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Цикловая комиссия общеобразовательных и
естественнонаучных дисциплин

УЧЕБНО – ПРАКТИЧЕСКОЕ ПОСОБИЕ
Readings in Radio and Computing

дисциплине «Иностранный язык в профессиональной деятельности»
 «Иностранный язык»

я студентов 2-3 курсов

спеальности 09.02.06 Сетевое и системное администрирование
 11.02.01 Радиоаппаратостроение

РАССМОТРЕНО
на заседании предметно-цикловой комиссии
общеобразовательных и естественнонаучных
дисциплин

СОСТАВИЛИ:
Иванова Н.К.
Минакова Е.Г.
Широкая Е.В.

Протокол №

от « » 201_ года

Председатель ЦК:

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УТВЕРЖДАЮ
Зам. директора по УМР
_____ М.В. Иванова
«_____» _____ 2019 г.

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СОСТАВИЛИ:
Иванова Н.К.
Минакова Е.Г.
Широкая Е.В.

Протокол №2

от «01» октября 2019 года

Председатель ЦК:

Басенкова В.Н.

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Учебное пособие по английскому языку «Readings in Radio and Computing» предназначено для студентов 2-3 курсов специальностей 11.02.01 Радиоаппаратостроение, 09.02.06 Сетевое и системное администрирование.

Цель пособия - научить чтению и пониманию оригинальной литературы, способствовать формированию лингвистических навыков в данных отраслях знаний. Учебное пособие содержит основные и дополнительные тексты, сопровожденные лексико-грамматическими упражнениями разной степени сложности.

При организации учебного материала ставилась задача повторения и обобщения основных грамматических тем и лексики за 1 курс, а также углубленное изучение тех грамматических и лексических явлений, которые необходимы студентам для профессионального общения на английском языке.

Пособие содержит шесть уроков, состоящих из 3 текстов, цикла лексико-грамматических упражнений, заданий, способствующих развитию разговорных навыков и грамматического справочника.

Данное пособие включает два разных когнитивных аспекта познания, технический и гуманитарный и будет способствовать как углубленному изучению английского языка, так и повышению грамотности студентов в области инфокоммуникационных технологий и систем связи и радиотехники.

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UNIT 1

Text 1 A. English as a world language

Text 1 B. Engineering

Grammar:

Степени сравнения прилагательных.

Местоимения.

Времена группы Simple (Active)

Text 1 A. ENGLISH AS A WORLD LANGUAGE

Task 1. Memorize the following words and word-combinations:

cultural relations - культурные связи;

development - развитие;

modern standing - современное положение

native speaker - носитель языка;

numerous — многочисленный

Task 2. Read the text and do the exercises that follow it.

English has become a world language. In Shakespeare's time it was a "provincial" language of secondary importance with only six million native speakers. Nowadays English has become the world's most important language in politics, science, trade and cultural relations.

It is the official language of the United Kingdom of Great Britain and Northern Ireland, of the United States of America, of Australia and New Zealand.

English is used as one of the official languages in Canada, the Republic of South Africa and the Irish Republic. It is also spoken as a second language by many people in India, Pakistan, numerous countries in Africa. English is studied and used as a foreign language.

It is used for communication, listening to broadcasts, reading books and newspapers, in commerce and travel. Half of the world's scientific literature is in English. English is associated with technological and economic development. It is the language of automation and computer technology.

It is not only the universal language of international aviation, shipping and sport. English has become a world language because of its establishment as a

mother tongue outside England in all the countries of the world. The exporting of English began in the seventeenth century, with the first settlements in North America.

Above all, it is the great growth of population in the United States, assisted by massive immigration in the nineteenth and twentieth centuries, that has given the English language its modern standing in the world.

Task 3 Decide whether the following statements are true [T] or false [F].

1. English has become the world's language in the course of the last decade.
2. In a number of speakers it is the second language in the world.
3. It is one of the official languages in Pakistan.
4. English has an international status because it is widely used as a foreign language.
5. Many people in different countries of Africa speak English as a second language.
6. English has become a world language only because it is widely studied as a foreign language.
7. It is used only as a foreign language outside Great Britain.
8. The exporting of English began in the nineteenth century.

Task 4. Answer the following questions:

1. When did English become a world language?
2. In what spheres is English the world's most important language?
3. Where is it the only one official language?
4. Where is English spoken as a second language?
5. In what way is it used more widely?
6. Where is English the major language?
7. What are the reasons of English becoming a world language?

Text 1 B ENGINEERING

Task 1. Memorize the following words and word- combinations

application - применение,
использование;

chemical engineering - химическое
машиностроение

civil engineer - инженер-строитель;
civil engineering - гражданское
строительство;
communications engineer - инженер-
связист;
communications engineering - техника
средств связи;
design - проектировать,
конструировать;
device - прибор, устройство,
механизм;
electrical engineer - инженер-
электрик;
electrical engineer - инженер-
электрик;
electrical engineering -
электротехника;
electrical engineering -
электротехника;
engine - тех. машина; мотор,
двигатель;
fortifications -укрепления;
machine-tool - станок;
mechanical engineer - инженер-
механик
mechanical engineering -
машиностроение;
military engineering - военно -
инженерное дело;
nuclear engineering-ядерная техника;
power engineering -
электроэнергетика;
quantity - количество;
science - наука;
space engineering - космическая
техника;
temple - храм;
to branch off - ответвляться

Task 2. Read the text, get its central idea and note the important details

A science dealing with design, construction and operation of structures, engines, machines, various devices is known in English as engineering for which it is sometimes difficult to find Russian equivalents.

The proper Russian equivalents are “техника, строительство, инженерное дело”.

Now the art of building houses, temples, pyramids and other structures is called “civil engineering”. At the time of the Roman Empire there were already two branches of engineering: civil engineering and military engineering.

Military engineering included the building of fortifications and military devices. One may find the remains of Roman structures in Italy, on the territory of modern

England which was under Roman rule for about four centuries. By time civil engineering grew into a profession requiring college training and has become an important branch of national economy.

With the invention of the steam engine and the growth of factories practical application of the science of mechanics and thermodynamics to the design of machines attracted the attention of civil engineers. They called themselves "mechanical engineers", separating themselves from civil engineering. It laid the foundation for a new branch of engineering - mechanical engineering.

Mechanical engineering deals with design, construction and operation of engines, turbines, air-conditioning, refrigeration devices, elevators, conveyors, escalators. The mechanical engineer designs machine-tools for various operations and their application in various production processes.

One of the many branches of mechanical engineering is aeronautics which deals with the mechanics of moving bodies in fluid or air. In the 19th century with the development of the science of electricity a new branch of engineering - electrical engineering appeared.

Electrical engineering is divided into main branches: communications engineering and power engineering.

Communications engineering deals with minute quantities of electricity, used for all kinds of communications; power engineering - with the means for producing power. Therefore, the electrical engineer designs radio, television and telephone equipment; the power engineer - generators, switches, transformers, etc.

In the middle of the 20th century there appeared new branches of engineering - nuclear engineering and space engineering. Nuclear is based on atomic physics. Space engineering is impossible without all modern scientific achievements.

Present day engineering includes chemical engineering, dealing with processes and equipment possible to change the state, energy content, physical and chemical composition of various materials.

Nowadays there are hundreds of subdivisions of engineering but all of them branched off from civil, mechanical, electrical or chemical engineering.

