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Электронная техника

Пособие по развитию навыков чтения на английском языке для студентов 1-го курса ФКП, ФРЭ, ФТК БГУИР дневной формы обучения

Electronic Engineering

Reader for the first year daytime students of the Computer-aided Design, Radioengineering and Electronics, Telecommunications Faculties

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Целью пособия является развитие навыков чтения и понимания научно-технической литературы на материале текстов по техническим специальностям.

Пособие состоит из 8 разделов, каждый из которых включает краткий тематический словарь, тексты и задания к ним. Тексты взяты из Encyclopedia Britannica, обработаны и сокращены.

Пособие предназначено для работы в аудитории под руководством преподавателя.

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UNIT I

Part A. **Word List**

access	/ˊæksəs/	доступ
apparent	/əˊpærənt/	видимый, очевидный, явный
apply	/əˊplaɪ/	применять, прилагать, прикладывать
array	/əˊreɪ/	целый ряд; большое количество; масса; множество
attenuate	/əˊtenjueɪt/	истощать, ослаблять
cellular	/ˊseljələ(r)/	клеточный, ячеистый, сотообразный
cellular telephone		сотовый телефон
circuit	/ˊsɜ:kɪt/	цепь, схема
integrated circuit (IC)	/ˊɪntɪgreɪtɪd/	интегральная схема, микросхема
constitute	/ˊkɒnstɪtju:t/	образовывать
consumer	/kənˊsju:mə(r)/	широкого потребления (о товарах)
convert	/kənˊvɜ:t/	превращать
deal with (past, p.p. dealt)	/di:l/	иметь дело с кем-либо, чем-либо
device	/dɪˊvaɪs/	прибор, устройство
encompass	/ɪnˊkʌmpəs/	1. окружать; 2. содержать, заключать (в себе)
exceptional	/ɪkˊsepʃənl/	исключительный, необычный
facilitate	/fəˊsɪlɪteɪt/	облегчать, продвигать
fibre	/ˊfaɪbə(r)/	волокно, жилка
optical fibre	/ˊɒptɪklˊfaɪbə(r)/	оптическое волокно, световод
impact	/ˊɪmpækt/	воздействие, влияние
intermingle	/ˌɪntəˊmɪŋgl/	смешивать(ся), перемешивать(ся)
intricate	/ˊɪntrɪkət//	запутанный, сложный
manufacture	/ˊmænjuˊfæktʃə(r)/	производить
performance	/pəˊfɔ:məns/	работа, действие, исполнение
range	/reɪndʒ/	простираться (от… до); колебаться (в известных пределах)
regenerate	/rɪˊdʒenəreɪt/	восстанавливать, регенерировать
sophisticated	/səˊfɪstɪkeɪtɪd/	сложный, усовершенствованный, современный
utilize	/ˊju:təlaɪz/	использовать, утилизировать

I. Study the following words and choose:

a) *nouns*

1) apply, application, applied, applicable, applicant, appliance;
2) significance, significant, significative, signify, signification;
3) electronic, electronics, electronically, electronicize, electron;
4) breadth, broad, broaden, broadly.

b) *adjectives*

1) physics, physicist, physical, physic;
2) facility, facilitate, facilitation, facile;
3) science, scientist, scientific, scientifically;
4) except, exception, excepting, exceptive, exceptional.

II. Arrange the words of the two groups in pairs

a) *with similar meaning*

1) encompass	a. have relations
2) intricate	b. weaken
3) exceptional	c. complicated
4) attenuate	d. fast
5) intermingle	e. out of the ordinary
6) constitute	f. make easy
7) facilitate	g. establish
8) deal with	h. mix together
9) rapid	i. surround

b) with contrary meaning

1) broad	a. regress
2) advance	b. strengthen
3) motion	c. producer
4) different	d. narrow
5) consumer	e. complicate
6) facilitate	f. unimportant
7) attenuate	g. the same
8) essential	h. simple
9) complex	i. rest

III. Match the words with their definitions.

1) circuit	a) strong impression or effect
2) impact	b) change from one form into another
3) access	c) closed path for an electric current
4) apply	d) make practical use
5) manufacture	e) vary between limits
6) sophisticated	f) clearly seen or understood
7) apparent	g) complex, with the latest improvement and refinements
8) range	h) produce goods on a large scale by machinery
9) convert	i) right, opportunity or means of reaching, using or approaching

IV. Study the text and try to understand all details.

ELECTRONICS

1. Electronics is a branch of physics that deals with the emission, behaviour, and effects of electrons (as in electron tubes and transistors) and with electronic devices. Electronics encompasses an exceptionally broad range of technology. The term originally was applied to the study of electron behaviour and movement. It came to be used in its broader sense with advances in knowledge about the fundamental nature of electrons and about

the way in which the motion of these particles could be utilized. Today many scientific and technical disciplines—including physics, chemistry, materials science, mathematics, and electrical and electronic engineering—deal with different aspects of electronics.

2. Research in these fields has led to the development of such key devices as transistors, integrated circuits, lasers, and optical fibres. These in turn have made it possible to manufacture a wide array of electronic consumer, industrial, and military products. These products range from cellular radiotelephone systems and videocassette recorders to high-performance supercomputers and sophisticated weapons systems. The impact of electronics on modern life has been pervasive. It can be said that the world is in the midst of an electronic revolution at least as significant as the industrial revolution of the 19th century. Evidence of this is apparent everywhere.

3. Electronics is essential, for example, in telecommunications. An ever-increasing volume of information is transmitted in digital form. Digital techniques, in which signals are converted into groups of pulses, allow the intermingling of voice, television, and computer signals into one very rapid series of pulses on a single channel that can be separated at the receiving end and reconstituted into the signals originally sent. Because the digital pulses can be regenerated perfectly after they become attenuated with distance, no noise or other degradation is apparent at the receiving end.

4. Electronic controls for industrial machines and processes have made possible dramatic improvements in productivity and quality. Computer-aided design tools facilitate the designing of parts that have complex shapes, such as aircraft wings, or intricate structures, such as integrated circuits. The production of designs of this sort is done by computer-controlled machines that receive instructions directly from the design tools.

5. Access to knowledge has been made far easier by computerized indexes of scientific and technical journals, which are accessible from centralized services over telephone lines. These central databases are being supplemented by new techniques derived from digital audio and video disc technology, which provide locally, and at low cost, access to vast amounts of information in text and graphic form.

V. Say whether the following statements are true or false.

1. Electronics studies electronic phenomena and devices.
2. Nowadays electronics is out of relation to chemistry.
3. The electronic revolution is less important than the industrial revolution of the 19th century.
4. Electronics is of no importance in telecommunications.
5. In digital techniques signals are mixed on a single channel.
6. Productivity and quality in industry were greatly improved thanks to electronics.

7. At present the only opportunity of getting information is over telephone lines.
8. Computerized indexes of scientific and technical journals make it possible to obtain information easier.

VI. Complete the following sentences choosing the most suitable variant.

1. Manufacturing of many electronic products became possible thanks to the invention of
   a) high-performance supercomputers;
   b) transistors, ICs and other electronic devices;
   c) sophisticated weapons systems.
2. In digital techniques signals are changed into
   a) groups of pulses;
   b) voice;
   c) electric current.
3. There is no noise at the receiving end
   a) because of the perfect regeneration of the digital pulses;
   b) because the digital pulses become attenuated with distance;
   c) because the digital pulses can be separated at the receiving end.
4. It became easier to design complex shapes and structures with the help of
   a) industrial machines;
   b) machine-tools;
   c) computer-aided design tools.
5. Obtaining information was facilitated by
   a) telephone lines;
   b) scientific and technical journals available;
   c) computerization.

VII. Read paragraph 1 of the text and answer the questions.

1. What is electronics?
2. Why did the term electronics acquire a wider meaning?
3. What branches of science are connected with electronics?

VIII. Read paragraph 2 and say what devices made it possible to produce both videocassette recorders and high-performance supercomputers.

IX. Look through paragraphs 2 and 3 and find English equivalents of the following words and word combinations.

Интегральные схемы, оптоволокно, в свою очередь, товары широкого потребления, современные системы вооружения, по крайней мере, цифровая технология, объем информации, смешивание сигналов, первоначально, ослабленный.

X. Read the first sentence of paragraph 4 and mark pauses. Divide it into sense groups, find out the means of connection between these sense groups and between the words in each group.
XI. Translate paragraphs 4 and 5 into Russian.
XII. Make an outline of the text.
XIII. Speak about the significance of electronics

Part B.

I. Look through the list of English words and their Russian equivalents facilitating reading text B.

Internal storage - внутреннее запоминающее устройство;
magnetic core - оперативная память на магнитных сердечниках;
stack -собирать, скомпоновывать;
punched card - перфокарта;
batch processing - пакетная обработка;
treat - рассматривать, трактовать, интерпретировать;
queue - становиться в очередь; образовывать очередь.

II. Define the meaning of the "x" word.

store: storage= хранить: x;
appear: appearance= появляться: x;
capable: capability= x: способность;
process: processing= обрабатывать: x;
internal: external= внутренний: x;
increase: decrease= увеличивать: x;
complex: complexity= x: сложность;
fast: faster= быстрый: x;
efficiency: inefficiency= эффективность: x.

III. Find in the list the following parts of speech: a) nouns, b) adjectives, c) adverbs, d) verbs.

Magnetic, generation, provide, storage, transistor, compare, tremendous, reduction, previous, greater, complexity, usually, location, easily, capability, user, numerous, require, data, external, utilize, circuit, improve, fast, totally, appropriate.

IV. Complete the sentences with the following words:
increased, have been classed, to be brought, using, are provided, external, compared to.

1. Computer systems … into three generations.
2. The first computers used magnetic drums for internal storage and magnetic tape for … storage.
3. Early computers were slow … modern machines.

4. Solid-state memory greatly … the speed and capacity of the internal memory.
5. Early computers required data … to them.
6. Modern computers … with the capability of handling numerous input devices directly.
7. This data was usually prepared by … punched cards.

V. Read the text and say which paragraph contains the information about the advantage of computers to have large information capacity but small physical dimensions.

FROM THE HISTORY OF COMPUTERS

1. Computer systems have been classed into three generations. The first generation consisted of vacuum-tube-based machines. They used magnetic drums for internal storage and magnetic tape for external storage. These computers were slow compared to modern machines and required data to be brought to them.

2. Second-generation computers using transistors began to appear in 1959. The internal storage used magnetic cores, with magnetic material wired into frames that were stacked into large cores. This form of storage represented a tremendous increase in speed and in bulk over previous storage methods. The external storage in second-generation computers used magnetic disks. This form of storage also added increased speed and greater "online" capability as compared to magnetic tape systems.

3. Since 1964, a third generation of computers has begun to emerge. These computers utilized integrated circuits to increase capability and decrease size, while integrated technology also provided improved internal storage capability. Solid-state memory, being now totally electronic, greatly increased the speed and capacity of the internal memory while decreasing its cost and complexity. External memory continued to use magnetic disks, which became larger and faster.

4. It was stated that early computers required data to be brought to them. This data was usually prepared by using punched cards or magnetic tape. The cards or tapes would then be carried to the computer where they would be processed. The transfer of data in this fashion was called batch processing. As each batch of data was received, it was placed into line with other batches of data which were processed one after another. Reports were generated, files were updated, new tapes were made and the revised data was routed to appropriate locations in the form of punched cards or magnetic tape. The inefficiency of such a system is easily seen in retrospect.

5. Later-model computers are provided with the capability of handling numerous input devices directly. These multitask computers treat the incoming data in much the same way as the earlier computers did. Incoming

data is received from the various input devices and is lined up, or queued by the computer. The computer will then process the incoming data according to internal procedures. The modern computers are so fast in their operation that they can handle many users without the users even being aware than others are on the system.

VI. Say if the following statements are true or false. Correct the false statements.

1. An early computer used to be made of vacuum tubes.
2. The internal storage of the second-generation computers represented a great increase in speed and reduction in bulk over previous storage methods.
3. Since 1964, the third-generation computers have begun to use magnetic disks.
4. The transfer of data called batch processing is seen to be extremely efficient in retrospect.
5. Multitask computers process the incoming data in the way similar to the earlier computers.

VII. Choose the best answer: a, b or c to complete the sentences.

1. The first generation computers were designed on the basis of
    a) integrated circuits;
    b) vacuum valves;
    c) semiconductor devices.
2. The second-generation of computers is based on
    a) transistors;
    b) magnetic discs;
    c) superconducting devices.
3. A third generation of computers provides
    a) the capability of handling numerous input devices directly;
    b) improved external storage capability;
    c) increase in speed and capacity of internal memory.
4. Modern computers can handle
    a) magnetic cores;
    b) magnetic drums;
    c) input devices directly.

VIII. Divide the text into logical parts and find the topical sentences in each part.

IX. Give a short summary of the text.

Part C.

I. Read the following text and entitle it.

1. The working principles of electronics can be demonstrated by tracing the history of radio tubes and photoelectric cells. The history began in 1883, when Thomas Edison found that the heated filament in his incandescent lamp gave off material that blackened the inside of the bulb. This was called the Edison effect, and it led to the development of the modern radio tube. In the Edison effect, also called thermionic emission, heat supplies some electrons in the filament with at least the minimal energy to overcome the attractive forces holding them in the structure of the metal. This discharge of electrons is widely used as a source of electrons in conventional electron tubes—for example, in television picture tubes.

2. In 1887 Heinrich Hertz, while trying to prove the existence of radio waves, discovered the photoelectric effect. If polished metal is given a negative charge and then is flooded with ultraviolet radiation, it steadily loses the charge. Some chemical elements such as cesium and selenium are sensitive to visible light. This discovery led to photoelectric cells.

3. The development of the radio tube began in 1904, when John A. Fleming of England produced the Fleming valve, which today is called a diode, meaning “two electrodes.” He started by heating a filament (also called a cathode) in a vacuum tube with “A-circuit current.” The heat drove electrons out of the filament and into surrounding space. If nothing more happened, the first electrons to escape would soon have formed a negative space charge that would have kept others from being driven out because like charges repel. Fleming avoided this by placing a plate in the tube and connecting the plate and filament through an outside B circuit. The electrons driven from the filament then crossed the tube to the plate and followed the circuit back to the filament. Fleming next placed a battery in the B circuit. The battery was used to supply electrons—that is, negative charges—to the filament, or cathode, and draw them from the plate, or anode, leaving a positive charge. Electrical heating drove electrons steadily from the filament and sent a strong current through the B, or plate, circuit. The strength of the current depends partly upon the heat and partly upon the voltage from the battery. This device could be used as a radio detector.

4. In 1906 the American inventor Lee De Forest transformed the diode into a device that he called an audion, the modern name of which is triode. He did this by inserting a grid of fine wire mesh between the filament and the plate. If variable voltages from an antenna circuit are placed on the filament and the grid, they cause variations in the flow of electrons to the plate. Moreover, the variations in current are much stronger than those caused by the voltage of the incoming signal acting alone. Thus the triode amplifies, or strengthens, the signal.

5. The vacuum tube became the basis of radio, television, and computers, the latter first developed at the end of World War II in 1944 and 1945. The invention of the transistor in 1947 initiated a radical reduction in the size of electronic circuits and in their power requirements. The later development of the integrated circuit set into motion the continuing miniaturization of all electronic devices, which has at the same time greatly increased their speed and computing power.

