in 1921.

The first commercial was claimed to be sent out over WEAJ in New York City in 1922, however that is disputed because in KDKA's initial broadcasts announcers mentioned a record store in exchange for records to play on the air, as did KQW announcers in San Jose, California. (It's interesting to note that Westinghouse, which owned KDKA, was founded by George Westinghouse, the first owner of an electric company to employ the principles of alternating current. These principles were obtained through a relationship with Nikola Tesla who held the patent, and also had the patent on wireless transmission.)

But was KDKA the first station? Though its November 2, 1920 debut is considered the official start of Radio broadcasting, others were doing the same prior to KDKA. Earlier that same year, in Detroit, WWJ using call letters 8MK began regular broadcasts. And much earlier, in 1912, Charles David Herrold began regular, continuous broadcasts of music and information in San Jose. The amateur station was well-known around the Bay area. It eventually became KQW and then KCBS.

In 1913 the physics department at Iowa State University began wireless demonstrations and is documented by a newspaper article to have done one such demonstration at the Iowa State Fair in 1915. It became station 9YI and later WOI. With groundwork dating back to 1904, the University of Wisconsin in Madison experimented with voice and music transmission in 1917. Their calls were 9XM, and later WHA.

Exercise 1: *Put five questions to the text.*

Exercise 2: *Divide the text into logical parts. State the subject of each part and entitle it:*

Exercise 3. Translate the given words into Russian paying attention to the suffixes:

1. SHIP - friendship, leadership, membership
2. AGE - carriage, marriage, passage,
3. ISM - capitalism, heroism, socialism

4. ANT - assistant, consultant,
5. ENCE - conference, difference, science
6. URE - agriculture, picture, culture, nature
7. ING - building, meeting, reading, saying,
understanding
8. DOM - freedom, kingdom, wisdom
9. SION/SSION - decision, precision, session, discussion,
impression
10. NESS - darkness, illness, happiness

Exercise 4. Say the following numbers in English:

- a) 3, 5, 11, 12, 13, 22,
23, 28, 51, 69, 80, 326, 1005, 530 435, 3 857 925, 8 274 597 330,
12 545 600 208.
- b) 1, 2, 3, 4, 12, 15, 23, 37,
52, 85, 149, 207, 1008, 2 000 325.

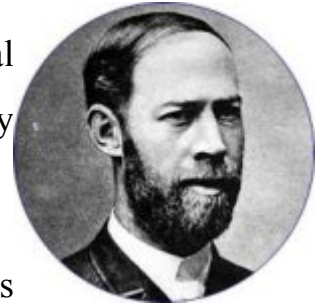
Exercise 5. Translate into English:

- 1) Два миллиарда тонн, 2) триста восемьдесят пять страниц, 3) миллионы книг,
4) одна четвертая территории, 5) двадцать первое декабря 1991 года,
6) двенадцатое марта 1800 года, 7) три пятых пути, 8) ноль целых двадцать
пять сотых, 9) четыре целых одна треть, 10) двадцать пять целых пять
шестых, 11) одиннадцать целых сто восемь тысячных, 12) 7 часов ровно, 13) без
четверти семь, 14) половина десятого, 15) десять минут десятого.

Text C. Translate the following text in writing.

Hertz, Heinrich (1857-1894): one small leap, one giant step

Heinrich Hertz was the first man to transmit an electrical current between two points without using a wire, paving the way for radio.



A physics teacher in Germany, he had read Maxwell's ideas on electricity and developed an experiment to see if the theories stood up to practice.

In a corner of his polytechnic laboratory in Berlin, he made an electric charge jump from one metal rod to another. This small leap was a giant step. It proved that electromagnetic (radio) waves did exist and also that they moved at the speed of light.

Although an amusement for the students, Hertz could find no practical use at all for this discovery. It was left to Marconi to exploit the idea for transmitting radio.

Hertz died of blood poisoning aged only 37, but his name lives on as the unit for measuring radio frequencies-one cycle per second-the 'Hertz'.

UNIT 3. Electricity

Topic: What is Electricity?

Grammar: The Active Voice. The Perfect Tenses.

Vocabulary:

- | | |
|------------------|------------------------|
| 1. electricity n | электричество |
| 2. transform v | превращать, обращать |
| 3. application n | приложение, применение |
| 4. lighting n | освещение |
| 5. workshop n | мастерская |
| 6. device n | устройство, прибор |
| 7. generator n | генератор |
| 8. provide v | обеспечивать |
| 9. source n | источник |

Read and translate the following words and word combination:

Transform, lighting, electrochemistry, electrometallurgy, electrostatics, electromagnetism, dynamo, indicator.

Text A. Read and translate:

Electricity.

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

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

With the appearance of the electrical motor, power cables replaced transmission shafts, gear wheels, belts and pulleys in the 19-th century workshops. And in the

home a whole range of various time and labour saving appliances have become a part of our everyday lives.

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

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

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

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

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

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

Notes to the text:

1. transmission shafts, gear wheels, belts and pulleys – трансмиссионные валы, зубчатые колеса, ремни и блоки
2. time and labour saving appliances – электроприборы, экономящие время и труд
3. induction motors – индукционные моторы

4. per capita – на человека; на душу населения
5. by-products – побочные продукты

Exercise 1: Answer the following questions.

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

Exercise 2: Complete the sentences.

1. Thousands of applications of electricity such as are longstanding and unquestionable.
2. Other devices are based on specific properties of electricity:.....
3. The generator – – was also developed there.
4. is an indicator of the state of development and economic health of a nation.
5. One of the greatest advantages of electricity is

Exercise 3: Suggest another title for the text.

Grammar

Времена группы **Perfect** употребляются для выражения действия законченного, завершеного к какому-то моменту времени в настоящем, прошедшем и будущем.

Времена группы Perfect образуются с помощью вспомогательного глагола to have в соответствующем времени (**have/has; had; will have**), лице и числе и причастия II смыслового глагола (V₃).

He has just started the experiment.

They hadn't arrived yet.

I'll have finished by 6 o'clock.

Времена группы **Perfect Continuous** обозначают начатое действие, которое длится в определенный момент в настоящем, прошедшем или будущем, и образуются при помощи глагола *to have* в соответствующем времени (**have/has; had; will have**), 3 формы глагола *to be* (**been**) и смыслового глагола с окончанием **-ing**.

He has been working here for 3 years.

Exercise 1: *Translate into Russian and explain the use of tenses.*

1. I have just turned the radio on.
2. He has never been to India.
3. He understood the text after he had read it again.
4. We had been conducting this experiment for two hours before you came.
5. I haven't seen him since he graduated from the University.
6. They will have finished their work by Monday.
7. He had finished his work by five o'clock yesterday.
8. Russian Radio has been transmitting its programmes to other countries since the 30s.
9. The technician will have recorded the data before you come.
10. Electronic has made a rapid progress.

Exercise 2: *Open the brackets.*

1. You (see) this film already?
2. The students (do not) the exercise yet.
3. Who (read) my book by Monday?
4. I (meet not) this woman before.
5. The postman (bring) already the telegram when we came home.

6. The postgraduates (write) their papers by the end of the term.
7. When they arrived the concert already (begin).
8. Oh, I (not see) you for ages.
9. He (be) ever abroad?
10. Ann, mother hopes that you (come) home by 3 o'clock.
11. Before the army my brother (work) at the Rostselmash.
12. They just (return) from the conference.
13. I never (show) this picture to anybody.
14. You (speak) to him about my son?
15. Our family (live) in Taganrog before we moved in Rostov.
16. We (finish) our work before it rains.

Exercise 3: Choose the right form.

1. We often translate technical texts. I just this text.
a) has translated b) translated c) have translated
2. Were you writing a letter when I came in? No, by that time I my letter already.
a) have translated b) had translated c) will translate
3. Now he makes experiments in our lab, and where hethem before?
a) has made b) had made c) makes
3. When will you finish your work? Iit by tomorrow.
a) will have finished b) will be finished c) will finish
4. Yes, I saw this film last week and it was the best film I ever.....
a) has seen b) have seen c) had seen
5. Where are his parents? They to Moscow recently.
a) went b) go c) have gone
6. As a rule the postman comes at 9 o'clock but today he earlier.
a) have come b) has come c) come
7. Did you speak to his mother? Yes, Ito her already.