Task 3. Insert prepositions (in, into, at, of, by, from) where necessary.

1. ____ the middle of the 20th century there appeared new branches ... engineering.
2. The profession ____ a civil engineer requires college training.
3. Dams, water systems, railways, etc. are built ____ civil engineers.
4. Mechanical engineering achieved a prominent position ____ the very beginning.
5. Electrical engineering is subdivided ____ two branches.
6. Nowadays there are hundreds ____ subdivisions ____ engineering.

Task 4. Insert articles where necessary.

1. ... term “engineering” is used in many specialties, it has many meanings.
2. This branch of industry appeared 30 years ago; very soon it achieved ... prominent position.
3. Mechanical engineering is one of ... most important branches of engineering.
4. ... physical changes are sometimes accompanied by ... chemical changes.
5. Among ... names of ... early inventors of steam engines we should mention ... name of Cherepanov.

Task 5. Translate into English.

1. Термин “engineering” имеет много значений. Одним из самых распространенных значений слова “engineering” является “техника”.
2. Самой старой отраслью техники считается гражданское строительство зданий, дорог, мостов.
3. Появление машиностроения было связано с изобретением паровой машины.
4. Инженер-механик имеет дело с проектированием и конструированием различных машин.
5. Появление электротехники связано с достижениями в области электричества.
6. В середине XX в. появились новые отрасли машиностроения: ядерная техника и космическая техника.
7. Ядерная техника основана на атомной физике.

8. Космическая техника базируется на достижениях всех отраслей науки и техники.

GRAMMAR REVIEW

1. *Определите, какими частями речи являются выделенные слова. Предложения переведите.*

1. Computers process data in a matter of minutes.
2. This process will prevent the formation of impurities.
3. The capacities of mobile stations range from 600 to 700 kilowatts.
4. The operating range of this device is extremely broad.
5. So far we know only a few functions of lasers.
6. The new computing equipment functions normally.

2. *Раскройте скобки, употребляя требующуюся форму прилагательного.*

1. We should eat (healthy) food.
2. Today the streets aren't as (clean) as they used to be.
3. It's (bad) mistake he has ever made.
4. This man is (tall) than that one.
5. Asia is (large) than Australia.
6. The Volga is (short) than the Mississippi.
7. Which building is the (high) in Moscow?
8. Mary is a (good) student than Lucy.
9. The Alps are (high) than the Urals.
10. This garden is the (beautiful) in our town.
11. She speaks Italian (good) than English.
12. Is the word "newspaper" (long) than the word "book"?
13. The Thames is (short) than the Volga.
14. The Arctic Ocean is (cold) than the Indian Ocean.
15. Chinese is (difficult) than English.
16. Spanish is (easy) than German.
17. She is not so (busy) as I am.
18. It is as (cold) today as it was yesterday.

3. *Переведите предложения, обращая внимание на форму прилагательных:*

1. This classroom is larger and lighter than other classrooms. It is the largest and the lightest room here.

2. The red line on this drawing is shorter than other lines. It is the shortest line.
3. Mathematics is more important for technical students than many other subjects. It is one of the most important subjects at any technical Institute.
4. The results of his last experiments were worse than before. He got the worst results that time.

4. Переведите предложения на русский язык, обращая внимание на значение союза as...as:

1. Venus is nearly as big as the Earth.
2. He answered all the questions as well as his friends did.
3. No planet is as hot as the Sun.
4. The speed at which the Earth revolves round the Sun is nearly that of Venus.
5. When Mars is at its greatest distance from the Earth it is nearly as bright as the Polar Star.

5. Переведите предложения, обращая внимание на выделенные сочетания:

1. The nearer the Earth, the denser the atmosphere.
2. The more experiments scientists make, the greater is their knowledge of the structure of matter.
3. The bigger the mass, the bigger the weight of the body.
4. The nearer the centre of the Sun, the higher the temperature.
5. The more the scientist studied the problem, the better he understood its importance for man.
6. The stronger the magnet, the greater the distance through which it acts.

6. Заполните пропуски личными или возвратными местоимениями.

1. He is quite right, I agree with ... completely.
2. I looked at ... in the mirror and left the house in a very good mood.
3. "Who is it?" — "It's May I come in?"
4. Mr. Lloyds is very fat ... weighs over a hundred kilos?
5. ... introduced his wife to the guests.
6. Where shall ... meet, Bob?
7. James took the book and opened ...

8. We don't dress ... for dinner here.
9. I taught ... to play the guitar.
10. Selfish people only care about ...

7. Закончите предложения, используя притяжательные местоимения (*my, your, his, her, our, their*).

1. I left ... car in the garage.
2. Mary hung ... coat on the peg.
3. Jack had ... hair cut.
4. Neil and David ate ... supper.
5. I hope you enjoy ... holiday.
6. We'll invite you round to . house sometime and complete these by adding a possessive with own.
7. You must make up ... own mind.
8. The children had to cook . own supper.
9. Bill borrowed Jenny's car . own can was being repaired.
10. I'll bring . own sheets and towels.
11. Every dog had ... own special basket to sleep in.
12. You should do ... own washing up.

8. Вставьте вместо точек нужное по смыслу местоимение.

1. I have lost ... pen, may I take ... ?
2. If you've left ... dictionary at home, you may take
3. These pencils are ... , take ... if you want.
4. Help ... , please.
- 5.. often meet ... here.
6. He always makes dinner . . .
7. We have very many relatives in ... native town.
8. They can do it
9. ... of you knows his address?
10. There is . butter on the table, but there isn't . milk.

9. Поставьте "some", "any" или "no".

1. He does his homework without ... difficulty.
2. This year all the apples are red, we are going out this morning to pick ...
3. I'd like ... water, please.
4. There weren't ... tomatoes left.
5. I won't go with you. I have ... free time.
6. There aren't ... students at the moment.
7. Sorry, I have ... matches.
8. Do you have ... money?
9. The box was empty. There was ... apple in it.
10. Pour me ... milk, please.

10. Вставьте *something*, *anything*, *nothing* или *everything*.

1. My husband taught his son ... he knows.
2. Her patient has a bad memory. She can't remember
3. I think there is ... wrong with my watch.
4. We've got ... to eat. We've got only ... to drink.
5. The student didn't understand ... because she heard
6. Does he know ... about computers? — Yes, he knows ... because he is the best specialist in computer science at Harvard University.
7. He felt terrible. He couldn't

do ... else. 8. ... is all right, the patient is much better today. 9. Is there ... interesting in the programme of the concert? 10. I could see ... : it was quite dark. 11. Give me ... to drink. 12. I didn't take any money with me, so I couldn't buy

11. Раскройте скобки, употребляя глаголы в Present Simple или Future Simple (Все предложения относятся к будущему времени).

1. If I (to stay) some more days in your town, I (to call) you and we (to have) a good talk. 2. He (to go) to the Public Library very often when he (to be) a student. 3. As soon as I (to return) from school, I (to ring) you up. 4. You (to pass) many towns and villages on your way before you (to arrive) in Moscow. 5. I (to stay) at home till she (to come). Then we (to go) to the theatre if she (to bring) tickets. 6. After I (to finish) school, I (to enter) the University. 7. When he (to return) to St. Petersburg, he (to call) on us. 8. If I (to see) him, I (to tell) him about their letter. 9. We (to gather) at our place when my brother (to come) back from Africa. 10. I (to sing) this song with you if you (to tell) me the words.