Notes:
radio tube – электронная лампа
filament – нить накала
incandescent lamp – лампа накаливания
photoelectric cell – фотодиод

II. Answer the following questions on the contents of the text.

1. What discovery led to the modern radio tube?
2. When was the photoelectric effect discovered?
3. What does the Fleming valve consist of?
4. How does a triode differ from a diode?
5. When did the first computers appear?

III. Read the text and say where Thomas Edison's discovery finds wide application.

IV. Find information about Lee De Forest's contribution to the development of electronics.

V. List the major steps of electronics history.

VI. Give the main points of the text in 5-6 sentences.

UNIT 2

Part A

Word List

amplification	/ˌæmplɪfɪˈkeɪʃn/	усиление
beam	/biːm/	луч
before the turn of the century	/ˈsentʃəri/	в конце прошлого века
capacity	/kəˈpæsəti/	мощность, производительность
conduct	/kənˈdʌkt/	вести, проводить
disintegrate	/dɪsˈɪntɪgreɪt/	распадаться на составные части
duration	/djuˈreɪʃn/	продолжительность

emission	/iˊmɪʃn/	эмиссия (излучение)
encode	/ɪnˊkəʊd/	кодировать
fuel	/ˊfju:əl/	топливо
fulfilment	/fʊlˊfɪlmənt/	выполнение, осуществление
heat	/hi:t/	тепло, теплота
heat-resistant	/ˊhi:trɪzɪstənt/	теплостойкий
installation	/ˌɪnstəˊleɪʃn/	установка, сборка
invade	/ɪnˊveɪd/	вторгаться
lead	/led/	свинец
mysterious	/mɪˊstɪəriəs/	таинственный
simultaneous	/ˌsɪmlˊteɪniəs/	одновременный
single	/ˊsɪŋgl/	одиночный, единичный
stand for	/stænd/	символизировать, означать
stimulate	/ˊstɪmjuleɪt/	возбуждать, индуцировать
substance	/ˊsʌbstəns/	вещество
suggest	/səˊʤest/	предлагать, советовать
sword of heat	/sɔ:d/	огненный меч
tool	/tu:l/	инструмент, орудие, средство
treatment	/ˊtri:tmənt/	обработка
vaporize	/ˊveɪpəraɪz/	испарять(ся)
vary	/ˊveəri/	менять(ся), изменять(ся)
weapon	/ˊwepən/	оружие

I. Study the following words and choose:

a) nouns
1) reality, real, realistic, realize
2) intense, intensity, intensive, intensification
3) resistant, resist, resistance, resistive
4) development, developed, develop, developing
5) provide, providing, provision, provided

b) adjectives
1) strength, strengthen, strong, strongly
2) differ, differently, difference, different
3) transmissible, transmit, transmission, transmitter
4) inefficiently, efficient, efficiency, efficiently
5) dependence, dependent, depend, independence

c) verbs
1) communication, communicative, communicated, communicate
2) applied, applicable, apply, application
3) installation, installed, installment, install
4) amplify, amplifier, amplified, amplification
5) stimulus, stimulation, stimulate, stimulated

II. Arrange the words of the two groups in pairs:

a) with similar meaning

1) rapidly	a) requirement
2) sophisticated	b) almost
3) opportunity	c) realize
4) application	d) as well
5) also	e) use
6) fulfil	f) possibility
7) demand	g) complicated
8) nearly	h) fast

b) with contrary meaning

1) further	a) incapable
2) integrate	b) powerful
3) cooling	c) limitless
4) outside	d) inside
5) powerless	e) uncontrolled
6) controlled	f) heating
7) limited	g) disintegrate
8) capable	h) nearer
9) single	i) numerous

III. Match the words with their definitions.

1) heat	a) a line of light that shines from an object such as a torch or the sun
2) duration	b) a piece of information or a request that you send to someone or leave for them when you cannot speak to them directly
3) tool	c) an object such as a gun, a knife, or a missile, which is used to kill or hurt people in a fight or a war
4) weapon	d) a narrow beam of concentrated light that is used especially for cutting very hard materials and in surgery
5) sophisticated	e) made using advanced and complex methods
6) beam	f) warmth or the quality of being hot
7) message	g) the length of time during which something happens or exists
8) satellite	h) an object which has been sent into space in order to collect information
9) laser	i) any instrument or piece of equipment that you hold in your hands in order to help you to do a particular kind of work

IV. Study the text and try to understand all details.

LASER

1. In the “War of World” written before the turn of the century H. Wells told a fantastic story of how Martians almost invaded our Earth. Their weapon was a mysterious “sword of heat”. Today Wells’ sword of heat has come to reality in the laser. The name stands for light amplification by stimulated emission of radiation.

2. Laser, one of the most sophisticated inventions of man, produces an intensive beam of light of a very pure single colour. It represents the fulfillment of one of the mankind’s oldest dreams of technology to provide a light beam intensive enough to vaporize the hardest and most heat-resistant materials. It can indeed make lead run like water, or, when focused, it can vaporize any substance on earth. There is no material unamenable to laser treatment and laser will have become one of the main technological tools.

3. The applications of laser in industry and science are so many and so varied as to suggest magic. Scientists in many countries are working at a very interesting problem: combining the two big technological discoveries of the second half of the 20-th century – laser and thermonuclear reaction – to produce a practically limitless source of energy. Physicists of this country have developed large laser installations to conduct physical experiments in heating thermonuclear fuel with laser beams. There also exists an idea to use laser for solving the problem of controlled thermonuclear reaction. The laser beam must heat the fuel to the required temperature so quickly that the plasma does not have time to disintegrate. According to current estimates, the duration of the pulse has to be approximately a thousand-millionth of a second. The light capacity of this pulse would be dozens of times greater than the capacity of all the world’s power plants. To meet such demands in practice scientists and engineers must work hard as it is clear that a lot of difficulties are to be encountered on route.

4. The laser’s most important potential may be its use in communications. The intensity of a laser can be rapidly changed to encode very complex signals. In principle, one laser beam, vibrating a billion times faster than ordinary radio waves, could carry the radio, TV and telephone messages of the world simultaneously. In just a fraction of a second, for example, one laser beam could transmit the entire text of the Encyclopedia Britannica.

5. Besides, there are projects to use lasers for long distance communication and for transmission of energy to space stations, to the surface of the Moon or to planets in the solar system. Projects have also been suggested to place lasers aboard Earth satellites nearer to the Sun in order to transform the solar radiation into laser beams, with this transformed energy subsequently transmitted to the Earth or to other space bodies. These

projects have not yet been put into effect, because of the great technological difficulties to be overcome and therefore the great cost involved. But there is no doubt that in time these projects will be realized and the laser beam will begin operating in outer space as well.

Notes:

unamenable – неподдающийся
as to suggest magic – можно принять за чудо
put into effect – осуществлять

V. Say whether the following statements are true or false.

1. Laser means “light amplification by stimulated emission of radiation”.
2. Laser produces an intensive beam of light.
3. In the next few years laser will become one of the main technological tools.
4. Martians almost invaded the Earth before the turn of the century.
5. Laser and thermonuclear reaction can produce a limited source of energy.
6. The laser beam heats the fuel so quickly that the plasma disintegrates.
7. There are projects to transform lunar radiation into beams.
8. The laser beam will begin operate in outer space.

VI. Complete the following sentences choosing the most suitable variant

1. Laser produces
    a) an intensive beam of light
    b) hundreds of operations a second
    c) integrated circuits
2. The laser’s most important potential may be its use …
    a) in telephone
    b) in broadcasting
    c) in communications
3. Laser has become one of
    a) the most complex signals
    b) the most heat resistant materials
    c) the main technological tools
4. There also exists an idea to use laser for solving the problem of
    a) controlled thermonuclear reaction
    b) using electricity in devices
    c) detecting signals

VII. Read the first sentence of paragraph 4 and mark pauses. Divide it into sense groups, find out the means of connection between these sense groups and between the words in each group.

VIII. In paragraphs 2 and 3 find English equivalents of the following words and word combinations:

сложный, свет, обеспечить, испарять, теплостойкий, вещество, инструмент, применение, открытие, установка, решение, проводить эксперименты, требуемая температура, в соответствии с, приблизительно.

IX. Read paragraph 4 and answer the questions.

a. Which laser's potential is the most important?
b. What can be rapidly changed to encode complex signals?
c. Does one laser beam vibrate faster than ordinary radio waves?
d. How much time does it take to transmit the entire text of the Encyclopedia Britannica?

X. In paragraph 5 find information about projects to use lasers for distance communication and for transmission of energy to space stations.

XI. Make an outline of the text.

XII. Speak about laser and its applications in industry.

Part B

I. Look through the list of English words and their Russian equivalents facilitating reading text B.

1) attractive – привлекательный
2) concern – касаться, относиться
3) contents – содержание
4) enable – давать возможность
5) feature – особенность
6) link – соединять
7) provide – обеспечивать
8) represent – представлять
9) require – требовать
10. store – запасать, хранить

II. Define the meaning of the "x" words.

1) create: creation = создавать: x
2) explore: exploration: x
3) employ: employment: x
4) reside: residence: x
5) locate: location: x
6) transmit: transmission: x
7) store: storage: x

III. Complete the sentences with the given words:
provides, hypertext, information, Web sites, clicking, links

1. By … the computer's mouse on an element, the user gives the computer command.
2. The Internet … computers and computer networks around the world.

3. The Web is made up of electronic addresses called … .
4. A Web browser is a software package used to locate and display … on the Web.
5. Another major feature of the Web is … .
6. World Wide Web is the part of the Internet that … sounds, pictures, and moving images in addition to text.

IV. Choose

a) nouns:

1) move, movement, moving, moved
2) know, known, knowledge, unknown
3) understanding, understand, understandable, misunderstand
4) locate, location, located, locating
5) imagine, imaginary, imagination, imaginable

b) adjectives:

1) wide, widen, widely, width
2) short, shortly, shorten, shortage
3) physics, physicist, physical, physically
4) specific, specify, specification, specifically
5) introduce, introduction, introductory, introducing

V. Read the text and say which paragraph contains the information about hypertext.

1**.** World Wide Web is the part of the Internet that provides sounds, pictures and moving images in addition to text. The Internet links computers and computer networks around the world, but the portion of the network not on the World Wide Web (often called the Web, for short) contains only text information. The Web, however, has multimedia capabilities – including graphics, audio, and video. The Web is made up of electronic addresses called Web sites, which contain Web pages that hold the multimedia information. Web sites and their pages reside in computers connected to the Internet.

2. Tim Berners-Lee, an English computer scientist at the European Center for Nuclear Research (CERN) physics laboratory near Geneva, Switzerland, wrote the Web software in 1990. The Web became part of the Internet in 1991. The introduction of the Web helped make the Internet popular and easier to use.

3. Many computer users find the Web's multimedia contents more attractive than text-only contents. In addition, Web browsers make the Web easy to use. A Web browser is a software package used to locate and display information on the Web. To find information on other parts of the Internet requires complex software and knowledge of specific computer commands. A Web browser is easier to use because it employs a graphical user interface – a way of interacting with a computer using pictures as well as words. The

pictures represent commands in a manner that is easy to understand. For example, a small picture of a printer represents the command to print a document. By clicking the computer's mouse on an element, the user gives the computer command represented by that element.

4. Another major feature of the Web is hypertext. Hypertext enables a user to jump from one document to another – even if the documents are stored on different parts of the Internet. For example, in a Web site concerning space exploration, the words space shuttle might be highlighted. Clicking on these words would bring information about the shuttle to the screen. Pictures, too, can be used as hyperlinks (hypertext links). Words and pictures that hyperlink to other documents are called hot spots. Hot spots and their hyperlinks are created by the author of a Web page.

VI. Answer the questions:

1. What does World Wide Web provide?
2. What is the main function of the Internet?
3. How are electronic addresses called?
4. Who wrote the Web software in 1990?
5. When did the Web become part of the Internet?
6. What is a Web browser?
7. What enables a user to jump from one document to another?

VII. Match parts of the sentences in columns A and B.

A	B
1. The Internet links computers	a) Web pages
2. English computer scientist proposed	b) creates hot spots
3.The user gives the computer command	c) all over the world
4. Electronic addresses contain	d) easier
5. The author of a Web page	e) by clicking the computer mouse
6. Web browsers help user to find information	f) Web software

VIII. Divide the text into logical parts and find the topical sentences in each part.

IX. Give a short summary of text B.

Part C

I. Read the following text and entitle it.

1. One of the most interesting developments in telecommunication is the rapid progress of optical communication where optical fibers are replacing conventional wires and cables. Just as digital technologies greatly improved the telephone system, optical communication promises a considerable increase in capacity, quality, performance and reliability of the

global telecommunication network. New technologies such as optical fibers will increase the speed of telecommunication and provide new, specialized information service. Voice, computer data, even video images, will be increasingly integrated into a single digital communication network capable to process and transmit virtually any kind of information.

2. It is a result of combining two technologies: the laser, first demonstrated in 1960, and the fabrication 10 years later of ultra-thin silicon fibres which can serve as light wave conductors. With the further development of very efficient lasers plus continually improved techniques to produce thin silica of incredible transparency, optical systems can transmit pulses of light as far as 135 kilometers without the need for amplification or regeneration.

3. At present high-capacity optical transmission systems are being installed between many major US cities at a rapid rate. The system most widely used now operates at 147 megabits (thousand bits) per second and accommodates 6,000 circuits over a single pair of glass fibres (one for each direction of transmission). This system will soon be improved to operate at 1.7 gigabits (thousand million bits) per second and handle 24,000 telephone channels simultaneously.

4. A revolution in information storage is underway with optical disk technology. The first optical disks appeared in the early 1970s. They were and are used to record video films, but in a continuous spiral rather than digitally.

5. The first digital optical disks were produced in 1982 as compact disks for music. They were further developed as a storage medium for computers. The disks are made of plastics coated with aluminum. The information is recorded by using a powerful laser to imprint bubbles on the surface of the disk. A less powerful laser reads back the pictures, sound or information. An optical disk is almost indestructible and can store about 1000 times more information than a plastic disk of the same size.

6. The latest optical disk development is a system which enables computer users to record their own information on a glass or plastic disk coated with a thin film of tellurium. Such a disk can store 200 megabytes (200 million characters).

7. Besides, it is reported that an optical equivalent of a transistor has been produced and intensive research on optical electronic computers is underway at a number of US companies as well as in countries around the world.

8. It is found that optical technology is cost-effective and versatile. It finds new applications every day – from connecting communication equipment or computers within the same building or room to long-distance transcontinental, transoceanic and space communications.

II. Read the text and find the information about high-capacity optical transmission systems.

III. Which paragraph contains the information about first digital optical disks?

IV. Answer the following questions on the contents of the text.

1. What are optical fibers replacing?
2. What kinds of systems are being installed at present?
3. When did the first optical disks appear?
4. When were the first digital optical discs produced?