- a) has spoken b) have spoken c) spoke

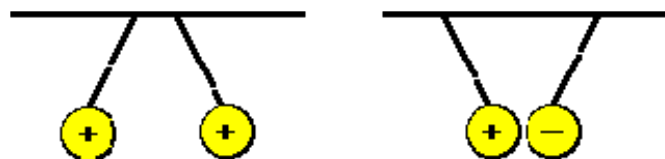
8. By the time you moved to our city we already this house.

- a) had built b) will have built c) built

Text B. Read and translate the text without a dictionary:

What is Electricity?

Everything we see is made up of tiny little parts called atoms. The atoms are made of even smaller parts. These are called protons, electrons and neutrons. They are very different from each other in many ways. One way they are different is their "charge." Protons have a positive (+) charge. Electrons have a negative (-) charge. Neutrons have no charge. Usually, atoms have the same number of electrons and protons. Then the atom has no charge, it is "neutral." But if you rub things together, electrons can move from one atom to another. Some atoms get extra electrons. They have a negative charge. Other atoms lose electrons. They have a positive charge. When charges are separated like this, it is called static electricity. If two things have different charges, they attract, or pull towards each other. If two things have the same charge, they repel, or push away from each other.



So, why does your hair stand up after you take your hat off? When you pull your hat off, it rubs against your hair. Electrons move from your hair to the hat. Now each of the hairs has the same positive charge. Things with the same charge repel each other. So the hairs try to move away from each other. The farthest they can get is to stand up and away from all the other hairs.



If you walk across a carpet, electrons move from the rug to you. Now you have extra electrons. Touch a door knob and ZAP! The electrons move from you to the knob. You get a shock.

Exercise 1: *Put five questions to the text.*

Exercise 2: *Imagine that you are a Student and your partner is a Professor of Physics. Ask him for some information on Electricity.*

Exercise 3: *Write out words connecting with the term “Electricity”.*

Exercise 4. *Read and translate the given words into Russian paying attention to the suffixes:*

- 1) ABLE - comfortable, eatable, miserable
- 2) AL - cultural, natural, territorial
- 3) ANT - distant, important, resistant
- 4) ARY - necessary, ordinary, revolutionary
- 5) ED - developed, interested, talented
- 6) ENT - different, dependent, transparent
- 7) FUL - beautiful, careful, powerful, useful
- 8) IAN - Canadian, Russian, Rumanian
- 9) IBLE - convertible, possible, terrible, visible
- 10) IC - atomic, heroic, historic, poetic
- 11) ING - disappointing, interesting
- 12) ISH - boyish, reddish, Irish, Spanish
- 13) IVE - detective, effective, impressive, inventive

14)LESS - hopeless, homeless, lifeless, useless

15)OUS - dangerous, famous, various

16)Y - busy, dirty, rainy, sunny, windy

Text C. *Translate the text in writing.*

Michael Faraday

Michael Faraday (1791-1867), an Englishman, made one of the most significant discovery in the history of electricity: Electromagnetic induction.

He was born in a small village near London on September 22, 1791 in the family of a blacksmith. When he was thirteen, he went to work in a bookbinder's shop, where he lived among the books and where he got interested in science, and especially in electricity and chemistry. Later, having begun to work in the laboratory of Humphry Davy, the most popular lecturer in London at that time he studied electricity and then he himself began to teach.

During his lifetime Faraday made more than two thousand difficult experiments and made countless discoveries in chemistry and physics. But the most important discovery of his is the generation of electricity from magnetism.

After some more experiments he made a machine, that gave Faraday a current of electricity.

This was the beginning of all the great machines that make electricity today. These machines light and heat our houses, they make our radio sets work, they move our electric trains. It was the beginning of the electric age, which has changed the face of the Earth.

The farad, the unit of capacitance is named in the honor of Michael Faraday.

UNIT 4. The Story Of Television

Topic: Television

Grammar: The Passive Voice

Vocabulary

- | | |
|--------------------|-------------------------------------|
| 1. broadcast v | передавать по радио |
| 2. medium (media)n | среда |
| 3. breakthrough n | прорыв |
| 4. decade n | десятилетие |
| 5. accurate adj | точный |
| 6. available adj | доступный, имеющийся в распоряжении |
| 7. databank n | банк данных |
| 8. dominate v | преобладать |

Read and translate the following international words:

Vision, dominate, media, budget, boom, service, coronation, audience, decade, medium, accurate.

Text A. Read the following text:

The Story So Far

The idea of a machine able to broadcast both sound and vision goes back to 1875. But it wasn't until 1926 that a Scottish engineer turned the idea into a practical reality. Now, his invention dominates the modern media. This is its story.

John Logie Baird produced the first television pictures just eight years after the First World War. They were in black and white and were not very clear, but he had proved that the principle worked. Early sets made in the years Baird's breakthrough cost as much as small car and not many were sold. Soon, though, his original system was improved and in 1936 Britain's first regular TV programme went on the air. "Here's Looking At You" was broadcast by the BBC from north London's

Alexandra Palace studios twice a day for a weekly budget of one thousand pounds. But Great Britain wasn't the only country producing programmes. Other European nations, including Germany, were also involved in the early days of television. As, of course, was America – and it's there that the real TV revolution began after World War Two.

US television boomed in the late '40s. Commercial stations began to open in almost every city, and national networks made programmes which were seen from coast to coast. One of the American networks – CBS – even developed a colour service as early as 1951. Two years later, TV took another important step when it covered its first major international event – the coronation of Britain's Queen Elizabeth II. It was the first time that a worldwide audience of millions had seen history take place in their own homes.

By the end of the decade, TV culture was rapidly becoming a fact of life on both sides of the Atlantic. Even so, it was still a very young medium – lots of people didn't have sets – and many experts thought it wouldn't last. That all changed in the '60s and '70s, though, as television started to satisfy the public's desire, not just for entertainment, but also for rapid, accurate information. As more and more sets were sold, the importance of TV news quickly grew. After all – what other medium could show you live – as TV did in 1969 – Neil Armstrong's first steps on the moon?

Exercise 1: *Insert the proper words:*

- 1) They were in black and white and were not very ...
- 2) Early sets made in the years Baird's ... cost as much as a small car.
- 3) In 1936 Britain's first regular TV programme went on the ...
- 4) Other European nations were also ... in the early days of television.
- 5) It was still a very young ... and many experts thought it wouldn't last.

Air, clear, medium, involved, breakthrough

Exercise 2: Answer the questions:

- 1) Where does the idea of TV go back to?
- 2) Who produced the first television picture?
- 3) When did US television boom?
- 4) What other developments connected with TV can you mention?
- 5) Can you foresee the future of television?

Exercise 3: Say if the following statements are true or false:

- 1) The idea of broadcasting both sound and vision was turned into practical reality in 1875.
- 2) The first television pictures were colour.
- 3) Early sets made in the years Baird's breakthrough cost as much as a small car.
- 4) Great Britain was the only country producing programmes.
- 5) Television started to satisfy the public's desire for entertainments.

Grammar**The Passive Voice**

	Present	Past	Future	Future-in-the-Past
Simple	The book is written.	The book was written.	The book will be written.	The book would be written.
Continuous	The book is being written.	The book was being written.	-----	-----

Perfect	The book has been written.	The book had been written.	The book will have been written.	The book would have been written.
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1) Дополнение в предложении с глаголом-сказуемым в страдательном залоге может употребляться с предлогом **by** (действующее лицо) или **with** (орудие действия).

The drying of materials is effected by a high-frequency current.

Сушка материалов производится током высокой частоты.

This laboratory is provided with the most modern equipment.

Эта лаборатория оснащена самым современным оборудованием.

2) Глагол в страдательном залоге можно переводить на русский язык :

- глаголом быть (в прошедшем и будущем времени) и краткой формой причастия;
- неопределенно-личной формой глагола
- подлежащее в предложении с глаголом в страдательном залоге переводится на русский язык существительным в винительном или дательном падеже.

He was offered this job himself.

Ему самому предложили эту работу.

A body at rest remains at rest unless it is acted upon by an external force.

Тело, находящееся в покое, остается в состоянии покоя, пока на него не воздействует внешняя сила.