12. Раскройте скобки, употребляя глаголы в Present Simple, Past Simple или Future Simple.

1. My sister (not to like) coffee. 2. When you (to go) to bed every day? 3. What he (to read) yesterday? 4. What he (to read) every day? 5. What he (to read) tomorrow? 6. You (to give) me this book tomorrow? 7. Where she (to be) tomorrow? 8. Where she (to go) tomorrow? 9. She (to go) to the country with us tomorrow? 10. They (to stay) at home tomorrow. 11. What you (to do) last Sunday? 12. When you (to finish) your homework? It (to be) very late, it (to be) time to go to bed. 13. How you usually (to spend) evenings?

13. Поставить предложения в вопросительной и отрицательной форме.

1. He saw this man 2 days ago. 2. We'll return these books to the library tomorrow. 3. The news will be of great interest. 4. He studies at our college. 5. We discussed this problem last week. 6. Students usually take exams in January. 7. I wrote a letter to my parents 2 days ago.

UNIT 2

Text 2 A. History of Communication Systems

Text 2 B. The Story of Radio

Text 2 C. Guglielmo Marconi

Grammar:

Времена группы Simple (Passive).

Модальные глаголы

Text 2 A. History of Communication Systems

1. Pronounce the following words paying attention to the letter combination:

nk - ink, sink, link, wink, think, drink ng - sing, long, strong, wing, ring, hang

2. Make sure if you can read the words correctly:

Commercial, constructed, successful, microwave, researchers, centralized

Task 1. Memorize the following words and word-combinations:

chunk of data — порция данных,

relay — передавать;

фрагмент данных;

rely on — основываться на;

deflection of needle — отклонение

спутник;

стрелки;

to dub — называть;

establish — устанавливать;

to span over — охватывать;

fiber optics — волоконная оптика;

to suffer from — страдать,

four-node network — сеть с 4 узлами;

нарушаться;

independently — независимо,

tower — вышка, башня, мачта;

самостоятельно;

wireless communication —

mainframe — большая

беспроводная связь;

вычислительная машина;

TCP-Transmission Control Protocol —

multi-signal telegraph —

протокол управления передачей

многосигнальный телеграфный

аппарат;

Task 2. Read and translate the text, using a dictionary

Early telecommunications included smoke signals and drums. Drums were used by natives in Africa, New Guinea and South America, and smoke signals in North America and China.

In 1792, a French engineer, Claude Chappe built the first visual telegraphy (or semaphore) system between Lille and Paris. However semaphore as a communication system suffered from the need for skilled operators and expensive towers often at intervals of only ten to thirty kilometres. As a result, the last commercial line was abandoned in 1880.

The first commercial electrical telegraph was constructed in England by Sir Charles Wheatstone and Sir William Fothergill Cooke. It used the deflection of needles to represent messages and started operating over twenty-one kilometres of the Great Western Railway on 9 April 1839.

On the other side of the Atlantic Ocean, Samuel Morse independently developed a version of the electrical telegraph. The patented invention proved successful and by 1851 telegraph lines in the United States spanned over 20,000 miles (32,000 kilometres).

The first successful transatlantic telegraph cable was completed on 27 July 1866, allowing transatlantic telecommunication for the first time. The international use of the telegraph has sometimes been dubbed the "Victorian Internet".

The electric telephone was invented in the 1870s, based on earlier work with harmonic (multi-signal) telegraphs. The first commercial telephone services were set up in 1878 and 1879 on both sides of the Atlantic in the cities of New Haven and London. Alexander Graham Bell held the master patent for the telephone that was needed for such services in both countries.

In December 1901, Guglielmo Marconi established wireless communication between Britain and Newfoundland, earning him the Nobel Prize in physics in 1909. On March 25, 1925, Scottish inventor John Logie Baird publicly demonstrated the transmission of moving pictures at the London department store.

After midcentury the spread of coaxial cable and microwave radio relay allowed television networks to spread across even large countries. It was not until

the 1960s that researchers started to investigate packet switching — a technology that would allow chunks of data to be sent to different computers without first passing through a centralized mainframe. A four-node network emerged on December 5, 1969. This network would become ARPANET, which by 1981 would consist of 213 nodes. In September 1981, Internet Protocol/ Transmission Control Protocol was introduced. The TCP/IP protocol is much of the Internet relies upon today. Internet access became widespread late in the century, using the old telephone and television networks.

In 1990, the code for what was now called the “World Wide Web” was developed, as well as the standards for HTML, HTTP and URL. In modern times, telecommunications involves the use of electrical devices such as the telegraph, telephone, and teleprinter, the use of radio and microwave communications, fiber optics and their associated electronics, plus the use of the orbiting satellites and the Internet.

(From Wikipedia)

Task 3. Answer the following questions.

1. What did early telecommunications include?
2. Who were drums and smoke signals used by?
3. When was the first semaphore system built?
4. What did semaphore as a communication system suffer from?
5. When was the first commercial electric telegraph constructed?
6. What did Samuel Morse develop?
7. What happened on 27 July 1866?
8. What do you know about the first commercial telephone services?
9. What did Guglielmo Marconi establish in December 1901?
10. What allowed television networks to spread across even large countries?
11. What can be said of packet switching?
12. How many nodes did ARPANET have at first?
13. What does telecommunications involve in modern times?

Task 4. Read the following word-combinations and translate them.

Smoke signals, visual telegraphy, skilled operators, to represent messages, the patented invention, transatlantic communication, to establish wireless communication, to investigate packet switching, to become widespread, orbiting satellites.

Task 5. Choose the correct variant and complete the following sentences.

1. The first commercial electrical telegraph was constructed by ...
 - a. George Stibitz
 - b. Guglielmo Marconi
 - c. Sir Charles Wheatstone and Sir William Fothergill Cooke.
2. The conventional telephone was invented by ...
 - a. John Logie Baird in 1845
 - b. Alexander Bell in 1876
 - c. George Stibitz in 1940
3. In December 1901, Guglielmo Marconi ...
 - a. established wireless communication between Britain and the United States
 - b. became a pioneer of colour television
 - c. invented the conventional telephone
4. The first was constructed in England by Sir Charles Wheatstone and Sir William Fothergill Cooke:
 - a. moving picture
 - b. electrical telegraph
 - c. lightning rod
5. The spread of allowed television networks to spread across large countries.
 - a. electrical telegraph
 - b. commercial telephone services
 - c. coaxial cable and microwave radio relay.
6. On the 25th of March, 1925, Scottish inventor John Logie Baird ...
 - a. started to investigate packet switching
 - b. publicly demonstrated the transmission of moving silhouette pictures

- c. constructed the first commercial electrical telegraph.

Text 2 B. THE STORY OF RADIO

Task 1. Memorize the following words and word-combinations:

| | |
|---|---|
| by means of - с помощью, | to include - включать в состав, |
| посредством; | содержать; |
| circumference [sə'klmf(ə)r(ə)ns]- окружность | to make a discovery - сделать открытие; |
| convenience - удобство; | to oscillate - колебаться; |
| essential - основной; | to put forward a theory - выдвинуть теорию; |
| loose - свободный, незакрепленный; | to suggest a method - предложить метод; |
| merely только, всего лишь; | to take a step forward - сделать шаг вперед; |
| mouthpiece - микрофон; | to turn to - обратиться; |
| persistent - упорный, настойчивый; | wavelength - длина волны; |
| point - точка; | wireless - беспроводный |
| thereby - посредством этого; | |
| to discharge - разряжать; | |
| to give rise to - способствовать; | |

Task 2. Read the following words and word-combinations and translate them. Write a transcription to the words

The inquiries, patient inquiry, a telephone receiver, ether, mathematical geniuses, suggest, distinguish, successful

Task 3. Read the text, get its central idea and note the important details.