V. Give the main points of the text in 5-6 sentences.

UNIT 3

Part A

Word List

account	/əˊkaʊnt/	отчет, счет
assume	/əˊsju:m/	принимать
band	/bænd/	полоса частот
bundle	/ˊbʌndl/	пучок
carry	/ˊkæri/	передавать, проводить
coaxial cable	/ˊkəʊæksɪəl ˊkeɪbl/	коаксиальный кабель
dial	/ˊdaɪəl/	набирать номер (по телефону)
enormously	/ɪˊnɔ:məsli/	чрезвычайно, крайне, очень
exchange	/ɪksˊtʃeɪnʤ/	обмен
existence	/ɪgˊzɪstəns/	существование
filament	/ˊfɪləmənt/	нить накала
frequency	/fri:kwənsi/	частота
huge	/hju:ʤ/	огромный, громадный, гигантский
increasingly	/ɪnˊkri:sɪŋli/	все больше и больше, все в большей и большей степени
instantly	/ˊɪnstəntli/	немедленно, незамедлительно
instantaneously	/ˌɪnstənˊteɪniəslɪ/	мгновенно, моментально
medium	/ˊmi:diəm/	средство, способ
message	/ˊmesɪʤ/	сообщение, послание
network	/ˊnetwɜ:k/	сеть
process	/ˊprəʊses/	обрабатывать
repeater station	/rɪˊpi:təˊsteɪʃn/	ретрансляционная станция
require	/riˊkwaɪə/	требовать
satellite	/ˊsætəlaɪt/	спутник
spread	/spred/	распространение
supplement	/ˊsʌplɪmənt/	дополнять
tie	/taɪ/	связывать

I. Study the following words and choose:

a) a noun

1.	a) transmit	b) transmission	c) transmissible	d) transmitted
2.	a) communication	b) communicate	c) communicated	d) communicative
3.	a) assuming	b) assumption	c) assumed	d) assume
4.	a) conductor	b) conduct	c) conductive	d) conducted

b) *an adverb*

1.	a) increased	b) increase	c) increasing	d) increasingly
2.	a) add	b) added	c) additionally	d) additional

c) *participle II*

1.	a) transform	b) transformation	c) transformed	d) transformer
2.	a) conversion	b) converted	c) converting	d) convert
3.	a) send	b) sender	c) sent	d) sends
4.	a) ties	b) tie	c) tied	d) tying

II. Arrange the words of the two groups in pairs

1. with similar meaning:

a) huge, various, require, supplement, tie, existence, carry, convert, data, instantaneously, transmit, change, consist, use, by means of.

b) with the help of, alter, send, enormous, information, different, connect, apply, compose, conduct, immediately, being, addition, demand, transform.

2. *with contrary meaning:*

a) transmit, various, tie, wide, thin, include, allow, encode, rapidly.

b) separate, exclude, receive, slowly, decode, similar, forbid, narrow, thick.

III. Match the words with their definitions.

1) filament	a) any manmade object launched from and revolving around the earth
2) encode	b) a fine wire with a high resistance; it is heated by the passage of an electric current, it is used in electric-light bulbs.
3) dial	c) very great in size, quantity, extent, etc.
4) supplement	d) call by means of a telephone
5) tie	e) at once
6) process	f) a conductor for a high electric current; it consists of several wires twisted together and covered with insulating material such as rubber, plastic or cloth
7) instantly	g) to carry out a process on data for a particular purpose, may be carried by a person, or by a computer.
8) huge	h) to convert (a message, document, etc.) from plain text into code
9) satellite	i) make an addition or additions to
10) cable	j) to make a connection

IV. Study the text and try to understand all the details.

TELECOMMUNICATION

1. Communication ties together the parts of a society just as the nervous system ties together the parts of an individual. From earliest times, when the only form of communication was speech, to the present, when electronic signals carry information instantly to practically any point on Earth, communication has been the way people have organized their cooperative activities. In the modern world there are two main types of communications media. One type consists of the mass media—such as television, radio, newspapers, and magazines—in which organizations send messages to a large number of people. The other type consists of direct, point-to-point communications—telephone, telegraph, data transmission, and postal service. Of these, the electronic media (all but the postal service) are termed telecommunications.

2. Telecommunication first came into existence with the development of the telegraph in the 1830s and 1840s. For the first time, news and information could be transmitted over great distances almost instantaneously. The invention of the telephone in 1876 by Alexander Graham Bell fundamentally transformed telecommunications. The telephone system assumed its modern form with the development of dial phoning and its spread during the middle decades of the 20th century.

3. After 1975, however, a new transformation of telecommunications began. The technology used to carry information changed radically. At the same time ordinary telephone and telegraph traffic was enormously supplemented by huge masses of computer data, as millions of computers were tied together into global networks.

4. In most cases telecommunications systems transmit information by wire, radio, or space satellite. Wire transmission involves sending electrical signals over various types of wire lines such as open wire, multi pair cable, and coaxial cable. These lines can be used to transmit voice frequencies, telegraph messages, computer-processed data, and television programs. Another somewhat related transmission medium that has come into increasingly wider use, especially in telephone communications, is a type of cable composed of optical fibers. Here electrical signals converted to light signals by a laser-driven transmitter carry both speech and data over bundles of thin glass or plastic filaments.

5. Radio communications systems transmit electronic signals in relatively narrow frequency bands through the air. They include radio navigation and both amateur and commercial broadcasting. Commercial broadcasting consists of AM, FM, and TV broadcasting for general public use.

6. Satellite communications allow the exchange of television or telephone signals between widely separated locations by means of microwaves. Since satellite systems do not require the construction of intermediate relay or repeater stations, as do ground-based microwave systems, they can be put into service much more rapidly.

Modern telecommunications networks thus not only send the traditional voice communications of telephones and the printed messages of telegraphs and telexes, they also carry images of video transmissions used in videoconferences in which the participants can see as well as hear each other. Additionally they carry encoded data ranging from the business accounts of a multinational corporation to medical data relayed for analysis by physicians thousands of miles from a patient.

V. Say whether the following statements are true or false.

1. Electronic signals carry information to practically any point on the Earth.
2. Mass media send messages to a large number of people.
3. All mass media including postal service are called telecommunications.
4. Telecommunications first appeared with the development of telegraph in the 1830s and 1840s.
5. The technology used to carry information slightly changed after 1975.
6. Radio communications systems transmit electronic signals in extremely wide frequency bands through the air.
7. Satellite communications permit the exchange of signals by means of microwaves.
8. Ground-based microwave systems require the construction of repeater stations.
9. The still images of facsimile machines or the moving images of video can also be carried by modern telecommunications networks.
10. Modern telecommunications networks transmit only coded data.

VI. Complete the following sentences choosing the most suitable variant.

1. One type consists of the mass media such as
   a) television, radio, newspapers, and magazines
   b) telephone, telegraph, data transmission
   c) television, telephone, telegraph and postal service
2. The telephone system assumed its modern form with the development of … during the middle decades of the 20th century.
   a) telegraph traffic
   b) dial phoning
   c) facsimile machines
3. In most cases telecommunications systems transmit information by:
   a) open wire, telexes, or faxes
   b) coaxial cable, optical fibers, or global networks
   c) wire, radio, or space satellite

4. Radio communications systems include
   a) radio navigation, radio location and communication
   b) radio navigation and both amateur and commercial broadcasting
   c) radio detection, TV broadcasting and video television transmissions
5. In optical fibres electrical signals converted to light signals by a laser-driven transmitter carry
   a) both encoded data and still images of facsimile machines
   b) both voice frequencies and printed messages
   c) both speech and data

VII. Read § 1 and answer the following questions.
1. What does communication tie?
2. How many types of communications media are there in the world?
3. What medium can't be referred to telecommunications?

VIII. Read § 2 and say who fundamentally transformed telecommunications.

IX. Read § 3 and explain why ordinary telephone and telegraph traffic was fundamentally supplemented by huge masses of computer data.

X. In § 4 and § 5 find English equivalents of the following words and word combinations.
Передавать информацию, оптические волокна, пучки, проводная передача, коаксиальный кабель, относительно, полоса частот, преобразовывать в световые сигналы, нить накала.

XI. Read the fourth sentence of § 4 and mark pauses. Divide it into sense groups, find out the means of connection between these groups and between the words in each group.

XII. In §6 find information about the capabilities of modern telecommunications networks.

XIII. Make an outline of the text.

XIV. Speak on
1. The importance of communication in the modern world and its types.
2. The origin and the development of telecommunication.
3. Different communications systems.
4. Modern telecommunications networks.

Part B

I. Look through the list of key-words and make your predictions about the content of it.

*Wo*rd processing, personal computers, dedicated word processors, electronic typewriters, software, powerful tool.

II. Define the meaning of the "x" words

1) provide : provision = обеспечивать : "x"
2) resemble : resemblance = "x" : сходство
3) delete : deletion = удалять : "x"
4) entire : entirely = полный : "x"
5) replace : replacement = "x" : замена
6) versatile : versatility = многосторонний : "x"
7) perform : performance = выполнять : "x"
8) add : additional = дополнять : "x"
9) process : processing = "x" : обработка

III. Complete the sentences with the given words: linked, introduced, a magnetic disk, software, most expensive, has replaced, to check, characters

1. Word processing … typewriting for many tasks at home, in school and in the office.
2. Personal computers need special instructions called … to perform word processing.
3. Personal computers display … on a computer screen as the user types them.
4. Computers can transfer information to other computers … in a network or send information over telephone lines.
5. Most word processing programs and dedicated word processors enable the user … for spelling errors.
6. The computer can store the document on … so additional copies or corrections can easily be made later.
7. Personal computers are also … processing machines.
8. Computer companies … relatively expensive dedicated word processors in the mid-1970's.

IV. Choose

a) adjectives

1) expense – expend – expensive – expenditure
2) powerfully – power – powerless – powered
3) relate – relativity – relatively – relative
4) special – specially – specialize – specification
5) instruct – instructive – instruction – instructor

b) nouns

1) equip – equipment – equipping – equipped
2) moved – move – movement – mover
3) limitation – limit – limited – limiting
4) edits – editor – edit – edited
5) character – characterize – characteristics – characterized

V. Read the text and entitle it.

1. Word processing is the use of computers to type, edit, and print letters, reports, articles, and other documents. It has replaced typewriting for many tasks at home, in school, and in the office. Business people, authors, students, and lawyers turn to word processing as a tool for writing.

Three main types of equipment are used for word processing: (1) personal computers, (2) dedicated word processors, and (3) electronic typewriters. Personal computers need special instructions called programs or software to perform word processing. Dedicated word processors are computers that do only word processing. Most dedicated word processors have built-in word processing software. Electronic typewriters resemble electric typewriters but include a built-in dedicated computer. The computer provides limited word processing capabilities, such as the ability to store and automatically type a small amount of text.

2. Personal computers and dedicated word processors display characters on a computer screen as the user types them. Words, lines, paragraphs, and pages can be added, deleted, moved, or copied with a few keystrokes or the click of a button on a handheld control called a mouse. Most word processing programs and dedicated word processors enable the user to check for spelling errors. Many can check grammar in a limited way.

3. At the touch of a key, the user can print out an entire document. The computer can store the document on a magnetic disk, so additional copies or corrections can easily be made later. In addition, most word processing programs for personal computers and some dedicated word processors can sort and merge lists and perform limited mathematical computations.

Personal computers are the most powerful and versatile of the word processing machines. They can be programmed to do many things besides word processing. Computers can transfer information to other computers linked in a network or, using a device called a modem, send information over telephone lines. Personal computers are also the most expensive word processing machines. Dedicated word processors are a less expensive option for individuals and small businesses whose computer needs are limited to word processing.

4. Electronic typewriters can perform only the most basic word processing functions, such as inserting, deleting, and underlining text. Most can also check for spelling errors. On many electronic typewriters, a small screen displays material as it is typed. Many electronic typewriter have a

memory, but the amount of text it can store is much smaller than in a personal computer or dedicated word processor.

5. Computer companies introduced relatively expensive dedicated word processors in the mid-1970's. Prices fell in the 1980's, and personal computers and word processing programs for personal computers became common. Personal computers are the most widely used form of word processor.

VI. Choose the right continuation of the following sentences.

1. Students use the word processing	a. programs or software
2. Personal computers need	b. on a magnetic disk
3. Pages can be moved with	c. as a tool for writing
4. At the touch of a key, the user can	d. perform mathematical computations
5. The computer can store the document	e. the click
6. Word processing programs can	f. a small amount of text
7. Computers can send information	g. print out a document
8. The typewriter can store	h. over telephone lines

VII. Divide the text into logical parts and find the topical sentences in each part.

VIII. Give a short summary of text B.

Part C

I. Look at the title. What do you think this reading will be about?

FROM THE HISTORY OF TELEGRAPH

1. Any system that can transmit encoded information by signal across a distance may be called a telegraph. The word was coined in about 1792 from the Greek words *tele,* “far,” and *graphein,* “to write,” but the principle is much older. The earliest forms of telegraphy were probably smoke, fire, and drum signals. By about 300 BC Greeks had devised a method of alphabetic signaling using large vases visible from a distance. Letters were signified according to the positions of vases in a grid of rows and columns. A similar system was used by medieval prisoners tapping signals between cells, using grids.

2. In the late 18th century optical telegraphs were invented by Claude Chappe in France and by George Murray in England. Called semaphores, they relayed messages from hilltop to hilltop with the aid of telescopes. Chappe's system used a vertical timber holding a movable crossbar with indicators at each end that could assume various configurations like a

signalman with flags. Murray's system used a large tower-mounted box with six panels that opened and closed in different coded combinations.

3. Rapid development of telegraph systems came with the discovery that electric impulses could be used to transmit signals along a wire. Among the many electric systems devised was the needle telegraph. This was based on Hans Christian Oersted's discovery in 1819 that an electric current in a wire caused a magnetized needle next to the wire to deflect. The five-needle telegraph - patented by William Fothergill Cooke and Charles Wheatstone in London in 1837—utilized this principle with a panel imprinted with letters and numerals to which the five needles pointed singly or in pairs. It was widely used in Great Britain, especially for railroad signaling.

4. The development of the electromagnet about that time provided Samuel F.B. Morse with a way to transmit and receive electric signals. Together with Alfred Vail, his partner from 1837, Morse developed the simple operator key—something like a single typewriter key—which when depressed completed an electric circuit and sent an electric pulse to a distant receiver. This was originally a device that embossed a series of dots and dashes on a paper roll. About 1856 a sounding key was developed; skilled operators could listen to what the key “said” and write the messages directly. Telegraph systems quickly spread across Europe and the United States and soon resulted in mergers and associations such as the Western Union Telegraph Company in 1856.

5. With growing telegraph traffic, refinements were necessary. The duplex circuit, developed in Germany, made it possible for messages to travel simultaneously in opposite directions on the same line. Thomas Edison devised a quadruplex system in 1874 that permitted four messages to travel at once, two going in each direction. The most revolutionary system was invented by Jean-Maurice-Émile Baudot. His time-division multiplex, invented in 1872, consisted of a brush arm that traveled around a copper ring divided into equal sectors. In each sector there were five segments capable of receiving electric impulses and corresponding to a five-level code. As the brush arm moved in its circle, it picked up a code number from one sector and then the next and so on. As many messages as there were sectors could be sent simultaneously. The Baudot code is still used in some modern teletype machines.

6. By the end of the 19th century, the world was crisscrossed by telegraph lines, including numerous cables across the Atlantic Ocean. Some early telegraphs using keyboards and type wheels could produce tapes of printed messages, which were long used in stock-exchange tickers. In 1903 Donald Murray of England combined Baudot's time-division multiplex system and its five-level code with a system for punching tape devised by Wheatstone to produce a system that transmitted page-form telegrams.The invention of the telephone made a new range of technology available to

telegraphy, particularly in the field of high-speed information transmission. Other significant developments in telegraphy include the use of microwave radio links to carry up to 1,800 channels in a single circuit. Satellite transmission is now widely used for international telegraphy, as are the high-frequency radio bands. Many modern telegraph terminals consist of tele-printers using the American Standard Code for Information Interchange (ASCII), a seven-pulse code capable of producing 128 alphabet, number, and control signals.