The gamma rays are affected by a magnetic field.

Магнитное поле оказывает воздействие на гамма лучи.

It has long been known that lightning is nothing else but an electric spark.

Давно известно, что молния – не что иное, как электрическая искра.

Exercise 1: *Translate the following sentences into Russian:*

- 1) Sounds are produced by the vibration of matter.
- 2) The translation from one language into another will soon be performed by the computers.
- 3) The agreement was signed ten years ago.
- 4) While the experiment was being carried out nobody left the laboratory.
- 5) Now solar energy is being studied by a lot of research groups.
- 6) The apparatus will be working when you come.
- 7) A new method has been used in order to investigate this problem.
- 8) The new apparatus had already been installed when the delegation arrived.
- 9) Your report will have been published by the end of the year.

Exercise 2: *Translate the following sentences paying attention to the tense and voice of verbs:*

1. a) The work on the apparatus is almost finished.
b) The work on the apparatus is being finished.
c) The staff of the laboratory is finishing the work on the apparatus.
2. a) The plans are usually discussed at the beginning of the year.
b) They are discussing the plans of the next year.
c) The plans of the next year are being discussed at the meeting.
3. a) While he was having dinner, his car was being cleaned.
b) Do you know who was cleaning the car?
c) Was your car cleaned well?

Exercise 3: *Say the following sentences in the Passive Voice.*

- 1) I shall inform you about the new discovery.
- 2) Solar batteries generate electricity.

- 3) The researcher carries out the experiments at high temperatures.
- 4) Radio employs electrical energy to transmit sounds, images and signals.
- 5) New data will support the results of our research.
- 6) These devices distribute the electric energy.
- 7) A.S.Popov invented the first radio receiver.
- 8) Our engineers are producing a new type of computing equipment.
- 9) Two ventilators were purifying our laboratory for twenty minutes.
- 10) A lot of research groups are studying solar energy now.
- 11) After they had tested the new device it was installed in our laboratory
- 12) They will have completed the construction of this television center by the end of the next year.
- 13) We had repaired this equipment before you came.
- 14) We have just translated this text.

Exercise 4: *Insert the verbs in brackets in the proper form.*

- 1) The positive results (obtain) until a more powerful apparatus (install).
- 2) They (determine) the main properties of the substance.
- 3) The explanation of these strange facts (not/give) yet.
- 4) He (offer) a very interesting job at the Institute.
- 5) All the necessary information (store) in the computer.
- 6) At the Institute the students (teach) many different subjects.
- 7) At the factory the young workers (train) to use the new equipment.
- 8) After careful consideration your report (publish) in one of the forthcoming issues of the journal.
- 9) The problem of the future of human civilization on the Earth is (study) by the scientists throughout the world.
- 10) Numerous questions (discuss) by the commission at the moment.

Exercise 5: *Translate the following sentences into English using the Passive Voice.*

- 1) Перед экспериментом вещества смешали в большом сосуде.
- 2) Этот прибор предпочитают всем остальным по причине его высокой надежности.
- 3) Профессор ссылался на результаты последнего эксперимента.
- 4) Автоматизация все больше используется во всех отраслях промышленности.
- 5) Недавно были произведены несколько попыток создать искусственный дождь.
- 6) Результаты уже должны быть опубликованы.
- 7) Во время эксперимента температура должна поддерживаться на уровне 20°C.

Text B. *Read and translate the text:*

Early Television Foundation

The first mechanical television systems were developed by John Logie Baird in England and by Charles Jenkins in the USA in the mid 20s. Picture quality was very poor, and the screens were only an inch or so wide and were made up of only 30 to 60 lines (compared to 525 lines in the present U.S. system). These sets used a motor to rotate a metal disk to produce a picture rather than a picture tube. A neon tube behind the disk provided the light.

By 1930, television was being broadcast from over a dozen stations in the U.S., not only from the major cities such as New York and Boston, but also from Iowa and Kansas. Several manufacturers were selling sets and kits. The frequencies used for TV broadcasting at that time could travel long distances, so reception was possible hundreds of miles from the station. However, the pictures suffered from not only poor resolution, but also fading and ghosting.

In England, regularly scheduled 30 line television programming was first broadcast by the BBC in September of 1929. At first, only the picture was transmitted for a few hours a week, after regular radio broadcasting was completed for the day of March of 1930, sound and pictures were transmitted together. Because of the poor picture quality, mechanical television was not a success. By 1933 most stations were off the air in the United States. 30 line transmission by the BBC continued until 1935, when electronic television broadcasting started.

Exercise 1: Put five questions to the text.

Exercise 2: Discuss the first stages of television development.

Exercise 3: Form nouns adding the suffixes –er, -or to the given verbs.

Translate the nouns and verbs into Russian:

to design – designer

To build, to operate, to contain, to receive, to produce, to transmit, to invent, to discover, to drive, to translate, to convert, to regulate, to accumulate, to react, to use, to vibrate, to record.

Exercise 4: Give the initial words of the following derivatives:

Different, communication, cooker, technological, invisible, equipment, vibration, quickly, responsible, relatively, typical, ceaselessly, probably, magnetic, ultraviolet, announcement, occurrence, transmitter, receiver, organization.

Exercise 5: Make sure if you can read these words correctly and say what words in the Russian language help you to guess their meaning:

Modern, person, phonograph, code, signal, telegraph, symbol, method, diaphragm, experiment, poem, to reproduce, stereo, process, principle, line, microphone, original, laboratory, energy, apparatus, instrument, diameter, type.

Text C. Translate the text in writing.

Since 1980 there have been four more major developments.

The first is video, which has given viewers the power to control what they watch and when they watch it. These days, fifty percent of homes have a VCR (video-cassette recorder) and millions more are being sold every year.

The second is satellite TV. Thanks to DBS (direct broadcast satellites), dozens of new channels are now available to anyone who buys a receiving “dish”. Many of these new channels specialize in one kind of programme – e.g. news, sport, cartoons, music, movies.

The third development is cable – a system of hi-tech wires, which provides even more channels... at a price. But not only that. Cable also makes it possible for you to communicate through your TV.

Fourthly, there’s HDTV (high definition television), which now offers a much clearer and more realistic picture than was possible even a few years ago.

So... more channels, more choice, more clarity. What is there left for TV to achieve in the future? The answer to that is two-way communication. Modern technology means that twenty-first century televisions will be linked to computer databanks. This way, viewers will be able to ask questions (via remote control) about what they’re watching and the answers will appear on their screens. This idea is called “hyper-media” and it’s still at an early stage. But then, as we’ve just seen, TV has come a very long way in a very short time. The hyper- media revolution could happen sooner than many people think.

UNIT 5. Vacuum Tubes

Topic: Vacuum Tubes

Grammar: Degrees of Comparison

Vocabulary

- | | |
|--------------------|------------------------------|
| 1. amplify v | усиливать |
| 2. discrete adj | отдельный |
| 3. circuit n | схема, цепь |
| 4. arrangement n | расположение |
| 5. envelope n | оболочка, баллон |
| 6. lead n | провод |
| 7. incandescent | накал, накаливание |
| 8. evacuate v | выкачивать |
| 9. space charge n | пространственный заряд |
| 10. intercept v | перехватывать, останавливать |
| 11. grid n | сетка |
| 12. distortion n | искажение |
| 13. remedy v | исправлять |
| 14. ubiquitous adj | широко распространенный |
| 15. inherent adj | присущий |

Say what parts of speech the following words belong to:

Amplify – amplification – amplifier

Apply – application – applicable

Emit – emitter – emission

Place – replace – replacement

Observe – observation – observer – observatory

Correspond – corresponding – correspondingly – correspondence

Satisfy – satisfaction – satisfactory - unsatisfactory

Text A. *Read and translate the following text.*

Vacuum Tubes

In electronics, a vacuum tube is a device generally used to amplify a signal. Once used in most electronic device, vacuum tubes are now used only in specialized applications. For most purposes, the vacuum tube has been replaced by the much smaller and less expensive transistor, either as a discrete device or in an integrated circuit. At the start of the 21st century there has been renewed interest in the vacuum tube, this time in the form of the Field-emitter microtube.