Without understanding the inquiries of pure science¹, we cannot follow the story of radio. It begins perhaps with Joseph Henry, an American physicist, who discovered in 1842 that electrical discharges were oscillating.

A gigantic step forward was taken by James Maxwell, a Scottish physicist and one of the great mathematical geniuses of the 19th century. By purely mathematical reasoning², Maxwell showed that all electrical and magnetic phenomena could be reduced to stresses and motions in a medium, which he called the ether. Today we know that this "electrical medium" does not exist in reality³. Yet the concept of an

ether helped greatly, and allowed Maxwell to put forward his theory that the velocity of electric waves in air should be equal to that of the velocity of light waves, both being the same kind of waves⁴, merely differing in wave length.

In 1878, David Hughes, an American physicist, made another important discovery in the pre-history of radio and its essential components. He found that a loose contact in a circuit containing a battery and a telephone receiver (invented by Bell in 1876) would give rise to sounds in the receiver, which corresponded to those that had impinged upon the diaphragm of the mouthpiece.

In 1883, George Fitzgerald, an Irish physicist, suggested a method by which electromagnetic waves might be produced by the discharge of a condenser. Next we must turn to Heinrich Hertz, the famous German physicist, who was the first to create, detect and measure electromagnetic waves, and thereby experimentally confirmed Maxwell's theory of "ether" waves. In his experiments he showed that these waves were capable of reflection, refraction, polarization, diffraction and interference.

A.S. Popov (1859-1906) was in 1895 a lecturer in physics. He set up a receiver in 1895, and read a paper about it at the Meeting of the Russian Physico-Chemical Society on April 25 (May 7, New Style) 1895. He demonstrated the world's first radio receiver, which he called "an apparatus for the detection and registration of electric oscillations". By means of this equipment, Popov could register electrical disturbances, including atmospheric ones. In March 1896 he gave a further demonstration before the same society. At that meeting the words "Heinrich Hertz" were transmitted by wireless telegraphy in Morse code and similarly received before a distinguished scientific audience⁵. Popov became the inventor of the radio, May 7 being celebrated each year as "Radio Day" in many countries.

Marconi invented a system of highly successful wireless telegraphy, and inspired and supervised its application.

Such is the story of the many inventors of wireless telegraphy, working with each other's equipment, adding new ideas and new improvements to them. It was a

patient, persistent inquiry into natural laws and it was animated⁶ by the love of knowledge.

During the first years of its development, radio communication was called "wireless telegraphy and telephone". This name was too long for convenience and was later changed to "radio" which comes from the well-known Latin word "radius" - a straight line drawn from the centre of a circle to a point on its circumference. Wireless transmission was named radio transmission, or simply "radio".

The term "radio" now means the radiation of waves by transmitting stations, their propagation through space, and reception by receiving stations. The radio technique has become closely associated with many other branches of science and engineering and it is now difficult to limit the word "radio" to any simple definition.

Notes:

1. *without understanding the inquiries of pure science* - на зная истоков чистой науки
2. *by purely mathematical reasoning* - при помощи чисто математических рассуждений
3. *does not exist in reality* - на самом деле не существует
4. *both being the same kind of waves* - причем обе являются волнами одного типа
5. *distinguished audience* - авторитетная аудитория
6. *to be animated by the love of knowledge* - быть движимым любовью к знаниям

Task 4. Answer the questions

1. What scientists were involved in the invention of radio?
2. Who discovered the oscillations of electric discharges?
3. What was Maxwell famous for?
4. Does the ether exist in reality?
5. What discovery did David Hughes make?
6. What did Hertz try to do?
7. Who was the inventor of radio?
8. Where does the word “radio” come from?
9. What does the term “radio” mean now?

Task 5. Make up sentences with the following words and word-combinations:

The story of radio, the velocity of electric waves, to create, to set up, to invent, the radiation of waves, to measure, discovery, a circuit, electrical discharges, to be produced.

Task 6. Explain the origin of the word "radio".

Task 7 Retell the text.

Text 2 C. GUGLIELMO MARCONI

Task 1. Memorize the following words and word- combinations:

| | |
|---|---|
| conceive — задумывать. | matriculation — вступительный |
| landowner — землевладелец; | экзамен в вуз; |
| martinet — сторонник строгой дисциплины; | to cope with — справиться с; withheld — отказать; wreck - сломать |

Task 2. Read the text, get its central idea and note the important details

Guglielmo Marconi (b. Bologna, Italy, 25th April 1874, d. Rome, Italy, 20th July, 1937) was the second son of Giuseppe Marconi, a wealthy landowner, and his second wife, Annie Jameson, the daughter of an Irish Whiskey distiller. Giuseppe Marconi ruled his household in the style of a martinet.

Guglielmo spent most of childhood away from home. Consequently, his education was neglected. When he was sent to a school, he was unable to cope with his studies and other students made fun of his poor Italian accent. He failed to pass the entrance examination to the Italian Naval Academy and went to Livorno Technical Institute.

His ambition was to have an electrical career, but he could not even pass his matriculation. His father became very angry, wrecked the devices Guglielmo had constructed, and even withheld his pocket money. However, his mother did all she could to help her son do his experiments.

Marconi did experiments on electromagnetic waves with the assistance of Prof. A. Righi (*Аугусто Риги*) of Bologna [bə'ləunjə] and discovered that increased transmission distance could be obtained with larger antennas. In 1895, he achieved

a transmission distance of 1.5 miles, and conceived of 'wireless telegraph' communication.

Being unable to interest the Italian Government in the potential of his work, he moved to London in 1896. His Irish cousin, Henry Jameson Davis, helped him to form and finance the Wireless Telegraph and Signal Co. Ltd., which became Marconi's Wireless Telegraph Co. Ltd. in 1900. On 12 December 1901 he received a transatlantic wireless communication. He became famous overnight.

Marconi received many awards including the Nobel Prize for physics, which he shared with K. F. Braun in 1909.

(eleceng.adelaide.edu.au/about/history/famous-scientists)

Task 3. Give a brief summary of the above text.

GRAMMAR REVIEW

1. Раскройте скобки, употребляя глаголы в Present, Past или Future Simple Passive.

1. My question (to answer) yesterday. 2. Hockey (to play) in winter. 3. Mushrooms (to gather) in autumn. 4. Many houses (to burn) during the Great Fire of London. 5. His new book (to finish) next year. 6. Flowers (to sell) in shops and in the streets. 7. St. Petersburg (to found) in 1703. 8. Bread (to eat) every day. 9. The letter (to receive) yesterday. 10. Nick (to send) to Moscow next week. 11. I (to ask) at the lesson yesterday. 12. I (to give) a very interesting book at the library last Friday. 13. This work (to do) tomorrow. 14. Lost time never (to find) again. 15. Rome (not to build) in a day.