Notes:
grid - сетка
deflect - отклоняться
emboss - выбивать
refinement - усовершенствование
duplex – дуплексная (связь)
quadruplex – квадраплексный
time-division multiplex – временное уплотнение
stock-exchange tickers – телеграфный аппарат, автоматически печатающий на ленте последние биржевые новости

II. Read the text and answer the questions:
1. What system can be called a telegraph?
2. Who invented optical telegraphs?
3. What discovery contributed to the rapid development of telegraph systems in the 19th century?
4. What principle was used in the five-needle telegraph patented by W. Cooke and Ch. Wheatstone?
5. Whose code is still used in some modern teletype machines?
6. Who produced a system that transmitted page-form telegrams?

III. Explain the origin of the word "telegraph".

IV. Find the information about the earliest telegraph systems used.

V. Describe how A. Vail and S. Morse's simple operator key worked.

VI. Name refinements that were necessary for the development of telegraph in the 19th century.

VII. In paragraph 5 find the place about Baudot system.

VIII. Which paragraph contains information about the significant developments used in telegraphy nowadays.

IX. Give the main points of the text in 5-6 sentences.

UNIT 4

Part A

Word List

actual	/ˊæktʃuəl/	фактический, реальный, подлинный
amplify	/əˊreɪ/	усиливать
array	/ˊæmplɪfaɪ/	множество, *вчт* матрица, массив
assemble	/əˊsembl/	собирать, монтировать
axial	/ˊæksiəl/	осевой
beat	/bi:t/	бой, биение, колебание маятника
circuitry	/ˊsə:kɪtri/	схемы, схемотехника
complex	/ˊkɒmpleks/	сложный, комплексный
determine	/dɪˊtə:mɪn/	определять
efficiently	/ɪˊfɪʃntli/	умело, эффективно, производительно,продуктивно
exactly	/ɪgˊzæktli/	точно, ровно
fast	/fɑ:st/	скорый, быстрый
ultrafast	/ˊʌltrəfɑ:st/	сверхскорый
fidelity	/fɪˊdeləti/	верность, качество, воспроизведения, точность
high fidelity	/ˊhaɪfɪˊdeləti/	высококачественное воспроизведение
gripper	/ˊgrɪpə/	схват (робота), захватное устройство (робота)
highlight	/ˊhaɪlaɪt/	выделять, заострять внимание
interference	/ɪntəˊfɪərəns/	вмешательство, помеха
internal	/ɪnˊtɜ:nl/	внутренний
invaluable	/ɪnˊvæljuəbl/	неоценимый, бесценный
magnify	/ˊmægnɪfaɪ/	увеличивать
oscilloscope	/əˊsɪləskəʊp/	осциллоскоп
pack	/pæk/	упаковывать, уплотнять
pendulum	/ˊpendjələm/	маятник
prevent	/prɪˊvent/	предотвращать, препятствовать
record	/ˊrekɔ:d/	запись
response	/rɪˊspɒns/	ответ, реакция, отклик
tie	/taɪ/	связывать, привязывать, завязывать
tune	/tju:n/	настраивать, ~out устранять
vast	/vɑ:st/	обширный, просторный, громадный, огромный
versatile	/ˊvɜ:sətaɪl/	разносторонний, многосторонний, универсальный
voluminous	/vəˊlu:mɪnəs/	огромный

I. Study the following words and choose:

a) *nouns*

1) a) actual; b) act; c) actuality; d) actualize
2) a) amplify; b) amplification; c) amplifier; d)amplified
3) a) carry; b) carrier; c)carriage; d)carried
4) a) guide; b) guidance; c)guided; d)guiding
5) a) vast; b) vastness; c) vastly; d) vastitude

b) adjectives

1) a) axe; b) axial; c) axle; d) axled
2) a) pendulum; b) pendant; c) pendulous; d) pendulate
3) a) control; b) controller; c) controllable; d)controllability
4) a) determine; b) determinate; c) determinable; d) determination
5) a) magnify; b) magnificence; c) magnificent; d) magnification

c) verbs

1) a) vital; b) vitalize; c) vitality; d)vitalization
2) a) prevent; b) preventive; c) prevention; d) preventor
3) a)transmitter; b) transmit; c) transmissible; d) transmitting
4) a) tune; b) tuneful; c) tuned d) tuner
5) a) volume; b) voluminous; c) volumetric; d) voluminosity

II. Arrange the words of the two groups in pairs

a) with similar meaning

1. Complex, to highlight, to amplify, to control, to determine, to magnify, response, to manufacture, to supplement, fast, vast, versatile, voluminous.
2. Huge, to draw attention to, extensive, sophisticated, to direct, to define, to increase, answer, to produce, to add, rapid, many-sided, to strengthen.

b) with contrary meaning.

1. Fast, internal, invaluable, sophisticated, vital, voluminous, to amplify, to assemble, to magnify, to pack, to prevent, to tie, exactly, efficiently.
2. To weaken, simple, slow, to take to pieces, to reduce, to unpack, to promote, to untie, approximately, external, valuable, small, unimportant, inefficiently.

III. Match the words with their definitions.

1. circuit	a) hit repeatedly
2. beat	b) one of the slender threads of which many animal and vegetable growths are formed, e.g. cotton, wood, nerves, muscles
3. fiber	
4. fidelity	
5. oscillator	c) closed path for an electric current
6. pendulum	d) device for producing electric oscillations
7. response	e) accuracy, exactness
8. complex	f) answer, reaction
9. internal	g) difficult to understand or explain
10.voluminous	h) weighted rod hung from a fixed point so that it swings freely, esp. one to regulate the movement of a clock
	i) great in quantity; occupying much space
	j) of or in the inside

IV. Study the text and try to understand all details.

1. Integrated circuits are extremely versatile because a single basic design can be made to perform hundreds of different functions, depending on

the wiring of the circuits and the electronic programs or instructions that are fed into them. Most ICs perform calculations or logic manipulations in devices ranging from hand-held calculators to ultrafast supercomputers that can perform billions of calculations per second.

2. There are many other functions, however, that can be done with electronic circuitry. In radio and television receivers a primary function of circuits is the amplification of weak signals received by the antenna. In amplification a small signal is magnified to a large signal that is used to drive other circuits such as the speakers of a radio.

3. In many cases this amplification is performed with the help of oscillator circuits. Such circuits have a natural period or cycle of electrical current, similar to the natural beat of a pendulum. When driven by external signals of the same period, such as the transmission from a particular radio channel, the oscillator circuit increases its amplitude of oscillation.

4. To tune out other radio or television stations also received by a single antenna, filter circuits are frequently used. Such filters strongly reduce the signals at all but a single frequency, preventing interference among channels in a receiver.

5. These and other basic circuit types are used in a vast array of electronic devices. Consumer electronics, a field that was first developed in the 19th century with the invention of the phonograph, now includes radios, television sets, high-fidelity stereo systems, tape recorders, calculators, video games, and personal computers. Most of these devices contain one or more integrated circuits. Electronic controls have also been added to many electrical appliances such as dishwashers, washing machines, ovens, and food processors.

6. In industry and trade the computer, made up of from one to several thousand integrated circuits, has become an invaluable tool, controlling industrial operations and keeping track of voluminous business records. When connected to mechanical arms and grippers, electronics is the brain of the industrial robot that has come into increasingly widespread use for painting, welding, and assembling products that range from automobiles to watches.

7. Scientists use electronic computers to perform extremely complex calculations such as determining exactly the course of distant space probes; the probes themselves are packed with electronic instruments and communications equipment. Electronic instruments are used on Earth for scientific measurements and in the electronics industry itself to test equipment as it is manufactured. The oscilloscope, for example, is used to diagnose problems in electronic circuits, through a comparison of expected test patterns with actual results.

8. In the field of medicine electronic diagnostic instruments have given physicians a much clearer view of the human body than ever before. Computerized axial tomography (CAT) scanners, which are a sophisticated

form of X-ray machines, use computers to analyze X rays and produce three-dimensional views of internal organs. Nuclear magnetic resonance (nmr) scanners analyze the response of the body's chemicals to radio waves and magnetic fields, producing maps of the body's biochemistry and clearly highlighting areas of disease.

9. Virtually all modern communications rely on electronics. Electronic circuits switch telephone calls both on Earth and in communications satellites. Satellite electronics systems amplify and retransmit television and radio communications. Computers are tied together by electronic networks.

V. Say whether the following statements are true or false.

1. In radio or television receivers a secondary function of circuits is the amplification of weak signals received by the antenna.
2. In amplification a large signal is magnified to a small signal.
3. Amplification isn't performed with the help of oscillator circuits.
4. Filter circuits are frequently used to tune out other radio or television stations.
5. The computer controls industrial operations and keeps track of voluminous business records.
6. Electronic instrument diagnosing problems in electronic circuits is the amplifier.
7. Computerized axial tomography scanners produce four-dimentional views of internal organs.
8. Electronic circuits switch telephone calls both on Earth and in communications satellites.

VI. Complete the following sentences choosing the most suitable variant.

1. Integrated circuits are extremely ….
   a) simple b) versatile c) large
2. Amplification of weak signals is performed with the help of ….
   a) scanner circuits b) oscillator circuits c) filter circuits
3. Filter circuits are used ….
   a) to increase the signals
   b) to tune out radio or television stations
   c) to interfere in the channels in a receiver
4. Consumer electronics was first developed….
   a) in the 20th century b) in the 19th century c) in the 21st century
5. Many electrical appliances have got ….
   a) displays b) scanners c) electronic controls
6. The device used to diagnose problems in electronic circuits is called
   a) calculator b) oscilloscope c) laser
7. Television and radio communications are amplified and retransmitted by ….
   a) satellite electronics systems b) navigation system c) television

VII. Read the first sentence of the text and mark pauses. Divide it into sense groups, find out the means of connection between these sense groups and between the words in each group.

VIII. In paragraphs 2 and 3 find English equivalents of the following words and word combinations.

Радио и телевизионные приемники, усиление слабых сигналов, увеличивать собственное колебание маятника, передача, амплитуда колебания.

IX. *Read paragraph 4 and answer the questions.*

1. What is used to tune out other radio or television stations also received by a single antenna?
2. What do such filters strongly reduce?

X. In paragraph 5 find information about modern electrical appliances.
XI. Make an outline of the text.
XII. Speak about different applications of ICs.

Part B

I. *Look through the list of English words and their Russian equivalents facilitating reading text B.*

advent	*появление*
composite	*составной, сложный*
coat	*покрывать*
digital	*цифровой*
data	*данные*
film	*пленка*
load	*загружать*
lacquer	*(летучий) лак*
label	*наклейка, этикетка*
lay out (laid, laid)	*выставлять*
layer	*слой*
ofset printing	*офисная печать*
to store	*хранить*
trim	*подрезать*
scratch	*царапать*
silkscreening	*трафаретная печать*
storage	*запоминающее устройство, память*

II. Define the meaning of the "x" words.
e.g. develop: development = развивать: x
store: storage = хранить: x
invent: invention = изобретать: x

view: viewer = рассматривать: x
load: loading = загружать: x
reduce: reduction = уменьшать: x
increase: increasing = увеличивать: x

III. Complete the sentences with the given words:

invented, a data storage device, audio CDs, the advantage of MP3, coated, the data format of the disc, silkscreening and offset printing.

1. A compact disc is also used as……
2. Personal computers can generally play …..
3. …. is that it reduces the amount of space required to store audio by around ten times.
4. Philips …. the general manufacturing process.
5. Compact discs are made of polycarbonate plastic … with a much thinner aluminium.
6. Common printing methods for compact discs are ….
7. The Dutch electronics company Philips laid out ….

IV. Choose:

a) nouns

1.	a) coat	b) coated	c) uncoat
2.	a) layer	b) lay	c) laid
3.	a) print	b) printer	c) printable
4.	a) trim	b) trimmer	c) trimmed

b) adjectives

1.	a) scratch	b) scratchy	c) scratched
2.	a) silk	b) silken	c) silky
3.	a) digital	b) digit	c) digitizer
4.	a) composite	b) composition	c) compositor

V. Read the text and define its main idea.

COMPACT DISC

1. A compact disc (or CD**)** is an optical disc used for storing digital data. It was originally invented for digital audio and is also used as a data storage device, a CD-ROM. CD-ROM reading device is a standard component of most modern personal computers. In general, audio CDs are distinct from CD-ROMs, and CD players intended for listening to audio cannot make sense of the data on a CD-ROM, though personal computers can generally play audio CDs. It is possible to produce composite CDs containing both data and audio with the latter capable of being played on a CD player, whilst data or perhaps video can be viewed on a computer. Lately, with the advent of MP3 technology, audio player devices have been developed that can load and play

MP3-formatted files from CD-ROM discs. The advantage of MP3 is that it reduces the amount of space required to store audio by around ten times, thereby increasing maximum playback time per disc from around 74 minutes to more than 700 without significant degradation in sound quality.

2.The compact disc was developed in 1979 by Philips and Sony. Philips invented the general manufacturing process, based on their earlier Laserdisc technology, while Sony contributed the error-correction method. 1982 saw its mass production in Langenhagen near Hanover, Germany. Microsoft and Apple Computer were early enthusiasts and promoters of CD-ROMs. John Sculley. CEO of Apple at the time, said as early as 1987 that the CD-ROM would revolutionize the use of personal computers.

Originally the CD was supposed to be 60 minutes, but Sony insisted on it being 74 minutes so it could hold even the slowest versions of Beethoven's 9th Symphony. Later on, the discs would become larger, tough.

3. Compact discs are made from a 1.2 mm thick disc of polycarbonate plastic coated with a much thinner aluminium (originally gold, although you can still buy gold CDs for their data longevity) layer which is protected by a film of lacquer. The lacquer can be printed with a label. Common printing methods for compact discs are silkscreening and offset printing. CDs arc available in a range of sizes but the most commonly available is 120 mm (about 5 inches) in diameter. A 120 mm disc can store about 74 minutes of music or about 650 megabytes of data. Discs that can store about 700 megabytes (80 minutes of music) have become more common however. Less common 90, 99, and 100 minute discs also exist but are not compatible with all CD writers or readers. The mini-CD (not to be confused with the similar MiniDisc) is 80 mm (about 3 1/8 inches) in diameter, holds about 184MB of data or 21 minutes of audio, and has the exact same data format as the larger one. Yet another version of the CD has a mini-CD trimmed down to fit in with business cards.

4. The data format of the disc, known as the “Red Book” standard, was laid out by the Dutch electronics company Philips, who own the rights to the licensing of the “CDDA” logo that appears on the disc. In broad terms the format is a two-channel (left and right, for stereo) 16-bit PCM encoding at a 44.1 kHz sampling rate. Reed-Solomon error correction allows the CD to be scratched (to a certain degree) without degradation of the contents.

VI. Say if the following statements are true or false. Correct the false statements.

1. Personal computers can’t play audio CD.
2. There are many advantages of MP3 technology.
3. Microsoft was the pioneer in the usage of CD-ROMs.
4. First disks were large and tough.
5. The producers protect CD by a film of lacquer.
6. Mini-CD holds 80 minutes of audio.