Vacuum tubes, thermionic valves are arrangements of electrodes in a vacuum within an insulating, temperature-resistant envelope. Although the envelope was classically glass, power tubes often use ceramic and metal. The electrodes were attached to leads which passed through the envelope, in a way that was sealed air tight. On most tubes, the leads were designed to plug into tube sockets for easy replacement.

The simplest vacuum tubes resemble incandescent light bulbs, in that they have a filament sealed in a glass envelope, which has been evacuated of all air. When hot, the filament releases electrons into the vacuum, a process called thermionic emission. The resulting negatively-charged cloud of electrons is called a space charge. These electrons will be drawn to a metal plate inside the envelope if the plate, also called the anode, is positively charged. This results in a current of electrons flowing from filament to plate. Obviously this does not work the other way round, because the plate is not heated, so we have a diode, a device that conducts current only in one direction.

Development

John Ambrose Fleming, scientific adviser to the Marconi company invented the diode in 1904 based on an observation by Thomas Edison. The unidirectional current and construction of the original diode led to Lee DeForest placing another electrode, a bent wire or screen called the grid, between the filament and plate in 1907. De Forest discovered that the current flow from filament to plate depended on the voltage applied to the grid, and that the current drawn by the grid was very low, being

composed of the electrons which are intercepted by the grid. As the applied voltage of the grid varied from negative to positive, the current of electrons flowing from the filament to the plate would vary correspondingly. Thus the grid was said to electrostatically “control” the plate current. The resulting three-electrode device was therefore an excellent and very sensitive amplifier of voltages, it is known as a triode. The valve equivalent of a transistor, triodes were used in early valve amplifiers.

Many further innovations followed. It became common to use the filament to heat a separate electrode called the cathode, and to use the cathode as the source of electron flow in the tube rather than the filament itself. This minimized the introduction of “hum” when the filament was energized with alternating current. In such tubes, the filament is called a heater to distinguish it as an inactive element.

When triodes were first used in radio transmitters and receivers, it was found that they were often unstable and had a tendency to oscillate due to parasitic anode to grid capacitance. Many complex circuits were developed to reduce this problem, but proved unsatisfactory over wide ranges of frequencies. It was discovered that the addition of a second grid, located between the control grid and the plate and called a screen grid could solve these problems. A positive voltage slightly lower than the plate voltage was applied, and the screen grid was bypassed (for high frequencies) to ground with a capacitor. This arrangement decoupled the anode and the first grid, completely eliminating the oscillation problem. This two-grid tube is called a tetrode, meaning four active electrodes.

Exercise 1: *Insert the proper words:*

- 1) For most purposes, the vacuum tubes has been replaced by the much smaller and less expensive ...
- 2) Vacuum tubes, or thermionic valves are arrangements of ... in a vacuum within an insulating, temperature resistant envelope.
- 3) The simplest vacuum tubes resemble incandescent ...
- 4) When hot, the filament releases electrons into the vacuum, a process called ...

- 5) These electrons will be drawn to a metal plate inside the envelope if the plate, also called the ..., is positively charged.

Anode, light bulbs, thermionic emission, transistor, electrodes

Exercise 2: Answer the following questions:

- 1) What are vacuum tubes?
- 2) What process is called thermionic emission?
- 3) What is a diode?
- 4) What is a triode?
- 5) What are the drawbacks of triodes?
- 6) What other types of vacuum tubes do you know?
- 7) Where are vacuum tubes used?

Exercise 3: Find the words with the similar meaning:

- | | |
|-----------------|----------------------|
| 1. filament | 1. thermionic valves |
| 2. vacuum tubes | 2. aim |
| 3. envelope | 3. cathode |
| 4. purpose | 4. join |
| 5. attach | 5. pump out |
| 6. evacuate | 6. case |

Exercise 4: Complete the word combinations:

- | | |
|-------------------|--------------|
| 1. integrated | 1. valves |
| 2. thermionic | 2. current |
| 3. space | 3. circuit |
| 4. unidirectional | 4. charge |
| 5. sensitive | 5. voltage |
| 6. applied | 6. amplifier |

Grammar

Degrees of Comparison

- 1) односложные прилагательные

short – shorter – **the shortest**

hot – hotter – the hottest

dry – drier – the driest

- 2) многосложные прилагательные

useful – **more** useful – **the most** useful

- 3) степени сравнения, указывающие на уменьшение качества

considerable – **less** considerable – **the least** considerable

- 4) Запомните **исключения**:

Good (well) – better – the best

Bad (badly) – worse – the worst

Little – less – the least

Many (much) – more – the most

- 5) При сравнении используется союз **than**. Чтобы избежать повторения существительного, употребляется слово-заменитель one (that, these).

A small lamp has a higher resistance than a large one.

- 6) Для усиления сравнительной степени перед прилагательными и наречиями употребляются слова much, far, still, ever.

In technics we have to do with pressure much greater than that of air.

- 7) При сравнении одинакового качества употребляется союз **as...as**, при отрицании – **not so...as**.

This system is not so reliable as that one.

Exercise 1: *Open the brackets*:

- 1) You have got (much) time than I have.
- 2) Your collection of records is (good) than mine.

- 3) My recorder is (bad) than yours.
- 4) Perhaps my recorder is the (bad) of all.
- 5) You have a (good) opportunity to do it.
- 6) This is the (important) thing for me.
- 7) I think it is (little) important for him than for me.

Exercise 2: *Translate the following sentences into Russian:*

- 1) Lesson One is not so difficult as Lesson Three.
- 2) She doesn't work at her English as much as she did last year.
- 3) He knows English better than you.
- 4) English is easier than Russian.
- 5) The more we study, the more we know.
- 6) The nearer the earth, the denser the atmosphere.
- 7) The higher the voltage, the higher is the electron velocity.

Exercise 3: *Correct the mistakes:*

1. Mathematics is the most important for technical students than many other subjects.
2. This article is much interesting than that one.
3. Exercise 10 is the more difficult one.
4. These engines are not so powerful than those motors.
5. The big the mass, the big the weight of the body.
6. The greater the number of free electrons in a substance, the best this substance conducts electricity.

Text B. Read the following text and try to guess its title:

The chief reliability problem of a tube is that the filament or cathode is slowly "poisoned" by atoms from other elements in the tube, which damage its ability to emit electrons. Trapped gases or slow gas leaks can also damage the cathode or

cause plate-current runaway due to ionization of free gas molecules. Vacuum hardness and proper selection of construction materials are the major influences on tube lifetime.

To meet the unique reliability requirements of the early digital computer Whirlwind, it was found necessary to build special “computer vacuum tubes” with extended cathode life. The problem of short lifetime was traced to evaporation of silicon, used on the tungsten alloy to make the wire easier to draw. Elimination of the silicon from the heater wire alloy allowed production of tubes that were reliable enough for the Whirlwind project. The tubes developed for Whirlwind later found their way into the giant SAGE air-defense computer system. High-purity nickel tubing and cathode coatings free of materials that can poison emission also contribute to long cathode life. The first such “computer tube” was Sylvania’s 7AK7 of 1948. By the late 1950s it was routine for special-quality small-signal tubes to last for hundreds of thousands of hours, if operated conservatively.

Another important reliability problem is that the tube fails when air leaks into the tube. Usually oxygen in the air reacts chemically with the hot filament or cathode, quickly ruining it. Designers therefore worked hard to develop tube designs that sealed reliably. This was why most tubes were constructed of glass. Metal alloys and glasses had been developed for light bulbs that expanded and contracted in similar amounts, as temperature changed. These made it easy to construct an insulating envelope of glass, and pass wires through the glass to the electrodes.

Exercise 1: Put five general questions and seven special questions to the text.

Exercise 2: Divide the text into logical parts and suggest a title for it part.

Exercise 3: Form adjectives adding the suffix –less to the given nouns.

Translate the nouns and adjectives into Russian:

hope – hopeless

wire, noise, help, motion, friend, aim, shape, branch, cause, character, sense, respect, object, ground, harm, change, power, colour, limit, meaning, voice, weight, life.

Exercise 4: *Form adverbs adding the suffix –ly to the given adjectives and translate them:*

sure- surely

Separate, objective, quick, primary, active, considerable, complete, evident, social, competitive, mechanical, great, general, definite, absolute, different, automatic, sure, easy, similar, certain, frequent, constant, direct, main, probable.