2. Раскройте скобки, выбирая требующуюся форму глагола. Переведите предложения

1. At the station they will (meet, be met) by a man from the travel bureau. 2. She will (meet, be met) them in the hall upstairs. 3. The porter will (bring, be brought) your luggage to your room. 4. Your luggage will (bring, be brought) up in the lift. 5. You may (leave, be left) your hat and coat in the cloakroom downstairs. 6. They can (leave, be left) the key with the clerk downstairs. 7. From the station they will (take,

be taken) straight to the hotel. 8. Tomorrow he will (take, be taken) them to the Russian Museum.

3. Передайте следующие предложения в Passive Voice, обращая внимание на место предлога. Переведите предложения

E.g. We often speak of her. — She is often spoken of.

1. The senior students laughed at the freshman. 2. The group spoke to the headmistress yesterday. 3. Young mothers looked after their babies with great care. 4. Nobody lived in that old house. 5. They sent for Jim and told him to prepare a report on that subject. 6. We thought about our friend all the time. 7. The doctor will operate on him in a week. 8. The teacher sent for the pupil's parents. 9. They looked for the newspaper everywhere. 10. Nobody slept in the bed. 11. The neighbour asked for the telegram. 12. Everybody listened to the lecturer with great attention.

4. Раскройте скобки, употребляя глаголы в Active Voice или Passive Voice.

1. Nobody (to see) him yesterday. 2. The telegram (to receive) tomorrow. 3. He (to give) me this book next week. 4. The answer to this question can (to find) in the encyclopedia. 5. We (to show) the historical monuments of the capital to the delegation tomorrow. 6. You can (to find) interesting information about the life in the USA in this book. 7. Budapest (to divide) by the Danube into two parts: Buda and Pest. 8. Yuri Dolgoruki (to found) Moscow in 1147. 9. Moscow University (to found) by Lomonosov. 10. We (to call) Zhukovski the father of Russian aviation.

5. Передайте следующие предложения в Passive Voice.

1. He stole a lot of money from the shop. 2. We send our daughter to rest in the south every year. 3. They will show this film on TV. 4. I bought potatoes yesterday. 5. We shall bring the books to you tomorrow. 6. They sell milk in this shop. 7. They broke the window last week. 8. We shall do the work in the evening. 9. Livingstone explored Central Africa in the 19th century.

6. Передайте следующие предложения в Active Voice. Введите любые подходящие подлежащие.

1. The room was cleaned and aired. 2. Whom were these letters written by? 3. I shall not be allowed to go there. 4. All the questions must be answered. 5. Betty was

met at the station. 6. The girl was not allowed to go to the concert. 7. The roast chicken was eaten with appetite. 8. It was so dark, that the houses could not be seen. 9. The boy was punished for misbehaving. 10. The dictation was written without mistakes. 11. Whom was the poem written by? 12. Her dress was washed and ironed. 13. I was not blamed for the mistakes. 14. This house was built last year. 15. This article will be translated at the lesson on Tuesday. 16. When will this book be returned to the library?

7. Переведите на английский язык, употребляя глаголы в *Passive Voice*.

1. Нам показали очень странную картину. 2. Тебя ищут. Иди домой. 3. Вас всех пригласят в зал и расскажут обо всех изменениях в программе. 4. Почему над ним всегда смеются? 5. Нам всем дали билеты на выставку. 6. Лекции этого знаменитого профессора всегда слушают с большим вниманием. 7. Меня ждут? 8. Им задали три трудных вопроса. 9. За доктором уже послали. Подождите немного. 10. Всех пригласили в большой зал. 11. Эти письма просмотрены. Их можно отправлять. 12. На станции их встретил гид и отвез в гостиницу. 13. Эти журналы должны быть возвращены в библиотеку на следующей неделе.

8. Заполните пропуски модальными глаголами *can*, *may* или *must*.

1. What ... we see on this map? 2. ... you speak Spanish? — No, unfortunately I
3. At what time... you come to school? 4. ... I have it? 5. You ... not smoke here. 6. ... I take your book? — I am afraid not: I need it. 7. He... not speak English yet. 8. I have very little time: I ... go. 9. They ... not go to the park today because they are busy. 10. You ... read this text: it is easy enough. 11. She ... still live in Paris. 12. He is busy. He... be writing a book about his travels. 13. But he is happy. He... enjoy life. 14. My friend Danielle isn't a famous artist. But she ... even paint Russian icons. I ... only admire her beautiful pictures. She ... be a woman of great talents. She ... speak German, French and English. She ... translate a lot of articles for the Museum of her native town in Switzerland. She ... also teach these languages at school. She is fantastic. I am fascinated by everything that she does. She always gives the impression of being someone you ... trust.

9. Вставьте модальные глаголы can, may, must, need.

1. Peter ... return the book to the library. We all want to read it. 2. Why ... not you understand it? It is so easy. 3. ... we do the exercise at o[^]e? — Yes, you ... do it right now. 4. ... you pronounce the word? 5. You ... not have bought this meat: we have everything for dinner. 6. I ... not go out today: it is too cold. 7. ... I take your pen? — Yes, please. 8. We ... not carry the bookcase upstairs: it is too heavy. 9. We ... not carry the bookcase upstairs ourselves: the workers will come and do it. 10. When ... you come to see us? — I ... ocmc only on Sunday. 11. Shall I write a letter to him? — No, you ... not, it is not necessary. 12. ... I offer you something to drink? 13. Everything is clear and you ... not go into detail now. 14. He... not drink alcohol when he drives. 15. Don't worry! I ... change alight bulb. 16. By the end of the week I ... have finished writing my book. 17. She ... not call the doctor again unless she feels worse.

10. Замените модальные глаголы соответствующими эквивалентами.

1. Students must take exams in January. 2. She can speak French well. 3. You may take this book till tomorrow. 4. We must learn new words every week. 5. I live not far from my work. I can go by bus or I can walk. 6. You may come in. 7. We can take this book from the library. 8. She cannot do this work in time. 9. He must go to St. Petersburg for a few days. 10. We can see electrical devices everywhere.

11. Переведите предложения, обращая внимание на перевод модальных глаголов.

1. Everyone should know a foreign language. 2. To make supercomputers, we need highly developed electronics and new materials. 3. One should do one's work in time. 4. The students ought to know the history of their institute. 5. The development of new materials does not mean that old materials should lose their significance. 6. Marie Curie needed a laboratory and equipment for her research. 7. Every institute ought to be proud of their famous graduates. 8. One should know that «roentgen» is a unit (единица) of radiation.

12. Выберите предложения, где глаголы to have and to be используются в функции модальных глаголов

1. These devices have been used in our experiment. 2. Scientists have to work hard to create a new atomic technique. 3. A modern computer has two main parts: a memory and a computing unit. 4. As the known resources of coal and oil are limited, man has to find new sources of power. 5. Very difficult calculations in mathematics and electrical engineering have to be solved by computers. 6. People of good will have to struggle for peaceful use of atomic energy. 7. When technique reaches a very high stage of development, new methods of work will become possible. 8. We are to take into consideration all the advantages and disadvantages of this device for the future work. 9. We are to take special steps to reduce the weight of this mechanical part. 10. These new data are obtained after our experiment. 11. At present our engineers are to develop the most advanced methods of production. 12. Our design bureau has to construct a new adding machine. 13. This device has been used in our experiment. 14. The experts are to inspect this plant.

13. Переведите предложения, укажите модальные глаголы и их эквиваленты.