VII. Choose the best continuation for each of the following.

1. Compact disk was invented for	a. a personal computer
2. CD-ROM is a part of	b. 1979
3. The first CD was developed in	c. thin aluminium
4. The mini CD has the same data format	d. digital devises
5. CD is coated with	e. 700 megabytes
6. CD can store	f. as the larger

VIII. Divide the text into logical parts and find the topical sentences in each part.

IX. Give a short summary of text B.

Part C

I. *Read the following text and entitle it.*

1. Despite the importance of these other types of electronic devices, semiconductor-based circuits are the essential features of modern electronic equipment. These circuits are not made up of individual, separated components as was once the case. Instead, thousands of tiny circuits are embedded in a single complex piece of silicon and other materials called an integrated circuit (IC).

2. The manufacture of integrated circuits begins with a simple circular wafer of silicon a few inches across. Designers have produced drawings of exactly where each element in the finished circuits is to go. Usually these diagrams are themselves made with the help of computers. Photographs of the diagrams are then reduced in size many times to produce a photolithographic mask. The wafers are first coated with a material called a photoresist that undergoes a chemical change when exposed to light. Light shone through the mask onto the photo resist creates the same pattern on the wafer as that on the mask. Solvents then etch away the parts of the resist exposed to light, leaving the other parts intact.

3. After this another layer of material—for example, silicon doped with some impurities—is laid down on top of the wafer, and another pattern is etched in by the same technique. The result of several such operations is a multilayered circuit, with thousands of tiny transistors, resistors, and conductors created in the wafer.The wafer is then broken apart along pre-stressed lines into dozens of identical square or rectangular chips—the finished integrated circuits.

4. During the 1970s and 1980s advancing technology reduced the size of individual circuit elements by a factor of two every two years, leading in the same period to a fourfold increase in the number of elements that can fit on a

chip. This rapid increase in the power of the chips and the simultaneous rise in their speed allowed the development of microprocessors. Microprocessors, which are at the heart of millions of personal and home computers, pack the same computing power into a tiny chip a fraction of an inch on a side that 20 years earlier would have been provided by a computer that filled a whole room and cost many millions of dollars.

5. Individual chips are mounted on carriers with several dozen connector leads emerging from them. These, in turn, are soldered together onto printed circuit boards that may contain many dozens of chips. In large computers the boards themselves are mounted into large racks and again connected together.

6. By the mid-1980s integrated circuits made with the most advanced technology could carry as many as a million individual transistors, each only a few microns on a side. (A micron is a thousandth of a millimeter, or 0.00004 inch.) Many electrical engineers and scientists believe that the ultimate limits of size in these circuits might soon be reached.

7. It was expected that the circuit elements would become too small and contain too few individual atoms to be manufactured reliably. To continue the reduction in size and cost of microcircuits, new principles of operation may be required, perhaps involving specially designed organic molecules.

II. Read the text and answer the questions.

1. What does the manufacture of integrated circuits consist of?
2. When did advancing technology reduce the size of individual circuit elements by a factor of two every two years?
3. What allowed the development of microprocessors?
4. What do microprocessors comprise?
5. What could integrated circuits carry by the mid-1980s?
6. What is necessary to continue the reduction in size and cost of microcircuits?

III. Give the main points of the text in 5-6 sentences.

UNIT 5

Part A

Word List

add	/æd/	складывать, прибавлять
amazing	/ə´meɪzɪŋ/	удивительный, поразительный
appear	/ə´pɪə(r)/	появляться
approximately	/ə´prɒksɪmətlɪ/	приблизительно

brand	/brænd/	сорт, фабричная марка
central processing unit	/ˌsentrəlˈprəʊsesɪŋˌju:nɪt/	центральное процессорное устройство
complete	/kəmˈpli:t/	совершенный, полный, законченный
delay	/dɪˈleɪ/	задержка, замедление
design	/dɪˈzaɪn/	проект, конструкция
execute	/ˈeksɪkju:t/	исполнять, выполнять
fabricate	/ˈfæbrɪkeɪt/	изготовлять, производить
familiar	/fəˈmɪliə(r)/	хорошо знакомый, известный
improvement	/ɪmˈpru:vmənt/	улучшение, усовершенствование
incorporate	/ɪnˈkɔ:pəreɪt/	изготовлять, производить
introduce	/ˌɪntrəˈdju:s/	вводить, представлять
portable	/ˈpɔ:təbl/	портативный
relationship	/rɪˈleɪʃnʃɪp/	связь, отношение
splash	/splæʃ/	всплеск, бум
subtract	/səbˈtrækt/	вычитать

I. Study the following words and choose nouns:

1) a) introduced	b) introduce	c) introducing	d) introduction
2) a) process	b) processor	c) processing	d) procession
3) a) appear	b) appearance	c) disappear	d) disappearance
4) a) direct	b) direction	c) directly	d) directness
5) a) completion	b) completely	c) completeness	d) complete
6) a) using	b) used	c) user	d) usage
7) a) relate	b) relative	c)relatively	d) relationship
8) a) completion	b) completely	c) completeness	d) complete
9) a) execute	b) exact	c) executive	d) execution

II. Arrange the words of the two groups in pair:

a) with similar meaning

1) type	a) perfect
2) fabricate	b) connection
3) complete	c) perform operation
4) basic	d) fundamental
5) execute	e) rate
6) introduce	f) manufacture
7) relationship	g) kind
8) speed	h) bring into use

b) with contrary meaning

1) complete	a) powerless
2) powerful	b) disappear
3) appear	c) incomplete
4) approximately	d) subtract
5) add	e) exactly

6) same	f) unfamiliar
7) familiar	g) different

III. Match the words with their definitions.

1) brand	a) perform operation
2) execute	b) construct or manufacture
3) fabricate	c) a special or characteristic kind
4) computer	d) make whole or perfect
5) portable	e) electronic device for storing and processing data
6) design	f) one only
7) single	g) a scheme of lines or shapes forming a pattern
8) complete	h) convenient for carrying
9) relationship	i) connection

IV. Study the text and try to understand all details.

MICROPROCESSOR HISTORY

1. The computer you are using to read this page uses a microprocessor to do its work. The microprocessor is the heart of any normal computer, whether it is a desktop machine, a server or a laptop. The microprocessor you are using might be a Pentium, a K6, PowerPC, a Sparc or any of the many other brands and types of microprocessors, but they all do approximately the same thing in approximately the same way.

2. A microprocessor – also known as a CPU or central processing unit – is a complete computation engine that is fabricated on a single chip. The first microprocessor was the Intel 4004, introduced in 1971. The 4004 was not very powerful – all it could do was add and subtract, and it could only do that 4 bits at a time. But it was amazing that everything was on one chip. Prior to the 4004, engineers built computers either from collections of chip or from discrete components (transistors wired one at a time). The 4004 powered one of the first portable electronic calculators.

3. The first microprocessor to make it into a home computer was the Intel 8080, a complete 8-bit computer on one chip, introduced in 1974. The first microprocessor to make a real splash in the market was the Intel 8088, introduced in 1979 and incorporated into the IBM PC (which first appeared around 1982). If you are familiar with the PC market and its history, you know that PC market moved from the 8088 to the 80286 to the 80386 to the 80486 to the Pentium to the Pentium II to the Pentium III to the Pentium 4. All of these microprocessors are made by Intel and all of them are improvements on the basic design of the 8088. The Pentium 4 can execute any piece of code that runs on the original 8088, but it does it about 5,000 times faster!

4. The following table helps you to understand the differences between the different processors that Intel has introduced over the years.

Name	Date	Transistors	Microns	Clock speed	Data width	MIPS
8080	1974	6,000	6	2 MHz	8 bits	0.64
8088	1979	29,000	3	5 MHz	16 bits, 8-bit bus	0.33
80286	1982	134,000	1.5	6 MHz	16 bits	1
80386	1985	275,000	1.5	16 MHz	32 bits	5
80486	1989	1,200,000	1	25 MHz	32 bits	20
Pentium	1993	3,100,000	0.8	60 MHz	32 bits, 64-bit bus	100
Pentium II	1997	7,500,000	0.35	233 MHz	32 bits, 64-bit bus	~300
Pentium III	1999	9,500,000	0.25	450 MHz	32 bits, 64-bit bus	~510
Pentium 4	2000	42,000,000	0.18	1.5 GHz	32 bits, 64-bit bus	~1,700

5. From this table you can see that, in general, there is a relationship between clock speed and MIPS. The maximum clock speed is a function of the manufacturing process and delays within the chip. There is also a relationship between the number of transistors and MIPS. For example, the 8088 clocked at 5 MHz but only executed at 0.33 MIPS (about one instruction per 15 clock cycles). Modern processors can often execute at a rate of two instructions per clock cycle. That improvement is directly related to the number of transistors on the chip.

Notes:

MIPS (millions of instructions per second) - миллион инструкций в секунду

V. Say whether the following statements are true or false.

1. A microprocessor is the heart of any normal computer.

2. The microprocessor known as CPU is a complete computation engine that is fabricated on a dozen of chips.
3. The first microprocessor was Intel 4004, introduced in 1973.
4. The 4004 was not very powerful – all it could do was add and subtract.
5. The first microprocessor which made a real splash in the market was the Intel 4004.
6. Modern processors can often execute at a rate of two instructions per clock cycle.

VI. Complete the following sentences choosing the most suitable variant.

1. The microprocessor is the heart of … .
   a) any normal computer
   b) any computation engine
   c) any vacuum tube
2. Central processing unit is a complete computation engine fabricated…
   a) on a dozen of chips
   b) on a single chip
   c) on a square meter
3. The first microprocessor was Intel 4004, introduced in …
   a)1971, b)1975, c)1998
4. The 4004 powered one of …
   a) the first portable electronic calculators
   b) the second portable electronic calculators
   c) the third portable electronic calculators
5. All these microprocessors are improvements of the basic design of the…
   a) 8088, b) 80286, c) 80386
6. That improvement is directly related to the number of …
   a) IC on the chip
   b) transistors on the chip
   c) vacuum tubes on the chip

VII .Read the third sentence of the first paragraph of the text and mark pauses. Divide it into sense groups, find out the means of connection between these sense groups and between the words in each group.

VIII. In paragraphs 2 and 3 find English equivalents of the following words and word combinations.

Центральное процессорное устройство, на отдельном кристалле, изготавливать, настоящий бум на рынке, прежде.

IX. Read paragraph 3 and answer the questions.

1. What have you learnt about the first microprocessor Intel 8080? Describe its characteristic features.

2. What microprocessor made a real splash in the market? And why?

X. In paragraph 5 find information about a relationship between the number of transistors and MIPS.

XI. Make an outline of the text.

XII. Speak about microprocessor as the heart of any computer.

Part B

I. Look through the list of words and make your predictions about the content of it.

1) alter – чередовать, изменять
2) barrier – барьер, экран
3) cell – ячейка, элемент
4) console – пульт управления
5) charge – заряд, заряжать
6) drain – ток, потребление тока
7) drive – привод, двигать, приводить в действие
8) electron gun – электронная пушка
9) excite – возбуждать, побуждать
10) flow – поток
11) erase – стирать запись
12) layer – слой, пласт
13) threshold – порог, предел
14) storage – хранение

II. Define the meaning of the "x" words.

1. Charge: chargeable = заряжать: x
2. Alter: alteration = изменять: x
3. Electron: electronics = электрон: x
4. Application: apply = применение: x
5. Erase: eraser = стирать: x

III. Complete the sentences with the given words:
barrier, electron gun, to alter, storage, drains.

1. Flash memory is used for easy and fast information ….
2. Tunneling is used …. the placement of electrons in the floating gate.
3. The charge enters the floating gate and ….. to a ground.
4. This charge causes the floating-gate transistor to act like …… .
5. These negatively charged electrons act as a ….. between the control gate and the floating gate.

IV. Study the following words and choose:

a) nouns

1) a) storage	b) store	c) storing	d) stored
2) a) lay	b) layer	c) laid	d) laying
3) a) memorize	b) memorial	c) memory	d) memorable

b) verbs

1) a) alternate	b) alter	c) alternation	d) alternative
2) a) trapper	b) trappy	c) trap	d) trapeze
3) a) excitable	b) excitant	c) excite	d) excitement

V. Read the text and entile it.

Electronic memory comes in a variety of forms to serve a variety of purposes. Flash memory is used for easy and fast information storage in such devices as digital cameras and home video game consoles. It is used more as hard drive than as RAM. In fact, Flash memory is considered a solid state storage device. Solid state means that there are no moving parts - everything is electronic instead of mechanical.

Here are a few examples of Flash memory:

• Your computer's BIOS chip
• CompactFlash (most often found in digital cameras)
• SmartMedia (most often found in digital cameras)
• MemoryStick (most often found in digital cameras)
• PCMCIA Type I and Type II memory cards (used as solid-state disks in laptops)
• Memory cards for video game consoles

The two transistors are separated from each other by a thin oxide layer. One of the transistors is known as a floating gate, and the other one is the control gate. The floating gate's only link to the row, or wordline, is through the control gate. As long as this link is in place, the cell has a value of 1. To change the value to a 0 requires a curious process called Fowler-Nordheim tunneling. Tunneling is used to alter the placement of electrons in the floating gate. An electrical charge, usually 10 to 13 volts, is applied to the floating gate. The charge comes from the column, or bitline, enters the floating gate and drains to a ground. This charge causes the floating-gate transistor to act like an electron gun. The excited electrons are pushed through and trapped on other side of the thin oxide layer, giving it a negative charge. These negatively charged electrons act as a barrier between the control gate and the floating gate. A special device called a cell sensor monitors the level of the charge passing through the floating gate. If the flow through the gate is greater than 50 per cent of the charge, it has a value of 1. When the charge passing through drops below the 50-percent threshold, the value changes to 0. A blank EEPROM has all of the Erasing. The electrons in the cells of a Flash-memory chip can be returned to normal ("1") by the application of an

electric field, a higher-voltage charge. Flash memory uses in-circuit wiring to apply the electric field either to the entire chip or to predetermined sections known as blocks. This erases the targeted area of the chip, which can then be rewritten. Flash memory works much faster than a traditional EEPROMs because instead of erasing one byte at a time, it erases a block or the entire chip, and then rewrites it.

Notes:
EEPROM (Electrically Erasable Programmable Read-Only Memory) – электрически стираемая память

VI. Say if the following statements are true or false. Correct the false statements.
1. Flash memory is used for easy and fast information storage.
2. Flash memory is considered a mechanical device.
3. The floating gate is only link to the row, or wordline.
4. Tunneling is used to alter the placement of atoms in the floating gate.
5. If the flow through the gate is greater than 50 per cent of the charge, it has a value of 0.
6. Flash memory works much faster than a traditional EEPROMs.

VII. Divide the text into logical parts and find the topical sentences in each part.

VIII. Give a short summary of text B.

Part C

I. Read the following text and entitle it.

1. Semiconductors have had a monumental impact on our society. You find semiconductors at the heart of microprocessor chip as well as transistors. Anything that's computerized or uses radio waves depends on semiconductors.

2. Today, most semiconductor chips and transistors are created with silicon. You may have heard expressions like "Silicon Valley" and the "silicon economy," and that's why – silicon is the heart of any electronic or computer device.

3. A diode is the simplest possible semiconductor device, and is therefore an excellent beginning point if you want to understand how semiconductors work.

4. Silicon is a very common element – for example, it is the main element in sand and quartz. If you look "silicon" up in the periodic table, you will find that it sits next to aluminum, below carbon and above germanium.

5. Carbon, silicon and germanium (which, like silicon, is also a semiconductor) have a unique property in their electron structure – each has four electrons in its outer orbital. This allows them to form nice crystals. The four electrons form perfect covalent bonds with four neighboring atoms, creating a lattice. In carbon, we know the crystalline form as diamond. In silicon, the crystalline form is a silvery, metallic-looking substance.