Text C. *Translate the text in writing:*

In the early years of the 21st century there has been renewed interest in vacuum tubes, this time in the form of integrated circuits. The most common design uses a cold-cathode field emitter, with electrons emitted from a number of sharp nano-scale tips formed on the surface of a metal cathode.

Their advantages include greatly enhanced robustness combined with the ability to provide high power outputs at low power consumptions. Operating on the same principles as traditional tubes, prototype device cathodes have been constructed with emitter tips formed using nanotubes, and by etching electrodes as hinged flaps that are stood upright by a magnetic field.

Such integrated microtubes may find application in microwave devices including mobile phones, for Bluetooth and Wi-Fi transmission, in radar and for satellite communication. Presently they are being applied to flat-panel display construction.

UNIT 6. Waves

Topic: What is a Wave?

Grammar: some, any, no and their derivatives

Vocabulary:

slinky n	пружина
assume v	принимать, предполагать, допускать
equilibrium n	равновесие
disturbance n	возмущение
medium n	среда, атмосфера
adjacent particle n	соседняя частица
impart v	передавать
coil n	виток (пружины)
subsequently adv	последовательно
interact v	взаимодействовать
distinguish v	различать

Read and translate the following international words:

Characteristics, phenomenon, nature, equilibrium, vibration, observe, medium, transport.

Text A. Read and translate the text.

What is a Wave?

Waves are everywhere. But what makes a wave a *wave*? What characteristics, properties, or behaviours are shared by all the phenomenon which we typically characterize as being a wave? How can waves be described in a manner that allows us to understand their basic nature and qualities?

Consider a slinky wave as an example of a wave. When the slinky is stretched from end to end and is held at rest, it assumes a natural position known as the equilibrium or rest position. The coils of the slinky naturally assume this position, spaced equally far apart. To introduce a wave into the slinky, the first particle is displaced from its equilibrium. The particle might be moved upwards or downwards, forwards or backwards; but once moved, it is returned to its original position. The act of moving the first coil of the slinky in a given direction and then returning it to its equilibrium position creates a disturbance in the slinky. We can then observe this disturbance moving through the slinky from one end to the other. If the first coil of the slinky is given a single back-and-forth vibration, then we call the observed motion of the disturbance through the slinky a slinky pulse. A pulse is a single disturbance moving through a medium (a substance or material which carries the wave) from one location to another location. However, if the first coil of the slinky is continuously and periodically vibrated in a back-and-forth manner, we would observe a repeating disturbance moving within the slinky which endures over some prolonged period of time. The repeating and periodic disturbance which moves through a medium from one location to another is referred to as a **wave**.

Waves are said to be an energy transport phenomenon. As a disturbance moves through a medium from one particle to its adjacent particle, energy is being transported from one end of the medium to the other. In a slinky wave, a person imparts energy to the first coil by doing work upon it. The first coil receives a large amount of energy which it subsequently transfers to the second coil. This process of energy transfer continues as each coil interacts with its neighbour. This characteristic of a wave as an energy transport phenomenon distinguishes waves from other types of phenomenon. In a wave phenomenon, energy can move from one location to another, yet matter does not move. A wave transports its energy without transporting matter.

So, in conclusion, a wave can be described as a disturbance which travels through a medium, transporting energy from one location (its source) to another without transporting matter. Each individual particle of the medium is temporally displaced and then returns to its original equilibrium position.

Exercise 1. Insert the words from the text:

1. To introduce a wave into the slinky, the first particle is displaced from its...
2. The act of moving the first of the slinky in a given direction and then returning it to its equilibrium position creates ... in the slinky.
3. A pulse is a single disturbance moving through a ... from one location to another location.
4. The repeating and periodic disturbance which moves through a medium from one location to another is referred to as ...
5. This process of energy continues as each coil interacts with its neighbour.

a disturbance, equilibrium, transfer, coil, a wave, medium

Exercise 2. Complete the following sentences:

1. When the slinky is stretched from end to end and is held at rest, it assumes a natural position known as ...
2. To introduce a wave into the slinky, the first particle is ...
3. The act of moving the first coil of the slinky in a given direction and then returning it to its equilibrium position ...
4. If the first coil of the slinky is continuously and periodically vibrated in a back-and-forth manner, we would observe...
5. As a disturbance moves through a medium from one particle to its adjacent particle energy...
6. A wave transports its energy without...

Exercise 3. Answer the following questions:

1. What is equilibrium of a slinky?
2. What happens to a slinky if it is displaced from its equilibrium?
3. What creates a disturbance in the slinky?
4. What is a pulse?

5. What is referred to as a wave?
6. What distinguished waves from other types of phenomenon?

Grammar.

Утвердительное	Вопросительное	Отрицательное
Some	Any	No
-body	-body	-body
-one	-one	-one
-thing	-thing	-thing
-where	-where	-where

Местоимения **some, any, no** обычно выполняют в предложении функции определения. Сложные местоимения выступают в предложении в функции подлежащего или дополнения.

No substance is a perfect insulator.

It was clear that something had happened.

Some употребляется перед существительными конкретными в единственном и во множественном числе и перед существительными вещественными в единственном числе в значении какой-нибудь, некоторый, несколько, какой-то.

Some bodies have a motion of vibration or oscillation.

If you want to slow a molecule, let it do some work.

Some употребляется в вопросительных предложениях в значении небольшое количество, немного.

Will you give me some ink?

и в вопросах, содержащих какое-либо предложение или просьбу.

Will you buy some stamps?

Some употребляется перед числительными в значении около, приблизительно.

Some three hundred delegates will gather in our city.

Any и сложные местоимения, в состав которых входит *any*, употребляются в утвердительных предложениях в значении любой.

All molecules have the same average energy at any given moment.

Местоимения **some** и **any** могут выполнять в предложении также функцию дополнения, а местоимение *some*, кроме того, функцию подлежащего.

The meeting began and the hall was packed up, still some workers squeezed in, and some were left standing outside.

Exercise 1: Translate the following sentences:

- 1) Nobody failed in this examination yesterday.
- 2) Have you got any questions?
- 3) He didn't try to do anything.
- 4) Some new safety rules were considered by the committee.
- 5) They made no changes in the working plan.
- 6) Can anybody show me the way to the station?
- 7) He could think of nothing really interesting.

Exercise 2: Insert some, any, no.

- 1) - Have you got ... problem?
- No, I've got ... problem, but I have difficult seminar today.
- 2) - Do you need ... help?
- Yes, I badly need ... help.
- 3) - Have you got ... book on chemistry?
- No, I haven't got ... chemistry books, but my friend has got

Местоимения **many** (много) и **few** (мало) употребляются с исчисляемыми существительными.

A gas is made up of a good deal of emptiness and very few molecules.

Местоимения **much** (много) и **little** (мало) употребляются с неисчисляемыми существительными.

To an ordinary observer the air seems to offer little resistance to bodies moving through it.

Much и **many** обычно употребляются в вопросительных и отрицательных предложениях. В утвердительных предложениях они, как правило, определяются такими наречиями, как *very, too, so*.

He takes too much labour upon himself.

A few, a little несколько, немного обозначают наличие небольшого количества, т.е. имеют положительное значение, в то время как *few* и *little* подчеркивают недостаточность количества, т.е. имеют отрицательное значение.

There is a little hope. – There is little hope.

He has a few friends. – He has few friends.

Exercise 1: Insert *much, many, little, a little, few, a few*:

- a. I'd like to say ... words about my travelling.
- b. She had ... English books at home, so she had to go to the library.
- c. After the lesson everybody felt ... tired.
- d. There were ... new words in the text and Peter spent ... time learning them.
- e. Have you got ... time before the lesson?
- f. ... of these students don't like to look up words in the dictionary.
- g. ... of my friends are preparing for their entrance examinations now.
- h. They are not rich but they have got ... money – enough to live.

Text B. Read the text.

Categories of Waves

Waves come in many shapes and forms. While all waves share some basic characteristic properties, some waves can be distinguished from others based on some very observable (and some non-observable) characteristics. It is common to categorize waves based on these distinguishing characteristics.

One way to categorize waves is on the basis of the direction of movement of the individual particles of the medium relative to the direction which the waves travel.