1. Without a computer scientists will not be able to solve complicated problems. 2. Modern computers can multiply two numbers in a microsecond. 3. This machine can do the work of hundreds of workers. 3. He has to finish his experiment in time. 4. She was allowed to carry out this research as she had taken part in the scientific symposium. 5. Every student must know the difference between automation and mechanization. 6. With the help of radioactive elements we were able to measure the thickness of various materials. 7. Every engineer must improve his technical knowledge. 8. Scientists of different countries must cooperate in their research and peaceful application of their discoveries. 9. In fact, there is hardly any sphere of life where the atom may not find useful application. 10. The computer can perform different mathematical operations. 11. Our plant is to increase its output. 12. Every plant must fulfil its plan in time. 13. Workers must apply new methods of production.

14. Переведите предложения, обращая внимание на Perfect Infinitive:

1. The engineer might have overlooked something that may turn out to be important in carrying out this experiment. 2. All the preparations must have been completed long ago. 3. Some day atomic energy might have been used to control the weather

of the world. 4. He may have got the condenser he needed for his experiment. 5. He cannot have broken the tube while making this experiment. 6. You should have changed the current strength at all points of the circuit. 7. He may have got the article he needed. 8. You should have helped your friend.

Unit 3

Text 3 A. The Nature of Electricity

Text 3 B. Electric current

Text 3 C. Electric circuit

Grammar:

Времена группы Progressive (Active and Passive).

Функции глагола to be

Text 3 A. THE NATURE OF ELECTRICITY

Task 1. Memorize the following words and word-combinations:

confuse - смешивать, сбивать с толку, спутывать;

despite - несмотря, вопреки, несмотря на;

encounter opposition - встречать противодействие;

orbit - вращаться или двигаться по орбите

pressure - давление;

Task 2. Read the text and do the exercises that follow it.

THE NATURE OF ELECTRICITY

Practical electricity is produced by small atomic particles known as electrons. It is the movement of these particles which produces the effects of heat and light.

The pressure that forces these atomic particles to move, the effects they encounter opposition and how these forces are controlled are some of the principles of electricity.

Accepted atomic theory states that all matter is electrical in structure. Any object is largely composed of a combination of positive and negative particles of electricity. Electric current will pass through a wire, a body, or along a stream of water. It can be established in some substances more readily than in others, that all matter is composed of electric particles despite some basic differences in materials. The science of electricity then must begin with a study of the structure of matter.

Matter is defined as any substance which has mass (or weight) and occupies space. This definition should be broad enough to cover all physical objects in the universe. Wood, water, iron, and paper are some examples of matter. Energy is

closely related to, but not to be confused with, matter. Energy does not have mass, and it does not occupy space. Heat and light are examples of energy.

The smallest particle of matter which can be recognized as an original substance was thought to be a unit called the atom. Recently scientists have found particles even smaller than atoms, but our theories are still based on the atom. The atom consists of a nucleus and a cloud of electrons. It is generally agreed that the electrons are small particles of electricity, which are negative in nature. These particles orbit the nucleus in much the same fashion that planets orbit a sun.

Task 3. Give the English equivalents for the words below:

1 - производить; 2 - частица; 3 - тепло и свет; 4 - напряжение; 5 - сила; 6 - вещество; 7- положительный; 8 - отрицательный; 9 - электрический ток; 10 - вес; 11- ядро; 12 - состоит из; 13 - определять; 14 - движение; 15 - ученые.

Task 4. Read the following word-combinations and translate them:

1. atomic particle. 2. effects of heat and light. 3. encounter opposition. 4. principles of electricity. 5. to be composed (of) 6. pass through a wire. 7. structure of matter. 8. occupy space. 9. physical objects. 10. a cloud of electrons. 11. in the same fashion.

Task 5. Complete the sentences using the text:

1. Electricity is produced by ...
2. The effects of heat and light are produced by ...
3. According to the accepted atomic theory all matter is ...
4. Any object is composed of ...
5. Matter is defined as ...
6. Energy must not be confused with ...
7. The atom consists of ...
8. The smallest particle of matter is ...
9. Most theories are based on ...
10. Electrons are ...

Task 6. Make up 7 questions to the text

Task 7. Retell the text (5-7 sentences)

Text 3 B. ELECTRIC CURRENT

Task 1. Memorize the following words and word-combinations:

alternating current — переменный ток;

circuit - тех. схема; сеть; система;

Coulomb ['ku:lɒm] - кулон;

direct current — постоянный ток;

to meet requirements - соответствовать требованиям; under consideration - -

рассматриваемый, находящийся на рассмотрении;

vice versa – и наоборот; наоборот

Task 2. Read the text, get its central idea and note the important details.

The electric current is a quantity of electrons flowing in a circuit per second of time. The unit of measure for current is ampere. If one coulomb passes a point in a circuit per second then the current strength is 1 ampere. The symbol for current is I. The current which flows along wires consists of moving electrons. The electrons move along the circuit because the electromotive force drives them. The current is directly proportional to the e. m. f.*

In addition to traveling through solids, however, the electric current can flow through liquids as well and even through gases. In both cases it produces some most important effects to meet industrial requirements.

Some liquids, such as melted metals for example, conduct current without any change to themselves. Others, called electrolytes, are found to change greatly when the current passes through them.

When the electrons flow in one direction only, the current is known to be d.c., that is, direct current. The simplest source of power for the direct current is a battery, for a battery pushes the electrons in the same direction all the time (i.e., from the negatively charged terminal to the positively charged terminal).

The letters a.c. stand for alternating current. The current under consideration flows first in one direction and then in the opposite one. The a.c. used for power and lighting purposes is assumed to go through 50 cycles in one second. One of the great advantages of a.c. is the ease with which power at low voltage can be

changed into an almost similar amount of power at high voltage and vice versa. Hence, on the one hand alternating voltage is increased when it is necessary for long-distance transmission and, on the other hand, one can decrease it to meet industrial requirements as well as to operate various devices at home.

Although there are numerous cases when d.c. is required, at least 90 per cent of electrical energy to be generated at present is a.c. In fact, it finds wide application for lighting, heating, industrial, and some other purposes.

*Note: * e. m. f (electromotive force) - электродвижущая сила*

Task 3. Answer the questions

1. What is the electric current?
2. Is ampere a unit of measure for current or e.m.f?
3. Why do electrons move along the circuit?
4. Where can electric current flow?
5. What is one of the great advantages of the alternating current?

Task 4. Guess the meaning of the following international words:

Electric, ampere, symbol, proportional, industrial, metal, electrolyte, battery, generate.

Task 5. Give the English equivalents:

1 - течь, протекать; 2 - цепь, схема; 3 - единица измерения; 4 - провод; 5 - электродвижущая сила; 6 - твердое тело; 7 - жидкость; 8 - проводить (ток); 9 - источник энергии; 10 - постоянный ток; 11 - напряжение; 12 - переменный ток.

Task 6. Give Russian equivalents for the following:

1 - unit of measure; 2 - to flow along wires; 3 - in addition to; 4 - source of power; 5 - long-distance transmission; 6- to meet industrial requirements; 7- melted metals; 8 - great advantages; 9 - direct current; 10 - alternating current; 11 - under consideration; 12 - on the one hand; 13 - on the other hand; 14 - wide application.

Task 7. Fill in the blanks, using the words from the box:

direct current, solids, conduct, electric current, liquids, voltage, alternating current

1. A quantity of moving electrons flowing in a circuit is the
2. The current can flow through... and

3. Some liquids ... current without any change to themselves.
4. When the electrons flow in one direction only, the current is known to be
5. The current flowing first in one direction and then in the opposite one is
6. Such advantage of alternating current as alternating finds wide industrial and household application.