6. Metals tend to be good conductors of electricity because they usually have “free electrons” that can move easily between atoms, and electricity involves the flow of electrons. While silicon crystals look metallic, they are not, in fact, metals. All of the outer electrons in a silicon crystal are involved in perfect covalent bonds, so they can’t move around. A pure silicon crystal is nearly an insulator – very little electricity will flow through it.

Notes:

bond	соединение, связь
carbon	углерод
impact	воздействие, влияние
involve	вовлекать, включать в себя
lattice	решетка
pure	чистый

II. Read the text and answer the questions.

1. What elements are considered to be semiconductors?
2. Why is silicon the heart of any electronic or computer device?
3. What part do semiconductors play in a computer technology?

III. Which paragraph contains the information about conductors of electricity having “free electrons”.

IV. Give the main points of the text in 5-6 sentences.

UNIT 6

Part A

Word List

accurately	/ˊækjərətli/	точно
available	/əˊveɪləbl/	1) доступный, имеющийся в распоряжении; 2) пригодный, полезный
computer-aided design	/dɪˊzaɪn/	компьютерное проектирование
conduct transactions	/kənˊdʌkt rænˊzækʃnz/	вести дела
drastically	/ˊdræstɪkli/	решительно, радикально
fairly	/ˊfeəli/	1) довольно, в известной степени; 2) явно, совершенно

host computer	/ˊhəʊst kəmˊpju:tə(r)/	узловой компьютер
i.e. (id est, лат.) – that is		то есть
intercept	/ˌɪntəˊsept/	перехватить
knock out	/nɒk/	выводить из строя
packet switching	/ˊpækɪtˊswɪtʃɪŋ/	пакетная коммутация
provide (smb. with smth.)	/prəˊvaɪd/	1) обеспечивать, 2) предоставлять, давать
refine	/rɪˊfaɪn/	усовершенствовать
reliable	/rɪˊlaɪəbl/	надежный
resolve a problem	/rɪˊzɒlv/	решать проблему
run (a network)	/rʌn/	руководить, управлять
router	/ru:t/	маршрутизатор
service provider	/ˊsɜ:vɪs prəˊvaɪdə(r)/	поставщик сетевых услуг
wire	/ˊwaɪə(r)/	провод, телеграф
wireless	/ˊwaɪələs/	1) беспроволочный; 2) радио

I. Study the following words and choose:

a) nouns

1) reliable, rely, reliability, relied
2) provided, provider, provide, provident, provision
3) use, usage, useful, used
4) design, designate, designed, designer

b) verbs

1) receiver, receive, receivable, receivership
2) payable, pay, payment, payer
3) resolvent, resolution, resolute, resolve
4) cheap, cheapen, cheaply

c*) adjectives*

1) availability, avail, available
2) accessibility, access, accession, accessible
3) transmission, transmit, transmissible, transmitter
4) differently, differ, different, difference, differentiate

II. Arrange the words of the two groups in pairs

a*) with similar meaning*

1) route	a) information
2) available	b) supply
3) data	c) admittance
4) provide	d) payment
5) run	e) send
6) transmit	f)path
7) fee	g) accessible
8) access	h) manage

b) with contrary meaning

1) transmit	a) decrease
2) reliable	b) wireless
3) increase	c) make worse
4) develop	d) cheap
5) refine	e) receive
6) wire	f.)decode
7) encode	g) sustain
8) expensive	h) unreliable

III. Match the words with their definitions

1) host	a) to pass (from one person to another);
2) net	b) ready to be used; which can be obtained;
3) transmit	c) the company that maintains host computers which have an access to the Internet;
4) message	d) make better;
5) access	e) client / server computer through which most users experience their interaction with the Internet;
6) service provider	f) to stop something as it is passing
7) route	g) way of getting to someone, somewhere
8) available	h) groups of hardware and communication software dedicated to maintaining communication with other nets;
9) refine	i) way to be followed to get destination
10) intercept	j) news / information sent to someone

IV. Study the text and try to understand all details.

THE INTERNET

1. The Internet, a global computer network which embraces millions of users all over the world, began in the United States in 1969 as a military experiment. It was designed to survive a nuclear war. Information sent over the Internet takes the shortest path available from one computer to another. Because of this, any two computers on the Internet will be able to stay in touch with each other as long as there is a single route between them. This technology is called packet switching. Owing to this technology, if some computers on the network are knocked out (by a nuclear explosion, for example), information will just route around them.

2. Most of the Internet host computer (more than 50%) are in the United States, while the rest are located in more than 100 other countries. Although the number of host computers can be counted fairly accurately, nobody knows exactly how many people use the Internet, there are millions, and their number is growing by thousands each month worldwide.

3.The most popular Internet service is e-mail. Most of the people, who have access to the Internet, use the network only for sending and receiving e-

mail messages. However, other popular services are available on the Internet: reading USENET News, using the World-Wide Web, telnet, and Gopher.

4. In many developing countries the Internet may provide businessmen with a reliable alternative to the expensive and unreliable telecommunications systems of these countries. Commercial users can communicate over the Internet with the rest of the world and can do it very cheaply. When they send e-mail messages, they only have to pay for phone calls to their local service providers, not for calls across their countries or around the world. But who actually pays for sending e-mail messages over the Internet long distances, around the world? The answer is very simple: a user pays his / her service a monthly or hourly fee. Part of this fee goes towards its hosts to connect to a larger service provider. And part of the fee got by the large provider goes to cover its cost of running a worldwide network of wire and wireless stations.

5. But saving money is only the first step. If people see that they can make money from the Internet, commercial use of this network will drastically increase. For example, some western architecture companies and garment centers already transmit their basic designs and concepts over the Internet into China, where they are worked and refined by skilled – but inexpensive – Chinese computer-aided-design specialists.

6. However, some problems remain. The most important is security. When you send an e-mail message to somebody, this message can travel through many different networks and computers. The data are constantly being directed towards its destination by special computers called routers. Because of this, it is possible to get into any of computers along the route, intercept and even change the data being sent over the Internet. In spite of the fact that there are many strong encoding programs available, nearly all the information being sent over the Internet is transmitted without any form of encoding, i.e. “in the clear”. But when it becomes necessary to send important information over the network, these encoding programs may be useful. Some banks and companies even conduct transactions over the Internet. However, there are still both commercial and technical problems which will take time to be resolved.

VI. Say whether the following statements are true or false.

1. The number of the Internet users is growing each month worldwide. 2. The Internet was designed to survive a nuclear war. 3. Nearly all the information being sent over the Internet is encoded. 4. You have to pay for calls across your country or around the world when you send e-mail messages. 5. Some banks and companies are known to conduct transactions over the Internet. 6. The Internet began in the USA in 1989 as a military experiment.

VII. Complete the following sentences choosing the most suitable variant.

1. The technology of the Internet is called ….

a) step-by-step switching

b) message switching
c) packet switching

2. Information sent over the Internet takes….
a) the shortest path available from one computer to another
b) the longest path available from one computer to another
c) any path available from one computer to another

3. If your messages sent are to be confidential you have to use ….
a) decoding programs
b) encoding programs
c) entertainment programs

4. The most important problem of e-mail service is ….
a) security
b) cost
c) size

5. Most of the Internet host computers are in ….
a) Belarus
b) Australia
c) The USA

VIII. Read the first sentence of the text and mark pauses. Divide it into sense groups, find out the means of connection between these sense groups and between the words in each group.

IX. In paragraphs 2 and 3 find English equivalents of the following words and word combinations.

Доступ, узловой компьютер, точно, услуга, получать, остаток, размещаться, сообщение, имеющийся в распоряжении, сеть, возрастать.

X. Read paragraphs 4-5 *and answer the questions*.

1. What does the Internet supply commercial users with?
2. Are telecommunications systems reliable and cheap in comparison with the Internet?
3. What do the users of e-mail actually pay for?
4. Part of the fee goes towards its hosts to connect to a local service provider, doesn't it?
5. Do you know the ways of making money from the Internet?

XI. In paragraphs 6 find information about consequences of "clear" data transmission over the Internet.

XII. Make an outline of the text.

XIII. Speak about the worldwide use of e-mail service.

Part B

I. Look through the list of words and make your predictions about the content of it.

1) development	*развитие*
2) effort	*усилие*
3) employer	*работодатель*
4) flexibility	*гибкость*
5) isolation	*изоляция, уединение*
6) overcome (a problem)	*преодолеть, решить (проблему)*
7) processing	*обработка*
8) remotely	*на расстоянии*
9) suitable	*подходящий*
10) telecommunications	*телекоммуникация*
11) teleworking	*дистанционная работа, работа расстоянии*

II. Define the meaning of the “x” words.
1) develop: development = развивать:x
2) process: processing = обрабатывать: x
3) connect: connection = соединять: x
4) employ: employment = нанимать: x
5) depend: dependence = зависеть: x
6) require: requirement = требовать:x
7) provide: provision = обеспечивать: x

III. Complete the sentences with the given words:
computer technology, advantage, includes, suitable, introduced, effort, employer, teleworkers.
1. Teleworking ….. the whole range of work activities.
2. The results of the processed information are sent to the ….. .
3. The advances in the ….. gave a lot of opportunities for people.
4. Not all jobs are ….. for teleworking.
5. The main … to teleworkers is that less time, money and ….are spent.
6. ….. are typically computer professionals, who can work at home.
7. Teleworking was ….. to overcome the problem of rural isolation.

IV. Study the following word and choose:
a) nouns

1) employer	employ	employment	employed
2) flexible	flexibility	flexion	
3) connect	connected	connection	connective
4) information	inform	informative	informer

b) adjectives

1) suitability	suitable	suit	unsuitable
2) attractive	attractiveness	attract	attractable
3) electron	electronic	electronics	
4) isolate	isolation	isolator	isolated

c) adverbs

1) typically	typical	typify	type
2) expectance	expect	expectedly	expectant
3) normal	normality	normalize	normally
4) significance	significantly	significant	insignificancy

V. Read the title and make your predictions about the content of the text.

TELEWORKING

1. Teleworking includes the whole range of work activities, all of which mean working remotely from an employer or normally expected place of work. Such work generally includes the electronic processing of information, the results of which are sent to the employer, usually by a telecommunications link.

2. The advances in the computer technology since the early 1960s gave a lot of opportunities for people working in this field. They are typically computer professionals, such as system analysts and programmers, who can work at home. And teleworking is perfect for them. Some parts of Britain are isolated from the rest of the country and teleworking was introduced in order to overcome the problem of rural isolation. British Telecom is supporting the development of such telecommunication centers in Derbyshire and the Highlands and islands of Scotland.

3. Not all jobs are suitable for teleworking. The jobs that depend on personal “face-to-face”contact or need “hands on” operation cannot be done by a teleworker. This includes jobs such as receptionist, counter clerk and makers of goods that require complex machinery to produce. Jobs suitable for teleworking are mostly those that are connected with the handling, processing and transforming of information. In Britain the number of people employed in this type of information intensive job is growing significantly from day to day.

4. The main advantage to teleworkers is that less time, money and effort are spent on travelling to and from the workplace. It provides a wider choice of areas to live if the job is not connected with a certain geographical area. The flexibility that teleworking will give you with working hours is a great advantage for parents with young children. It can also be attractive for those who care for elderly or disabled relatives. Retired people may also use teleworking as a way of working part-time.

VI. Say if the following statements are true or false. Correct the false statements.

1. Teleworking means working remotely from an employer.
2. Specialists employed in the field of teleworking are usually office workers who cannot work at home.
3. Teleworking appeared in Brifain to maintain rural isolation.
4. Jobs done by teleworkers are connected with the electronic processing of information.
5. The main advantage is that more time, money and effort are spent on travelling to and from the workplace.
6. In Britain the number of people working in this field is decreasing significantly.
7. Teleworking provides people with flexibility.

VII. Divide the text into logical parts and find the topical sentences in each part.

VIII. Give a short summary of text B.

Part C

I. Read the following text and entitle it.

1. Millions of people around the world use the Internet to search for and retrieve information on all sorts of topics in a wide variety of areas including the arts, business, government, humanities, news, politics and recreation. People communicate through electronic mail (e-mail), discussion groups, chat channels and other means of informational exchange. They share information and make commercial and business transactions. All this activity is possible because tens of thousands of network are connected to the Internet and exchange information in the same basic ways.

2. The World Wide Web (WWW) is a part of the Internet. But it's not a collection of networks. Rather, it is information that is connected or linked together like a web. You access this information through one interface or tool called a Web browser. The number of resources and services that are part of the World Wide Web is growing extremely fast. In 1996 there were more than 20 million users of the WWW, and more than half the information that is transferred across the Internet is accessed through the WWW. By using a computer terminal (hardware) connected to a network that is a part of the Internet, and by using a program (software) to browse or retrieve information that is a part of the World Wide Web, the people connected to the Internet and World Wide Web through the local providers have access to a variety of information. Each browser provides a graphical interface. You move from place to place, from site to site on the Web by using a mouse to click on a portion of text, icon or region of a map. These items are called hyper-links or links. Each link you select represents a document, an image, a video clip or

an audio file somewhere on the Internet. The user doesn't need to know where it is, the browser follows the link.

3. All sorts of things are available on the WWW. One can use Internet for recreational purposes. Many TV and radio stations broadcast live on the WWW. Essentially, if something can be put into digital format and stored in a computer, then it's available on the WWW. You can even visit museums, gardens, cities throughout the world, learn foreign languages and meet new friends. And of course you can play computer games through WWW, competing with partners from other countries and continents. Just a little bit of exploring the World Wide Web will show you what a much of use and fun it is.

Notes:

retrieve – извлекать
recreation – развлечение
business transactions – коммерческие операции
broadcast live – передавать в прямом эфире

II. Read the text and answer the questions.

1. What is the Internet used for?
2. Why are so many activities such as e-mail and business transactions possible through the Internet?
3. What is the World Wide Web?
4. What does a user need to have an access to the WWW?
5. What are hyper-links?
6. What are the basic recreational applications of the WWW?