Categorizing waves on this basis leads to three notable categories: **transverse** waves, **longitudinal** waves, and **surface** waves.

A transverse wave is a wave in which particles of the medium move in a direction perpendicular to the direction which the wave moves.

A longitudinal wave is a wave in which particles of the medium move in a direction parallel to the direction which the wave moves. A sound wave is a classic example of a longitudinal wave.

A surface wave is a wave in which particles of the medium undergo a circular motion. The motion of the particles tend to decrease as one proceeds further from the surface.

Another way to categorize waves is on the basis of the ability (or nonability) to transmit energy through a vacuum (i.e., empty space). Categorizing waves on this basis leads to two notable categories: **electromagnetic** waves and **mechanical** waves.

An electromagnetic wave is a wave which is capable of transmitting its energy through a vacuum. Electromagnetic waves are produced by the vibration of electrons within atoms on the Sun's surface. These waves subsequently travel through the vacuum of outer space, subsequently reaching Earth. All light waves are examples of electromagnetic waves.

A mechanical wave is a wave which is not capable of transmitting its energy through a vacuum. Mechanical waves require a medium in order to transport their energy from one location to another. A sound wave is an example of a mechanical wave. (E.g. water waves, stadium waves, slinky waves, etc.)

The above categories represent just a few of the ways which physicists categorize waves in order to compare and contrast their behaviours.

Exercise 1: Put seven special questions to the text.

Exercise 2: State the purpose of the text and give the facts supporting it.

Exercise 3: Form verbs adding the suffix –en to the given adjectives, translate them:

fast – to fasten

bright, dark, sharp, wide, less, broad, deep, short, weak, hard

Form verbs with an opposite meaning adding the prefix un-. Translate them into Russian:

to cover – to uncover

to close, to load, to tune, to tie, to fasten, to charge, to balance, to fix, to lock, to pack, to bend.

Exercise 4: Practice the reading of the following words:

laser, maser, machine, amplification, concentrate, radiation, emission, intense, neutron, electron, proton, circle, liquid

Exercise 5: Find the roots of the following words:

Amplifier, different, development, industrial, intensity, achievement, atomic, revolutionary, building, shorten, achievable, realize.

UNIT 7. Integrated circuit

Topic: ICs

Grammar: Modal Verbs

Vocabulary:

integrated circuit n	ИС (интегральная схема), микросхема
semiconductor devices n	полупроводники
advancement n	усовершенствование
fabrication n	изготовление, производство
power consumption n	энергопотребление
obsolescence n	устаревание
ubiquitous n	повсеместный
inextricable n	сложный, запутанный

Complete the word combinations:

integrated	phone
semiconductor	memory
cellular	transistor
microwave	circuit
digital	oven
vacuum	tube
tiny	device

Text A. Read and translate the following text.

An integrated circuit (IC) is a thin chip consisting of thousands or millions of interconnected semiconductor devices, mainly transistors, as well as passive components like resistors. IC's were invented independently in 1959 by Jack Kilby

and Robert Noyce. As of 2004, typical chips are of size 1 cm² or smaller, but larger ones exist as well.

Among the most advanced integrated circuits are the microprocessors, which drive everything from computers to cellular phones to digital microwave ovens. Digital memory chips are another family of integrated circuits that are crucially important in modern society.

The IC was made possible by mid-20-th-century technology advancements in semiconductor device fabrication and experimental discoveries that showed that semiconductor devices could perform the functions performed by vacuum tubes at the time. The integration of large numbers of tiny transistors onto a small chip was an enormous improvement to the manual assembly of finger-sized vacuum tubes. The IC's small size, reliability, fast switching speeds, low power consumption, mass production capability, and ease of adding complexity quickly pushed vacuum tubes into obsolescence.

Only a half century after their development was initiated, Ics have become ubiquitous. Computers, cellular phones, and other digital appliances are now inextricable parts of the structure of modern societies. Indeed, many scholars believe that the digital revolution brought about by integrated circuits was one of the most significant occurrences in the history of mankind.

Exercise 1. Insert the words and word combinations from the text:

1. An integrated circuit is a ... consisting of thousands or millions of interconnected ..., mainly transistors, as well as resistors.
2. Among the most advanced integrated circuits are the ... which drive everything from computers to cellular phones.
3. Semiconductor devices could perform the functions performed by ... at the time.
4. The IC's small ... reliability, fast ..., low..., mass... and ease of adding ... quickly pushed vacuum tubes into obsolescence.

Complexity, thin chip, production capability, semiconductor devices, switching speeds, microprocessors, power consumption, vacuum tubes, size.

Exercise 2. Read the following sentences and say whether they are true or false:

1. An integrated circuit is a thin chip consisting of thousands or millions of transistors.
2. Typical chips can be of size 1 cm² or smaller.
3. Among the most advanced integrated circuits are the microprocessors, which drive everything from computers to digital microwave ovens.
4. Vacuum tubes are more widely used than IC.
5. Only a half century after their development was initiated, Ics have become ubiquitous.

Exercise 3. Answer the following questions:

1. What is an Integrated Circuit?
2. Who were Ics invented by?
3. Where are Ics used?
4. What did Ics supplant?
5. When did Ics become ubiquitous?

Grammar

Modal Verbs

Модальные глаголы обозначают не само действие, а указывают на отношение к нему говорящего. Модальные глаголы выражают способность, возможность, допустимость, вероятность действия, обозначенного последующим инфинитивом. Модальные глаголы *must*, *can*, *may*, в отличие от других глаголов, не имеют частицы *to* в исходной форме, не принимают никаких окончаний, и инфинитив после них употребляется без частицы *to*. Вопросительную форму эти глаголы образуют путем постановки глаголов *can*, *must*, *may* перед подлежащим, а отрицательную форму – путем добавления отрицания *not* после модального глагола.

Can you play tennis?

Must I translate this article?

Отрицательная форма глагола **must** употребляется только для выражения запрещения. Для того, чтобы передать значение отсутствия необходимости, употребляется модальный глагол **needn't**.

Must I translate these sentences? – No, you need't.

Can и **May** имеют формы прошедшего времени (**could** и **might**).

Долженствование может быть выражено:

1) глаголом **must** + инфинитив без частицы **to** в настоящем времени во всех лицах.

I must leave at once.

2) **to have** + инфинитив с частицей **to** в настоящем, прошедшем и будущем времени.

To have to выражает долженствование, вытекающее из внешних условий, и часто переводится на русский язык глаголом «приходится, пришлось».

I had to work hard to pass my examination.

3) **to be** + инфинитив с частицей **to** в настоящем и прошедшем времени.

To be to означает долженствование, вытекающее из предварительной договоренности или плана.

We were to inspect the new samples.

4) **should** выражает моральный долг или совет.

You should go and see him tomorrow.

Способность или возможность совершения действия может быть выражена:

1) глаголом **can** + инфинитив без частицы **to** (настоящее время) или **could** + инфинитив без частицы **to** (прошедшее время):

I can play tennis.

He could help you.

2) выражением **to be able** + инфинитив с частицей **to** (все времена):

We'll be able to see each other very often.

He was able to help me.

Выражение **разрешения** может быть выражено:

1) глаголом **may** + инфинитив без частицы to или **might** + инфинитив без частицы to. May и might относят действия к настоящему или будущему:

You may come here every day.

Do you think it'll snow? – Yes, it may (might).

2) **to be allowed** + инфинитив с частицей to, может быть использовано в настоящем, прошедшем и будущем времени:

He was allowed to borrow books from the University library.

Exercise 1: *Translate the following sentences into Russian paying attention to the modal verbs.*

1) Heat is a form of energy and may be measured in the units in which energy is measured.

2) We must say that the discovery of atomic energy is as important as the discovery of fire.

3) The origin of automation can be traced back to the early days of the first industrial revolution.

4) For a long time scientists couldn't discover the secret of the atom.

5) Without a computer scientists will not be able to solve complicated problems.

6) She was allowed to carry out this research as she had taken part in the scientific symposium.

7) Our plant is to increase its output.

8) The engineer might have overlooked something that may turn out to be important in carrying out this experiment.

9) All the preparations must have been completed long ago.

10) You should have changed the current strength at all points of the circuit.