Task 8. State the questions to the underlined words:

1. Melted metals conduct current without any change to themselves.
2. Alternating voltage can be changed to operate various devices at home.
3. A battery pushes the electrons in the same direction.
4. The alternating current is used for power and lightning purposes.
5. Alternating current accounts for 90 per cent of electrical energy generated now.

Task 9. Say some sentences about the types of electric current and its properties.

Text 3 C ELECTRIC CIRCUIT

Task 1. Memorize the following words and word-combinations

fuse - предохранитель

otherwise - или же, в противном случае;

series circuits - последовательная (электро)цепь;

short circuits — короткое замыкание , цепь короткого замыкания;

the source of supply — источник питания, снабжения ;

to result from — происходить в результате, быть следствием;

Task 2. Read the text and do the exercises that follow it.

The electric circuit is a complete path which carries the current from the source of supply to the load and then carries it again from the load back to the source.

The purpose of the electrical source is to produce the necessary electromotive force required for the flow of current through the circuit.

The path along which the electrons travel must be complete otherwise no electric power can be supplied from the source to the load. Thus, we close the circuit when we switch on our electric lamp.

If the circuit is broken or, as we generally say “opened” anywhere, the current stops everywhere. Hence, we break the circuit when we switch off our electrical devices.

The current may pass through solid conductors, liquids, gases, vacuum, or any combination of these. It may flow in turn over transmission lines from the power stations through transformers, cables and switches, through lamps, heaters, motors and so on.

There are various kinds of electric circuits such as open circuits, closed circuits, series circuits, parallel circuits and short circuits.

When electrical devices are connected so that the current flows from one device to another, they connect in series. Under such conditions the current flow is the same in all parts of the circuit, as there is only a single path along which it may flow.

The electrical bell circuit is the typical example of a series circuit. The parallel circuit provides two or more paths for the passage of current. The circuit is divided in such a way that part of the current flows through one path, and part through another. The lamps in your room and your house are generally connected in parallel.

The short circuit is produced when the current returns to the source of supply without control and without doing the work that we want it to do. The short circuit often results from cable fault or wire fault. Under certain conditions the short circuit may cause fire because the current flows where it was not supposed to flow. If the current flow is too great a fuse is used as a safety device to stop the current flow.

Task 2. Answer the questions

1. What is an electric circuit?
2. What is the purpose of the electrical source?
3. How can we break the circuit?
4. What kinds of electric circuits do you know?
5. Give the examples of a series and parallel circuits.
6. What does the short circuit often result from?

Task 3. Give the English equivalents:

1- электрическая цепь; 2- электрический заряд, 3 - замыкать цепь; 4- жидкость; 5 - — предохранительный механизм (устройство); 6 - включать; 7) короткое замыкание, 8 - таким образом; 9 - прохождение (протекание) тока; 10 - источник питания

Task 4. Fill in the blanks, using the words from the box:

results from, the circuit, cause, switch off, paths

1. We break the circuit when we ...our electrical devices.
2. There are various kinds of electric circuits.
3. The parallel circuit provides two or more ... for the passage of current.
4. The short circuit may ... fire.
5. . We close ... when we switch on our electric lamp.
6. The short circuit often ... cable fault or wire fault.

Task 5. State the questions to the underlined words:

1. We switch on our electric lamp. 2. There are various kinds of electric circuits. 3. The parallel circuit provides two or more paths for the passage of current. 4. The short circuit may cause fire.

Task 6. Give a brief summary of the above text.

GRAMMAR REVIEW

1. Переведите предложения, определив время и залог

1. New Metro lines are being built now in Moscow. 2. What is going on? A new film is being discussed. 3. What grammar was being explained when you came in? 4. What questions were being discussed at that time? 5. New methods of research are being used in our lab. 6. Much is being done to improve laboratory methods.

2. Выберите правильную форму глагола.

1. We (are translating, translate) a technical text now. 2. We usually (are not translating, do not translate) stories. 3. She (does not look, is not looking) through all the newspapers every evening. 4. He (looked, was looking) through a newspaper when the telephone rang. 5. What (were, was) you doing a minute ago? I (was watching, watched) television. 6. I (watch, am watching) television every day. 7. I

had a late night, I (worked, was working) until midnight. 8. Yesterday he (worked, was working) a lot. 9. The students (had, were having) an interesting discussion when the teacher came in. 10. The students often (have, are having) interesting discussions after lectures. 11. When he comes they (will be taking, will take) a test. 12. They (will be taking, will take) a test next

3. Поставьте глагол в соответствующем времени в зависимости от обстоятельства.

This student (study) physics (at present, every day, last semester, when the telephone rang, tomorrow at this time, next semester).

4. Найдите предложения с глаголом-сказуемым в Present Continuous, переведите.

1. Water and air are becoming more and more polluted. 2. At present computers are more widely used in the sphere of education. 3. Where were you at six o'clock? We were studying in the reading-room. 4. There are government and public organizations that are analysing data on land, forest and air. 5. New courses of education such as management are being organized in many institutes. 6. What will you be doing in the laboratory tomorrow morning? We shall be watching the operation of a new device. 7. Measures are being taken to save Lake Baikal. 8. The situation at Lake Baikal is remaining very serious. 9. Much attention is being paid at present to the development of international scientific contacts. 10. Science is becoming a leading factor in the progress of mankind.

5. А. Найдите предложения с глаголом-сказуемым в Continuous Passive, переведите.

1. Cambridge University was formed in the 12th century. 2. The solution of ecological problems may be achieved only by joint efforts of all countries. 3. Great changes in people's lives and work were brought about by the scientific and technological progress. 4. The theory of interaction of atmospheric and oceanic processes is being developed to determine the weather of the planet. 5. The teachers at Cambridge are called «dons» or «tutors». 6. Computers and lasers are being widely introduced at plants and factories. 7. The most important ecological

problems must be considered at the government level. 8. The training at Cambridge and Oxford is carried out by tutorial system.

В. Переделайте предложения из действительного в страдательный залог.

1. He is writing a letter at the moment. 2. John was preparing report all day yesterday. 3. We are learning grammar now. 4. At present mankind is making considerable investments to eliminate air pollution. 5. Today the changes in the global climate and water balance are bringing about serious changes in the environment. 6. Many scientists are constantly carrying out experimental work to solve the problem of environment protection. 7. The company is making plans for the future.

6. Translate the sentences into English using the Passive Voice:

1. На вокзале его всегда встречают друзья (to meet). 2. В нашем университете обучаются трем языкам (to teach). 3. Эта проблема обсуждается сейчас в печати (to discuss). 4. Специальным предметам нас будут обучать на третьем и четвертом курсах (to teach). 5. Во время занятия много говорилось о нашей будущей профессии (to speak of). 6. Я думаю, экзамены будут сданы нами успешно (to pass). 7. На занятиях по английскому языку нужно говорить по-английски (to speak). 8. Тема «Моя будущая профессия» будет изучаться в следующем семестре (to study). 9. Работа выполнена Вами хорошо (to do).

7. Передайте следующие предложения в Passive Voice.