III. Find the place in paragraph 2 containing the information about facilities required to have an access to the WWW.

IV. Give the main points of the text in 5-6 sentences.

UNIT 7

Part A

Word List

application	/ˌæplɪˈkeɪʃn/	1. применение, 2. приложение (напр. силы)
arouse	/əˈraʊz/	пробуждать, вызывать, возбуждать
celestial	/səˈlestiəl/	небесный, астрономический
cordless	/ˈkɔːdləs/	с батарейным питанием
considerable	/kənˈsɪdərəbl/	значительный, важный

disturbance	/dɪ´stɜ:bəns/	1. возмущение, нарушение, 2. помехи
instant	/´ɪnstənt/	немедленный, безотлагательный
means (s and pl)	/mi:nz/	средство, способ
observe	/əb´zɜ:v/	наблюдать, замечать
occur	/ə´kɜ:(r)/	случаться, происходить
perceive	/pə´si:v/	воспринимать, ощущать
predict	/prɪ´dɪkt/	предсказывать
propagate	/´prɒpəgeɪt/	распространяться, передаваться через среду
radiate	/´reɪdieɪt/	исходить из центра, излучать
relate	/rɪ´leɪt/	иметь отношение
relay	/rɪ´leɪ/	транслировать, передавать сигналы, ретранслировать
remarkable	/rɪ´mɑ:kəbl/	замечательный, удивительный, выдающийся
rotate	/rəʊ´teɪt/	вращаться
source	/sɔ:s/	источник, исток
speed	/spi:d/	скорость
velocity	/və´lɒsəti/	скорость

I. Study the following words and choose

a) nouns

1)	a) oscillator	b) oscillatory	c) oscillate	d) oscillation
2)	a) apply	b) applied	c) applicant	d) appliance
3)	a) disturbing	b) disturb	c) disturbed	d) disturbance
4)	a) operation	b) operating	c) operator	d) operative
5)	a) transmit	b)transmission	c) transmitter	d) transmissible

b*) adjectives*

1)	a) frequently	b) frequentative	c) frequent	d) frequency
2)	a) voice	b) voiced	c) voiceless	d) voicelessly
3)	a) observe	b) observer	c) unobservable	d) observation
4)	a) cycle	b) cyclist	c) cyclical	d) cyclically
5)	a) locate	b) location	c) locally	d) local

II. Arrange the words of the two groups in pairs:

a) *with similar meaning*

1) happen, speed, receive, devise, considerable, unobservable, spread, similar, show, detect, occupation, oscillate, cordless, join, observe

2) alike, vibrate, notice, propagate, wireless, piece together, demonstrate, velocity, profession, occur, obtain, important, perceive, invent, imperceptible

b) *with contrary meaning*

1) different, transmitter, earliest, inward, easy, absence, standing, finally, leave, low, near, rapidly, dim, visible, detailed

2) clear, return, unobservable, slowly, primarily, essential, distant, difficult, presence, similar, receiver, high, latest, moving, outward

III. Match the words with their definitions.

a) transmitter	1) device which receives messages, radio programmes and transmits them with greater strength, thus increasing the distance over which they are carried.
b) satellite	2) speed, quickness
c) technology	3) place from which something comes or is got
d) research	4) send out rays of light or heat
e) frequency	5) transmit, extend the operation
f) radiate	6) comparatively small body moving in orbit round a planet
g) propagate	7) study, mastery and utilization of manufacturing and industrial methods.
h) source	8) number of repetitions in a given time
i) velocity	9) investigation undertaken in order to discover new facts.
j) relay	10) part of a telegraph or radio apparatus for sending out signals, messages, music, etc.

IV. Study the text and try to understand all details.

RADIO

1. Early in the 19th century, Michael Faraday, an English physicist, demonstrated that an electric current can produce a local magnetic field and that the energy of this field will return to the current when the current is stopped or changed. James Clerk Maxwell, professor of experimental physics at Cambridge, in 1864 proved mathematically that any electrical disturbance could produce an effect at a considerable distance from the point at which it occurred and predicted that electromagnetic energy could travel outward from a source as waves moving at the speed of light.

2. At the time of Maxwell's prediction there was no known means of propagating or detecting the presence of electromagnetic waves in space. It was not until about 1888 that Maxwell's theory was tested by Heinrich Hertz, the famous German physicist, who demonstrated that Maxwell's predictions were true at least over short distances.

3. Radio aroused worldwide excitement in December 1901, when Guglielmo Marconi, the Italian physicist, received the first transatlantic radio signals in St. John's, Newfoundland, sent from a transmitter in England.

4. Radio messages and signals travel across space by way of electromagnetic waves. Light is another type of electromagnetic wave, as are

X rays, gamma rays, and cosmic rays. Since it is difficult for humans to perceive the action of these unobservable waves, electromagnetic wave action is often compared to that of water waves. Like water waves, radio waves also radiate away from a center. They can travel through the air and through a vacuum. Like light waves radio waves travel in straight lines at a velocity of about 300,000 kilometres (186,000miles) per second and have amplitudes that vary cyclically with time; that is they oscillate from a zero amplitude to a maximum and back again. The number of times the cycle is repeated in one second is called the frequency in cycles per second, and the time taken to complete one cycle is sometimes called the period. To commemorate Heinrich Herts a frequency of one cycle per second is called one hertz. The distance from one wave crest to the next is known as the wavelength. Wavelength and frequency are related. Dividing the speed of the electromagnetic wave by the wavelength gives the frequency.

5. From 1920 onward radio made phenomenal progress through research activities in Europe, North America, and Asia. The invention of the electron tube and later the transistor (1948) made possible remarkable developments.

Notes:

commemorate – отмечать, чтить память
crest – гребень, пик

V. Say whether the following statements are true or false.

1. Michael Faraday was the first to notice the existence of a local magnetic field produced by an electric current.
2. James Maxwell proved experimentally that electromagnetic energy could travel outward from a source.
3. Maxwell's theory was tested by Heinrich Hertz in 1888.
4. The first transatlantic radio signals were received early in the 20th century.
5. X rays, gamma and cosmic rays are not the type of electromagnetic waves.
6. The number of times the cycle is repeated is called the period.
7. Dividing the frequency of the electromagnetic wave by the wavelength gives the speed.

VI. Complete the following sentences choosing the most suitable variant.

1. Guglielmo Marconi, the Italian physicist, … the first transatlantic radio signals in St.John's, Newf. (transmitted, received, detected, produced)
2. Electromagnetic energy can travel outward from a … as waves moving at the speed of light. (point, way, field, source)
3. Maxwell's prediction was … by Heinrich Hertz, the famous German physicist. (obtained, compared, sent, tested)

4. The energy of this field will … to the current when the current is stopped or changed. (come back, occur, start, leave)
5. He demonstrated that Maxwell's predictions were (wrong, known, correct, considerable)
6. Wavelength and frequency are … (relayed, rotated, related, removed)
7. The … of the electron tube and later the transistor made possible remarkable developments. (find, discovery, invention, opening)

VII. *Read the first sentence of the text and mark pauses. Divide it into sense groups, find out the means of connection between these sense groups and between the words in each group.*

VIII. In paragraphs 2 and 4 find the information about the scientist who made a great contribution to the development of radio.

IX. In paragraph 4 find English equivalents of the following words and word combinations.
Исходить из центра, циклично варьируют по времени, воспринять действие этих невидимых волн, частота оборотов в секунду, расстояние от гребня одной волны до гребня другой, распространяться в воздушной среде и вакууме, разделить скорость электромагнитной волны на длину волны, колебаться от нулевой амплитуды до максимума и обратно, подобно световым волнам, часто сравнивают с водяными волнами, радиоволны распространяются по прямой.

X. Answer the following questions on text A.
1. What demonstrations did Michael Faraday make at the beginning of the 19th century?
2. What's the essence of Maxwell's prediction?
3. Why couldn't his theory be proved in those days?
4. When did radio signals cross the ocean?
5. What other types of electromagnetic waves can you name?
6. What is the speed of travel of radio waves?
7. In what way could you define the frequency and wavelength?
8. How are they related?
9. When did radio make phenomenal progress?

XI. Make an outline of the text.

XII. Speak about the history of radio and its basic physical properties.

Part B

I. Look through the list of English words and their Russian equivalents facilitating reading text B.

advent	появление
angle	угол
anticipate	предвидеть
chamber	камера
circumference	окружность
dim	тусклый
dissect	вскрывать, разбирать
fuzzy	расплывчатый
overlapping	частично дублирующий, накладывающийся (один на другой)
overwhelming	подавляющий
perforate	перфорировать, просверливать
pickup	датчик, адаптер
prism	призма
raster	растр
rectangular	прямоугольный

II. Define the meaning of the "x" words:

1) rotate: rotation = вращаться: x
2) suit: suitable = подходить: x
3) perforate: perforation = перфорировать: x
4) respect: respective = отношение, касательство: x
5) television: televise = телевидение: x
6) synchronous: synchronize = синхронный: x
7) project: projection = проектировать: x
8) resolve: resolution = решать: x
9) broadcast: broadcasting = передавать по радио: x
10) bright: brightness = яркий: x
11) generate: generator = порождать: x
12) view: viewer = смотреть: x
13) thick: thickness = толстый, плотный: x
14) limit: limitation = ограничивать: x

III. Complete the sentences with the given words:
overwhelming, increased, holes, proposed, the advent, promoted, the picture, equal to, followed with, produced

1. The number of scanned lines was ….. the number of perforations and each rotation of the disk …… a television frame.
2. John Logie Baird successfully …… a television system based on the Nipkow principle.
3. Inventors ……. the public demand for television before …… of radio broadcasting.
4. The EM 1 system won …… .

5. In the 1920's, Alan A. Campbell-Swinton …… a system that would use CRT's displaying ……. at the receiver.
6. An American inventor, Ch. Jenkins, …… a rotating ring, whose thickness varied and ……. around its circumference.
7. The scanner was a rotating disk with …… arranged in a spiral around its edge.

IV. Choose:

a) nouns

1) imagine	imaginative	image	imaginable	imagination
2) conduct	conduction	conductor	conductive	conductivity
3) respectable	respect	respective	respectability	respectful
4) rotate	rotation	rotary	rotatory	rotor

b) verbs

1) resolution	resolute	resolve	resolved
2) recognizable	recognition	recognizance	recognize
3) experiment	experimentation	experimental	experimenter
4) equalization	equality	equalize	equally

c) adjectives

1) light	lighten	lighter	lightish
2) anticipate	anticipatory	anticipated	anticipation
3) synchronization	synchronize	synchronism	synchronous
4) success	succeed	successful	successfully

V. Read the text and define its main idea.

WHO INVENTED TELEVISION

1. Inventors anticipated the public demand for television before the advent of radio broadcasting. So many participated in the development that it is impossible to answer the question "Who invented television?", but a few were so important as to be recognized as pioneers.

2. Paul Nipkow proposed the first practical mechanical scanner in Germany in 1884. The scanner was a rotating disk with holes arranged in a spiral around its edge. Light passing through the holes as the disk rotated produced a rectangular scanning pattern or raster which could be used to either generate an electrical signal from the scene for transmitting or to produce an image from the signal at the receiver. As the disk rotated, the image was scanned by the perforations in the disk, and light from different portions of it passed to a photocell. The number of scanned lines was equal to the number of perforations and each rotation of the disk produced a television frame. In the receiver, the brightness of the light source would be varied by the signal voltage. Again, the light passed through a synchronously

rotating perforated disk and formed a raster on the projection screen. Mechanical viewers had the serious limitation of resolution and brightness.

3. John Logie Baird, a Scottish engineer-inventor, successfully promoted a television system based on the Nipkow principle, received backing and sold transmitters and receivers. Laboratories in the United States and Great Britain worked to develop an all-electronic system. In Britain, the Electric and Musical Industries, Ltd., provided a system along with Baird's, and these were experimentally used to broadcast television programs by the BBC in November 1936. The EMI system won overwhelmingly. An American inventor, Charles Francis Jenkins, followed with a rotating ring whose thickness varied and increased around its circumference, forcing a rotating prism. By using two rings overlapping at right angles, a beam could be made to scan both horizontally and vertically, which unfortunately produced small, dim and fuzzy images. Jenkins' system, like Baird's, failed on the basis of poor quality.

4. AT&T first demonstrated a television system developed by one of Bell Lab's scientists Herbert Ives, again based on the Nipkow disks. GE also demonstrated a mechanical system developed by Ernst Alexanderson. David Sarnoff, however, would turn to research for a successful electronic system.

5. In the 1920's, Alan A. Campbell-Swinton, a prominent electrical engineer in London, proposed a system that would use CRT's displaying the picture at the receiver, with electromagnetic scanning to form the raster. His transmitter tube, using a chamber filled with gas which could conduct electrons, was not suitable. Credit for the first practical TV signal-generator of pickup must be shared by Vladimir K. Zworykin and Philo T. Farnsworth, who invented the iconoscope and the image dissector respectively.

VI. Say if the following statements are true or false. Correct the false statements.

1. The scanner was a rotating disk with holes.
2. The number of scanned lines was different to the number of perforations.
3. Scottish engineer promoted a television system based on Jenkins' system.
4. The first television programmes took place in 1940.
5. Jenkins' system had poor quality.
6. Campbell-Swinton's transmitter tube could conduct electrons.

VII. Put the sentences in chronological order.

1. Herbert Ives developed a television system and AT&T first demonstrated it.
2. One engineer proposed a system that would use CRT's.
3. Nipkow's principle helped to invent a television system.
4. The invention of the iconoscope was successful.

5. Charles Francis Jenkins developed a rotating ring.
6. The invention of mechanical scanner was made in Germany.

VIII. Answer the questions.
1. Why is it difficult to answer the question “Who invented television?”
2. When and where was the first practical mechanical scanner proposed?
3. What device was the basis of P.Nipkow’s scanner?
4. What did John Logie Baird promote?
5. Who worked at the development of an all-electronic system?
6. What did Charles Jenkins follow with?
7. What did ATaT and GE demonstrate?
8. Who invented the first iconoscope and image dissector?

IX. Divide the text into logical parts and find the topical sentences in each part.

X. Give a short summary of text B.

Part C

I. Scan the text and define its main idea.

RADIO AND ITS APPLICATION

1. In the earliest practical application, radio was used primarily to exchange messages with ships at sea. Radio is still used for this purpose and for communication across oceans.

2. Television, one of the most popular forms of entertainment in the home, is actually a kind of radio. It uses special equipment for sending and receiving pictures in the form of radio signals. The television audio signals are received by equipment similar to that used in other forms of radio. Other home devices that use radio technology are cordless telephones, garage-door openers, and radio-operated toy airplanes and cars.

3. Radio technology has other uses outside the home. It provides a means of instant communication with moving vehicles such as taxicabs, service trucks, squad cars and motorcycles. Observers in airplanes can report traffic violations, accidents, and traffic jams by radio to police officers on the ground. Many people in the medical profession have beepers – portable electronic devices used to page the person who carries it.

4. In radio telephones such as cellular mobile telephones, voice signals are sent across town or over long distances by high-frequency radio signals called microwaves. Land based microwave relay stations and communication satellites orbiting the Earth receive and transmit the microwave signals.

5. With radio to guide them, airplane pilots can fly through fog or storm and land safely at airports. Pilots and ship captains use radio navigation systems to determine their locations and stay on course.

6. Radio technology is also essential to space exploration. Space probes use radio waves to relay information about the solar system. Radio astronomy is used to detect celestial objects too distant and dim to be seen by optical telescopes. It can also be used to determine the chemical make up of stars and gas clouds and the speed and direction of moving stars. Using radio astronomy, quasars were discovered in the early 1960s. Pulsars, believed to be rapidly rotating neutron stars, were discovered later in the decade. With the information obtained scientists can piece together the puzzle of how the universe began.

Notes: squad car – полицейская машина

II. Read the text and find the information about domestic appliances that use radio technology.
III. Which paragraph contains the information concerning advances in radio astronomy?
IV. Find the place in paragraph 3 containing the information how radio is used outside the home.
V. Give the main points of the text in 5-6 sentences.