11) I must have met that man somewhere.

12) They couldn't have applied that equation.

13) He didn't have to carry out this experiment.

Exercise 2: Fill in the proper modal verb.

- 1) Drivers ... stop when they see the red light.
- 2) You ... study much if you want to pass the examination well.
- 3) Who... translate this sentence?
- 4) ... you speak English a year ago?
- 5) Every engineer know at least one foreign language.
- 6) You ... take a taxi if you don't want to be late for the concert.
- 7) Students ... not ... to smoke in the classrooms.
- 8) As he received a bad mark, he had to go over the material again.
- 9) We ... meet at the station at six.
- 10) You will ... repeat the material of the lectures before the examination.
- 11) You ... try to find out all the essential facts connected with his work in the Antarctic.
- 12) Do you know the student who ...make a report at our next meeting?

Exercise 3: Say the following sentences in the Past and Future.

- 1) We must pass the examination in physics.
- 2) You must read the text again.
- 3) They must begin their work at once.
- 4) He can continue his studies at the evening department.
- 5) I can translate this text without a dictionary.
- 6) His father can help him in his studies.
- 7) You may go home after classes.
- 8) They may continue the experiment.
- 9) The students may use dictionaries at the translation test.

Exercise 4: Answer the following questions according to the models:

Is he working now? – He might be working now.

Has he done it yet? – He must have done it.

- 1) Have they completed the experiment?

- 2) Are they testing the results?
- 3) Is he going on with his experiment?
- 4) Have they made the plot of these variables?
- 5) Has he referred to these data?
- 6) Have they explained this new phenomenon?

Text B. Read and translate the text. Try to understand all details:

Fabrication

The semiconductors of the periodic table of the chemical elements were identified as the most likely materials for a solid state vacuum tube by researchers like William Shockley at Bell Laboratories starting in the 1930s. Starting with copper oxide, proceeding to germanium, then silicon, the materials were systematically studied in the 1940s and 1950s. Today, silicon mono-crystals are the main substrate used for ICs. It took decades to perfect methods of creating crystals without defects in the crystalline structure of the semiconducting material.

Semiconductor ICs are fabricated in an almost two-dimensional bottom-up layer process which includes these key process steps:

- Imaging
- Deposition
- Etching

The main process steps are supplemented by doping, cleaning and planarisation steps.

A mono-crystal silicon wafer is used as the substrate. Photolithography is used to mark different areas of the substrate to be doped or to have polysilicon or aluminum tracks sputtered on them. Each device is tested, before packaging. The wafer is then diced into small rectangles called die. The die is then connected into a package using gold or aluminum wires which are welded to pads, usually found around the edge of the die. After packaging, the devices go through final test on very expensive automated testers, which account for over 25 percent of the cost of fabrication. A fabrication facility, commonly known as a semiconductor fab,

currently costs over a billion US dollars to construct, because much of the operation is automated. In the most advanced processes, the wafers exceed 30 centimeters in diameter (wider than a common dinner plate).

Exercise 1: Put five questions to the text.

Exercise 2: Make a short summary of the text.

Exercise 3: Form adjectives adding the suffixes:

-al

industry, digit, dimension, essence, vision, virgin, nature, sequence, electricity, logic, medicine, physics, instrument, proportion

-y

fault, air, fire, grain, fruit, crag, silver, smoke, wealth, dust, sun, sand, frost, storm, noise.

UNIT 8. Modern devices

Topic: New electronic media

Grammar: The Subjunctive Mood. The Conditional Clauses.

Vocabulary:

- | | |
|---------------------|---------------------|
| 1. Medium (media) n | средство |
| 2. Majority n | большая часть |
| 3. Divert v | отводить, отклонять |
| 4. Vital adj | жизненно важный |
| 5. Supply v | снабжать |
| 6. Evoke v | вызывать |
| 7. Store v | хранить |
| 8. Retrieve v | восстанавливать |

Read and translate the following international words:

Human, priority, connection, commercial, differentiate, automatic, limited, machine.

Text A. Read and translate the following text:

New electronic media

Over time, a wide range of communications media have been evolved to support human activities. In the process, new media have often assumed some of the functions of the existing media. For example, letters have been a personal communications medium for thousands of years. In the 19th century, priority messages began to travel by telegraph, and since the end of that century, people have been able to talk to each other over the telephone. The development so revolutionized personal communications that writing letters is a dying art – the information they contain and the functions they perform are now included in a telephone call. Telegraph has also undergone change. While it may still exist as a wire connection

carrying low-speed data, it has also developed into an automatic network serving commercial and industrial establishments. Even though the majority of message traffic has been diverted to Telephone, the telex network remains a vital communications facility in many nations. In other nations, Telegraph is being displaced by Data Communications, and both Telegraph and Telephone are being replaced by Electronic Mail, and other media.

Communications media may be differentiated on the basis of the functions they perform. Thus, Books, Magazines, Newspapers and Letters supply capsules of information which are of use over a limited time. For instance: many books will be of interest to someone for several years; on the average, magazines evoke interest over a shorter period of time; and newspapers and letters hold the interest of the majority of readers for a matter of days, or less. Insofar as they all store information which can be retrieved as many times as the user desires, they can be called record media.

In contrast, Telephone, Radio and Television deliver a continuous stream of information, as it is produced. They can be called real-time media. So can Data Communications, the medium which permits the exchange of information between machines. As for Telegraph, it exhibits both real-time and record features.

Exercise1. Insert the words and word combinations from the text:

1. In the 19th century, priority messages began to travel by ...
2. While it may still exist as a wire connection carrying low-speed data, it has also developed into an ... serving commercial and industrial establishment.
3. Even though the majority of messages traffic has been diverted to ... , ... remains a vital communications facility in many nations.
4. Both Telegraph and Telephone are being replaced by ...
5. As they all store information which can be retrieved as many times as the user desires, they can be called

record media, telegraph, Electronic Mail, automatic network, telex network, Telephone.

Exercise 2. Say whether the following sentences are true or false:

1. Letters have been a personal communications medium for thousands of years.
2. In the 19th century priority messages began to travel by telex.
3. Since the beginning of the 20th century people have been able to talk to each other over the telephone.
4. Electronic Mail and Data Communications have displaced telegraph and telephone everywhere.
5. Telephone, Radio and Television are called real-time media.

Exercise 1: Answer the questions:

1. What kinds of communications media have been evolved over time?
2. Has telephone undergone any change?
3. What are Telegraph and Telephone being displaced by?
4. What is the basis for differentiating communications media?
5. What are record- and real-time media?

Grammar

The Subjunctive Mood

Сослагательное наклонение выражает действие не реальное, а предполагаемое, условное или желаемое. На русский переводится сочетанием глагола в форме прошедшего времени с частицей «бы»:

Сослагательное наклонение выражается:

- 1) синтетическими формами: be, were, have, know и т.д.
- 2) аналитическими формами: should, would, could, may, might + Infinitive.

There would be no result without your help.

It is necessary that they should apply this method.

The Conditional Clauses.

Условные придаточные предложения присоединяются к главному предложению союзами: if, unless, provided (that).

Различают 3 типа условных предложений:

1 тип. Реальное условие, относящееся к будущему времени. (Переводится будущим временем)

If + Present Simple; will + Infinitive (without “to”)

If you come earlier, he will inform me.

2 тип. Маловероятное условие, относящееся к настоящему или будущему времени (Переводится глаголом в прошедшем времени с частицей «бы»)

If + Past Simple; would + Infinitive (without “to”);

3 тип. Нереальное условие, относящееся к прошедшему времени.

If + Past Perfect; would + Perfect Infinitive (without “to”).

Exercise 1. *Translate the following sentences into Russian:*

a) 1. Provided all the requirements were met, the efficiency of the apparatus would be increased. 2. Without the new instrument this experiment would not have been successful. 3. You could have done this work better. 4. It is required that those devices be used in this case. 5. Without proper care and maintenance this equipment wouldn't operate so well.

b) 1. If a solid body or a liquid is heated, it will usually expand. 2. The measurements were always correct provided the necessary instruments were used. 3. If the model fits well, the observed data will be correct.

c) 1. If I saw him tomorrow, I would certainly speak to him. 2. Provided the systems were installed on the line, we would have more chances to improve them. 3. If the temperature of the solution increased, the results of the experiment wouldn't accurate.

d) 1. If they had completed the research/ the results wouldn't have been discussed at the conference. 2. If he hadn't used this formula, he wouldn't have made this mistake. 3. They would have finished the work in time, provided they had had the necessary material.

Exercise 2. Open the brackets using the correct form of the verb:

1. If (to know) English well, you will be able to read articles in the original. 2. If I pass this exam, I (to be) very happy. 3. You (to become) much more experienced if you studied better. 4. If she began to work in this company her career would be successful. 5. If I (to see) our professor, I'd have discussed this question with him. 6. His assistant (to help) us, if he had had any free time. 7. You (to write) down all necessary data provided the tests are over. 8. If he hadn't been present at the lecture, we (not to understand) the new approach to the solution of the problem.

Exercise 3. Complete the sentences:

1. I would work much better if 2. Life would be much simpler if 3. I would have started to study English earlier if 4. I will go abroad if 5. I would have had more opportunities, if

Exercise 4. Translate into English paying attention to the tense-forms of the predicate:

1. Научный руководитель настаивает на том, чтобы вы провели эксперимент незамедлительно. 2. Без воды не было бы жизни на Земле. 3. Необходимо, чтобы пришли на конференцию заранее. 5. Если бы не было атмосферы, то поверхность Земли была бы чрезмерно горячей днем и холодной ночью. 6. Если мы получим необходимые распоряжения вовремя, мы сообщим вам об этом. 7. Если бы он работал более усердно в прошлом семестре, он сдал бы этот экзамен с первого раза.

Text B. Translate the text in writing:

Super Phones

Not long ago it became known that cell phone manufacturers were experimenting with several different designs for the handheld devices that would be linked to the advanced wireless networks of the future. If these machines really are to become digital companions, they will have to be versatile, adaptable and fashionable.

Companies such as Nokia, Ericsson and Motorola are working on the third-generation “super phone” that will look quite different from existing cell phones. In fact, calling them phones seems absurd. They will have built-in colour screens several inches square for presentation of high resolution graphics and video. Some may have a keyboard and a miniature mouse for data input, but most of them will use touch-sensitive screens and styluses like those employed now by the handheld computers.

In addition to carrying voice communication, the super phone will also be able to play music files that are circulating on the Web in the most popular MP3 format (or in whatever format may replace it).

Additional texts

Digital Watch

In a digital watch the mechanical part of the traditional mechanical wristwatch have been replaced by a vibrating quartz crystal to keep time. The vibrating quartz crystal is controlled by minute electronic circuits. One of the advantages of quartz is that it is very stable. The artificial quartz crystals used in digital watches are designed to vibrate up to 32,768 cycles per second when the current from a battery is passed through them.

These vibrations produce electric pulses. As the pulses travel through the electronic circuits of the microchip, their rate is gradually halved. The result is a pulse rate of one per second.

Each one-second pulse triggers the microchip to send signals to the liquid crystal display to advance the numerals by one second. The pulses are also used to controle different functions. Such a digital watch can show the day and date; it can have an alarm and a reminder and can act as a stopwatch with an accuracy of $1/100^{\text{th}}$ second.

What is GPS?

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites. GPS was originally intended for military

applications, but now the system is available for civilian use. GPS works in any weather conditions, anywhere in the world, 24 hours a day.

GPS satellites circle the earth twice a day in a very precise orbit and transmit signal information to Earth. GPS receivers take this information and use triangulation to calculate the user's exact location. Essentially, the GPS receiver compares the time a signal was transmitted by a satellite with the time it was received. The time difference tells the GPS receiver how far away the satellite is. Now, with distance measurements from a few more satellites, the receiver can determine the user's position and display it on the unit's electronic map.

A GPS receiver must be locked on to the signal of at least three satellites to calculate a 2D position (latitude and longitude) and track movement. With four or more satellites in view, the receiver can determine the user's 3D position (latitude, longitude and altitude). Once the user's position has been determined, the GPS unit can calculate other information, such as speed, bearing, track, trip distance, distance to destination, sunrise and sunset time and more.

Today's GPS receivers are extremely accurate within an average of three to five meters thanks to their parallel multi-channel design.

The 24 satellites that make up the GPS space segment are orbiting the earth about 12,000 miles above us. They are constantly moving, making two complete orbits in less than 24 hours. These satellites are travelling at speeds of roughly 7,000 miles an hour.

GPS satellites are powered by solar energy. They have backup batteries onboard to keep them running in the event of a solar eclipse, when there's no solar power. Small rocket boosters on each satellite keep them flying in the correct path.

Here are some other interesting facts about the GPS satellites:

1. The first GPS satellite was launched in 1978.
2. A full constellation of 24 satellites was achieved in 1994.
3. Each satellite is built to last about 10 years. Replacements are constantly being built and launched into orbit.
4. A GPS satellite weighs approximately 2,000 pounds and is about 17 feet across with the solar panels extended.

5. Transmitter power is only 50 watts or less.

GPS satellite can transmit radio signals. A GPS signal contains three different bits of information – a pseudorandom code, ephemeris data and almanac data.

The Internet

The Internet is a magnificent global network with millions and millions of computers and people connected to one another where each day people worldwide exchange an immeasurable amount of information, e-mail, news resources and, more important, ideas.

It has grown at a surprising rate. Almost everyone has heard about it and an increasing number of people use it regularly. The current estimate is that over 70 million people are connected, in some way, to the Internet – where they know it or not.

With a few touches at a keyboard a person can get access to materials in almost everywhere. One can have access to full-text newspapers, magazines, journals, reference works, and even books. The Web is one of the best resources for up-to-date information. It's a hypertext-based system by which you can navigate through the Internet. Hypertext is the text that contains links to other documents. A special programme known as "browser" can help you find news, pictures, virtual museums, electronic magazines, etc. and print Web pages. You can also click on keywords or buttons that take you to other pages or other Web sites. This is possible because browsers understand hypertext markup language or code, a set of commands to indicate how a Web page is formatted and displayed.

Internet Video conferencing programs enable users to talk to and see each other, exchanging textual and graphical information, and collaborate.

Internet TV sets allow you to surf the Web and have e-mail while you are watching TV, or vice versa. Imagine watching a film on TV and simultaneously accessing a Web site where you get information on the actors of the film. The next generation of Internet-enabled televisions will incorporate a smart-card for home-shopping, banking and other interactive services. Internet-enabled TV means a TV set used as an Internet device.

The Internet is a good example of a wide area network (WAN). For long-distance or worldwide communications, computers are usually connected into a wide area network to form a single integrated network. Networks can be linked together by telephone lines or fiber-optic cables. Modern telecommunication systems use fiber-optic cables because they offer considerable advantages. The cables require little physical space, they are safe as they don't carry electricity, and they avoid electromagnetic interference.

Networks on different continents can also be connected via satellites. Computers are connected by means of a modern to ordinary telephone lines or fiber-optic cables, which are linked to a dish aerial. Communication satellites receive and send signals on a transcontinental scale.

Electric Car

The electric car is not a new idea. It had success with American women in the early 1990s. Women liked electric cars because they were quiet and, what was more important, they did not pollute the air. Electric cars were also easier to start than gasoline-powered ones. But the latter was faster, and in the 1920s they became much more popular.

The electric car was not used until the 1970s, when there were serious problems with the availability of oil. The General Motors Co. had plans to develop an electric car by 1980. However, soon oil became available again, and this car was never produced.

Today there is a new interest in the electric car. The Toyota Co. recently decided to spend \$800 million a year on the development of new car technology. Many engineers believe that the electric car will lead to other forms of technology being used for transportation.

Car companies are working at developing a super car. A super-efficient car will have an electric motor. Four possible power sources are being investigated. The simple one is batteries. Another possibility is fuel cells, which combine oxygen from air with hydrogen to make electricity. Yet another approach would be a flywheel, an

electric generator consisting of free-spinning wheels with magnets in the rims that can produce a current. A fourth possible power source for the super-car would be a small turbine engine, running on a clean fuel like natural gas. It would run at a constant speed, generating electricity for driving vehicles or for feeding a bank of batteries, storing energy for later use.

Учебное издание

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