UNIT 8

Part A

Word List

awareness	/ə´weənəs/	знание, осведомлённость; сознание; понимание
distinguish	/dɪ´stiŋgwɪʃ/	находить отличия, различать, распознавать
duplicate	/´dju:plɪkeɪt/	дублировать, копировать; удваивать
essentially	/ɪ´senʃəli/	по существу; существенно
liken	/´laɪkən/	уподоблять; сравнивать
notable	/´nəʊtəbl/	примечательный, замечательный; заметный
option	/´ɒpʃn/	выбор, альтернатива
perception	/pə´sepʃn/	восприятие, осмысление, осознание, понимание
proof	/pru:f/	подтверждение, доказательство
proponent	/prə´pəʊnənt/	защитник, сторонник, поборник
random	/´rændəm/	случайный
reason	/´ri:zn/	убеждать, доказывать, приводить доводы
recognition	/ˌrekəg´nɪʃn/	понимание; осознание; признание; одобрение
rough	/rʌf/	грубый, черновой
simulate	/´sɪmjuleɪt/	моделировать, воспроизводить

simultaneous	/sɪml´teɪnɪəs/	одновременный
solely	/´səʊlli/	единственно, исключительно, только
speculate	/´spekjuleɪt/	обдумывать, взвешивать; размышлять

I. Study the following words and choose

a) nouns

1) add, addition, additional, additive;
2) recognizance, recognizable, recognition, recognize;
3) indication, indicator, indicate, indicative, indicated;
4) processor, process, procession, processing, processional;
5) outperform, performer, performance, performing;

b*) adjectives*

1) ability, able, disabled, disablement, inability;
2) create, creative, creativeness, creator, creation, creature;
3) notable, notably, notability, note, notedly, noteless;
4) speculate, speculator, speculation, speculative
5) employer, employee, employ, employable, employment

c) verbs

1) signify, significance, significant, signification;
2) decision, decisive, decisiveness, decide, decidedly;
3) selector, selectivity, select, selected, selective, selection;
4) hypothesize, hypothesis, hypothetical

II. Arrange the words of the two groups in pairs:

1) *with similar meaning*

a) alternative, allow, achieve, declare, distinguish, convene, insist, proponent, interpret, select, exploration, procedure, addition, recognition, operation, outperform;

b) choose, action, summon, surpass, permit, upholder, acknowledgement, differ, option, explain, investigation, supplement, attain, order, persist, proclaim;

2) *with contrary meaning*

a) employ, simultaneous, powerful, limited, same, multiple, create, convene, leading, random, logic, rough, essential, ability, simple, major, experience, awareness, artificial;

b) illogic, minor, destroy, different, natural, weak, unbounded, disability, ignorance, single, backward, hire, inexperience, complicated, even, secondary, deliberate, taking place, at different times.

III. Match the words with their definitions:

1) value	a. direct for treatment, information, or help
2) recognize	b. show with valid evidence that something is true
3) refer	c. a principle regarded as worthwhile or desirable
4) random	d. bring something into existence

5) logical	e. reflect and think deeply
6) generalize	f. the quality of being important
7) prove	g. experience or identify something or someone as having been known previously
8) create	h. draw a general conclusion from particular facts, experiences, or observations
9) significance	i. done or made in a way that has no specific pattern or purpose
10) speculate	j. something marked by consistency of reasoning

IV. Study the text and try to understand all details.

ARTIFICIAL INTELLIGENCE

1. In 1637 the French philosopher-mathematician René Descartes predicted that it would never be possible to make a machine that thinks as humans do. In 1950, the British mathematician and computer pioneer Alan Turing declared that one day there would be a machine that could duplicate human intelligence in every way and prove it by passing a specialized test. In this test, a computer and a human hidden from view would be asked random identical questions. If the computer were successful, the questioner would be unable to distinguish the machine from the person by the answers.

2. Inspired by Turing's theory, the first conference on AI convened at Dartmouth College in New Hampshire in 1956. Soon afterwards an AI laboratory was started at Massachusetts Institute of Technology by John McCarthy and Marvin Minsky, two of the nation's leading AI proponents. McCarthy also invented the AI computer language, Lisp; but by the early 1990s AI itself had not been achieved. However, logic programs called expert systems allow computers to “make decisions” by interpreting data and selecting from among alternatives. Technicians can run programs used in complex medical diagnosis, language translation, mineral exploration, and even computer design.

3. Machinery can outperform humans physically. So, too, can computers outperform mental functions in limited areas—notably in the speed of mathematical calculations. For example, the fastest computers developed are able to perform roughly 10 billion calculations per second. But making more powerful computers will probably not be the way to create a machine capable of passing the Turing test. Computer programs operate according to set procedures, or logic steps, called algorithms. In addition, most computers do serial processing: operations of recognition and computation are performed one at a time. The brain works in a manner called parallel processing, performing operations simultaneously. To achieve simulated parallel processing, some supercomputers have been made with multiple processors to follow several algorithms at the same time.

4. Critics of this approach insist that solving a computation does not indicate understanding, something a person who solved a problem would have. Human reasoning is not based solely on rules of logic. It involves perception, awareness, emotional preferences, values, evaluating experience, the ability to generalize and weigh options, and more. Some proponents of AI have, therefore, suggested that computers should be patterned after the human brain, which essentially consists of a network of nerve cells.

5. Employing what its program creators referred to as “reasoning power,” a computer at the Argonne National Laboratory in Illinois in December 1996 developed a proof for a mathematical problem that had been hypothesized more than 60 years ago but never proved. The significance of the event lay not in the nature of the proven postulate, but in the ability of the computer to reason through a mathematical problem, and not to simply solve the problem by following a specific program, or set of instructions. One scientist connected with the project likened the computer's reasoning process to human creativity, and some speculated that the development was a major step forward in the development of artificial intelligence.

V. Say whether the following statements are true or false.

1. Alan Turing assumed that there would be a device that would be able to surpass human intelligence.
2. John McCarthy and Marvin Minsky are propagandists of AI.
3. AI had been developed by the early 1990s.
4. AI can outperform humans physically and mentally.
5. Most computers cannot perform serial processing.
6. Rules of logic are the only thing human reasoning is based on.
7. Human brain works similar to successive processing.
8. In December 1986 a computer succeeded in solving a mathematical problem hypothesized about 60 years ago.

VI. Complete the following sentences choosing the most suitable variant.

1. Rene Descartes was the French … .
   a) physicist-mathematician b) philosopher-mathematician
   c) philosopher-logician
2. The first conference on AI convened at Dartmouth College in New Hampshire in … .
   a) 1965 b) 1955 c) 1956
3. An AI laboratory was organized at Massachusetts Institute of … .
   a) Radioengineering b) Communications c) Technology
4. The AI computer language was invented by … .
   a) Rene Descartes b) Alan Turing c) McCarthy
5. Machinery can outperform humans … .
   a) physically b) emotionally c) mentally

6. Computer programs operate according to … .
a) unset procedures b) logic steps c) emotional responses
7. Serial processing is performed by … .
a) some computers b) most computers c) few computers
8. Human brain performs operations … .
a) simultaneously b) in succession of actions
c) according to logic steps
9. Some scientists suggested that computers should be patterned after …
a) the human body b) the human brain c) the human emotions

VII. Read the second sentence of the text and mark pauses. Divide it into sense groups, find out the means of connection between these sense groups and between the words in each group.

VIII. In paragraphs 2 and 3 find English equivalents of the following words and word combinations.
Математические вычисления, одновременно, подходящий, достигать, в одно время, компьютерное проектирование, защитник, вдохновлять, обработка данных, грубо, следовать, объяснять данные, улучшать, физически, логические программы.

IX. Read paragraphs 1 and 4 and answer the questions.
1. Who predicted that it would never be possible to make a machine that thinks as humans do?
2. What did British mathematician and computer pioneer Alan Turing declare in 1950?
3. What was a specialized test suggested by Alan Turing?
4. What is the difference between human reasoning and solving a computation?
5. What did Al's proponents suggest?

X. In paragraph 5 find information about the significance of the development of the computer at the Argone National Laboratory in Illinois in December 1996.

XI. Make an outline of the text.

XII. Speak about the development of the computer intelligence.

Part B

I. Look through the list of English words and their Russian equivalents facilitating reading text B.
tiny - очень маленький, крошечный
assembly line - сборочный конвейер
welding – сварка

replace – заменять, замещать
hazardous - опасный, рискованный
handling - обращение (с чем-л.), умение обращаться;
handicapped - физически или умственно неполноценный

II. Define the meaning of the "x" words.

invention: invent –изобретение: X
perform: performance - выполнять: X
operation: operate - работа: X
increasing: increase – возрастающий: X
manipulate: manipulator – умело обращаться: X
technically: technician - технически: X
constructive: construct – конструктивный: X
house: housing – помещать: X
development: develop – развитие: X
possible: possibility – возможный: X

III. Complete the sentences with the given words:
development of computer, manipulator grippers, industrial robots, was designed by, a human brain. scientific research, be linked.

1. The problems of workers being replaced by….
2. Computers are likely to remain … without the ability to think or create for a long time.
3. A true android would also have to house or … to the computer.
4. The most important invention of 20th –century was….
5. Robots are very often used in our days in ….
6. The first robot …. a researcher from America Victor Scheinman.
7. Pressure –sensitive "skins" are developed for….

IV. Choose:

a) nouns
1) industrial, industry, industrious, industrially
2) selective, selected, select, selection
3) exploration, explorative, exploratory, explore
4) calculating, calculated, calculable, calculation
5) indicate, indicated, indicative, indication

b) adjectives
1) specialist, specialize, specialization, special
2) humanism, humanitarian, humanize, human
3) logic, logical, logician, logistical
4) significance, signification significant, signify
5) instruction, instructional, instruct, instructor

c) verbs
1) development, develop, developmental, developer

2) declaratory, declaration, declare, declared
3) perform, performance, performer, performing
4) solvable, solvability, solution, solve
5.) connected, connection, connect, connective

V. Read the following text and entitle it.

1. The most important 20th-century development, for automation and for robots in particular, was the invention of the computer. When the transistor made tiny computers possible, they could be put in individual machine tools. Modern industrial robots arose from this linking of computer with machine. By means of a computer, a correctly designed machine tool can be programmed to perform more than one kind of task. If it is given a complex manipulator arm, its abilities can be enormously increased. The first such robot was designed by Victor Scheinman, a researcher at the Artificial Intelligence Laboratory of the Massachusetts Institute of Technology in Cambridge, Mass. It was followed in the mid-1970s by the production of so-called “programmable universal manipulators for assembly” (PUMAs) by General Motors and then by other manufacturers in the United States.

2. The majority of the industrial robots in use in the world today are found in Japan; at least one Japanese factory uses an assembly line of robots to make still more robots.

3. Most of the robots in large automobile and airplane factories are used for welding, spray-painting, and other operations where humans would require expensive ventilating systems. The problem of workers being replaced by industrial robots is only part of the issue of automation as a whole, and individual robots on an assembly line are often regarded by workers in the familiar way that they think of their family car.

4. Current work on industrial robots is devoted to increasing their sensitivity to the work environment. Computer-linked television cameras serve as eyes, and pressure-sensitive “skins” are being developed for manipulator grippers. Many other kinds of sensors can also be placed on robots.

5. Robots are also used in many ways in scientific research, particularly in the handling of radioactive or other hazardous materials. Many other highly automated systems are also often considered as robots. These include the probes that have landed on and tested the soils of the moon, Venus, and Mars, and guided missiles of the military.

6. None of these robots bears much resemblance to the androids of fiction. Although it would be technically possible to construct a robot that was humanlike in outward form, true androids are still only a distant possibility. For example, even the apparently simple act of walking on two legs is very hard for computer-controlled mechanical systems to duplicate. In fact, the most stable “walker” thus far devised is a six-legged system. A true android would also have to house or be linked to the computer–equivalent of a human brain. Yet despite some claims made for the future development of “artificial

intelligence," computers are likely to remain calculating machines without the ability to think or create for a long time.

7. Research into developing mobile, autonomous robots is of great value. It advances robotics, aids the comparative study of mechanical and biological systems, and can be used for such purposes as devising robot aids for the handicapped.

VI. Say if the following statements are true or false. Correct the false statements.

1. The first industrial robot was designed by Narvin Minsky.
2. Robots are used for spray –painting.
3. Robots can test the soils of the moon.
4. It would be technically impossible to construct a robot that was humanlike in out word form.
5. The majority of industrial robots we can find in Russia.
6. The most important event of 20th century was the invention of the automobile.
7. To walk on two legs is very easy for computer-controlled mechanical systems.
8. Research into developing mobile, autonomous computers is of great value.
9. Correctly designed machine tool can perform more than one kind of task.

VII. Divide the text into logical parts and find the topical sentences in each part.

VIII. Give a short summary of text B.

Part C

I. Look through the list of English words and their Russian equivalents facilitating reading text B:

adjustment	1) приспособление, регулирование, регулировка;
appropriate	1) подходящий, соответствующий (to, for) 2) свойственный, присущий (to)
automaton	автомат
craftsman	мастер, ремесленник, квалифицированный рабочий
devise	разрабатывать, продумывать (планы, идеи), изобретать
distinguish	различить; проводить различие, различать
incorporate	соединять(ся), объединять(ся)
limb	конечность (человека или животного)
marvel	чудо, диво; предмет удивления
medieval	средневековый
rebellion	восстание; бунт, мятеж

II. Look at the title. What do you think this reading will be about? Read the text and define its main idea.

ROBOT

1. The word robot comes from the Czech writer Karel Chapek's 1921 play ‘R.U.R.' (which stands for “Rossum's Universal Robots”), in which mechanical beings manufactured to be slaves for humanity rise up in rebellion and kill their creators. Thus the fictional image of robots is often dramatic and sometimes troubling, expressing the fears that people may have of a mechanized world over which they cannot maintain control. The history of real robots is rarely as dramatic, but where developments in robotics may lead remains to be seen.

2. Robots exist today. They are used in a relatively small number of factories located in highly industrialized countries such as the United States, Germany, and Japan. Robots are also being used for scientific research, in military programs, and as educational tools, and they are being developed to aid people who have lost the use of their limbs. These devices, however, are for the most part quite different from or humanlike robots, and other robots of fiction. They rarely take human form, they perform only a limited number of set tasks, and they do not have minds of their own. In fact, it is often hard to distinguish between devices called robots and other modern automated systems.

3. Although the term robot did not come into use until the 20th century, the idea of mechanical beings is much older. Ancient myths and tales described walking statues and other marvels in human and animal form. Such objects were products of the imagination and nothing more, but some of the cleverly mechanized figures also mentioned in early writings could well have been made. Such figures, called automatons, have long been popular.

4. For several centuries, automatons were as close as people came to constructing true robots. European church towers provide fascinating examples of clockwork figures from medieval times, and automatons were also devised in China. By the 18th century, a number of extremely clever automatons became quite famous for a while. Swiss craftsman Pierre Jacquet-Droz, for example, built mechanical dolls that could draw a simple figure or play music on a miniature organ. Clockwork figures of this sort are rarely made any longer, but many of the “robots” built today for promotional or other purposes are still basically automatons. They may incorporate technological advances such as radio control, but for the most part they can only perform a set routine of entertaining but otherwise useless actions.

5. Modern robots used in workplaces arose more directly from the Industrial Revolution and the systems for mass production to which it led. As factories developed, more and more machine tools were built that could perform some simple, precise routine over and over again on an assembly line. The trend toward increasing automation of production processes proceeded through the development of machines that were more versatile

and needed less tending. One basic principle involved in this development was what is known as feedback, in which part of a machine's output is used as input to the machine as well, so that it can make appropriate adjustments to changing operating conditions.

III. Read the text and answer the following questions:

1. Where does the word *robot* come from? 2. Where are robots used today? 3. What are robots used for? 4. When did the term robot come into use? 5. What is automaton?

IV. Which paragraph contains the information about the mechanical dolls in ancient times.

V. Find the place in paragraph 2 containing the information about the usage of robots for many purposes.

VI. Give the main points of the text in 5-6 sentences.

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