1. He will introduce me to his friends. 2. They are building a bridge over the river. 3. I haven't yet translated the article. 4. We were looking at the man with great surprise. 5. You will speak about the film at the lesson. 6. The headmistress sent for the pupil's parents. 7. Has the secretary typed the letters yet? — No, she is typing them now. 8. We asked him about his holidays. 9. They have already discussed the novel. 10. He did not give me his address. 11. She showed him the way to the metro station.

8. Поставьте глагол в соответствующем времени

1. What you (do) when I (call) you? You (sleep) or what? 2. She looked out of the window and saw that the children (return) slowly from school. 3. The young couple

next to me (discuss) their plans for summer vacation - where to go. 4. When we (meet) for the first time, she (work) as a waitress in a cafe. 5. We (have) a very exciting holiday. We (play) tennis, (visit) friends, the children (swim) and (sunbathe). 6. What you (do) at 7 o'clock yesterday? 7. While my mother (knit) mittens, I (do) my homework.

9. Переведите предложения.

1. Что ты делал вчера в 8 часов? 2. Лил сильный дождь, когда я вышел из дома. 3. Вчера весь вечер дети играли в железную дорогу (to play a train set). 4. Вчера в это время я просматривал газеты. 5. На прошлой неделе в 7 часов вечера мои друзья не играли в хоккей, они смотрели фильм. 6. Когда он вошел в сад, солнце светило ярко и птицы пели на деревьях. 7. Чем занимался ваш отец вчера с 5 и до 7 часов?

10. Переведите предложения, обращая внимание на функцию глагола to be.

1. The results of the experiment are of great importance for our further work. 2. There are no chemical plants in our town. 3. The substance that we are speaking about is water. 4. We are to translate technical literature in the second year. 5. It was the study of natural phenomena that made it possible to formulate various laws. 6. Probably the most important use of electricity in the modern house is producing light. 7. Technical progress is now impossible without high-quality materials. 8. Electronics is being used more and more throughout the industry. 9. The electron is a particle. 10. The machine is of five parts. 11. Our task is to finish the test by 7 o'clock. 12. Radio was invented by a talented Russian scientist A.S.Popov. 13. Words in a dictionary are in alphabetical order. 14. Smoking is dangerous. 15. The temperature is three degrees above zero. 16. My friends are mostly students. 17. It is the only positive solution. 18. The British are very proud of their sense of humour. 19. This scientific discovery was the result of six years' research. 20. Our aim is to accomplish this task as soon as possible. 21. He will be an engineer in two years. 22. Their house is in the middle of the village.

11. Переведите предложения, обращая внимание на функцию глагола to be.

1. Our company is interested in different consumer goods. 2. English is the main language of the business world. 3. The development of foreign trade is of great importance for any country. 4. This company was to sign a contract. 5. Bank notes are issued by the central bank. 6. London is on the Thames. 7. The conference was attended by representatives of different countries.

UNIT 4

Text 4 A. What is an electron?

Text 4 B. Discovery an Electron

Text 4 C. Electron Emission

Grammar: Функции и перевод it, one, that

TEXT 4 A. WHAT IS AN ELECTRON?

Task 1. Memorize the pronunciation of the following words:

| | |
|--------------------------------|--------------------------------------|
| constituent — составная часть; | ratio - отношение, пропорция; |
| electron - электрон; | to acquire - достигать, приобретать, |
| identical - тождественный; | получать; |
| indivisible - неделимый; | to exert — напрягать (силы), |
| inseparable - неотделимый; | прилагать (усилия) |
| rapidity - быстрота | |

Task 2. Read the text and do the exercises that follow it.

We can think of the electron as a very small, indivisible, fundamental particle — a major constituent of all matter. All electrons appear to be identical and to have properties that do not change with time. Two essential characteristics of the electron are its mass and its charge. We can think of an electron as a "piece of matter" that has weight and is affected by gravity.

Just as the mass of any object is defined, we can define the mass of the electron by applying a force and measuring the resulting rate of change in the velocity of the electron, that is, the rapidity with which its velocity changes. This rate of change is called acceleration, and the electron mass is then defined as the ratio of the applied force to the resulting acceleration. The mass of the electron is found to be about 9.11×10^{-28} grams¹.

Not only the electron but also all matter appears to have positive mass, which is equivalent to saying that a force applied to any object results in an acceleration² in the same direction as the force.

All electrons have an electric charge, and the amount of charge, like the mass, is identical for all electrons. No one has ever succeeded in isolating an amount of charge smaller than that of the electron. The sign of the electron charge is conventionally defined as negative; the electron thus represents the fundamental unit of a negative charge. No experiment has yet succeeded in removing the charge from the electron, leaving only its mass. Therefore, instead of considering the electron a "massive" body that has somehow acquired a charge, it seems more realistic to think that the charge and the mass are two inseparable aspects of a single unity.

The motion of an electron, like that of any other body, results from a force acting on it. How can force be applied to an electron? One way is by gravity. Another is by bringing a second charge near the electron, thus exerting an attractive or repulsive force on it. In this case we may say that the second charge sets up electric field which applies a force to the first charge.

Finally, we find that an electric current flow will affect the motion of a nearby charge, but only if that charge is already in motion. In this case, we say that the current sets up a magnetic field which applies a force to the moving charge. These three are the only known ways of applying force to an electron. The relationship between these fields, the charges producing them and resulting effects on other charges are the laws of electron motion.

Notes:

¹ 9.11×10^{-28} grams — nine point eleven multiplied by ten to the minus twenty-eighth power

² to result in an acceleration — вызывать ускорение

Task 3. Answer the questions:

1. What is an electron?
2. What properties have electrons?
3. What are two essential characteristics of the electron?

4. How can we define the mass of an electron?
5. How is the rate of change called?
6. What is the mass of the electron?
7. What is identical for all electrons?
8. How is the sign of the electron charge defined?
9. What are two inseparable aspects of a single unity?
10. 10 What does the electron represent?
11. 11 What does the motion of an electron result from?
12. How can force to an electron be applied?
13. What sets up an electric field?
14. What sets up a magnetic field?
15. What are the laws of electron motion?

Task 4. Give the English equivalents:

1. составная часть материи
2. масса электрона составляет
3. электрический заряд
4. одинаковый для всех электронов
5. движение электрона
6. зависит от силы
7. создает электрическое поле
8. элементарная частица
9. можно определить
10. отношение

Task 5. Find the wrong statements and correct them.

1. The properties of the electrons do not change with time.
2. All electrons are identical and have permanent mass and velocity.
3. The electron mass is defined as the ratio of the applied force to the rate of change in the electron velocity.
4. The amount of charge is identical for all electrons.
5. The sign of the charge of the electron is positive.
6. The current affects a magnetic field.
7. An electric field applies a force to the first charge.

Task 6. Translate into English:

1. Электрон — маленькая, неделимая, основная частица.
2. Свойства электрона не изменяются со временем.
3. Существенные характеристики электрона — масса, заряд.
4. Масса определяется как отношение силы к ускорению.
5. Знак заряда электрона отрицательный.
6. Заряд и масса — два

неотделимых аспекта единого целого. 7. Движение электрона зависит от силы, действующей на него.

Task 7. Make an annotation to the text.

Text 4 B DISCOVERY AN ELECTRON

Task 1. Memorize the pronunciation of the following words:

particle accelerator - ускоритель частиц

profound effect on... - огромное влияние на...;

to pave the way - проложить дорогу;

Task 2. Read and translate the text

In the closing years of the 19th century a professor of physics in Cambridge discovered the electron. That was J.J. Thomson. First he was a student and then a lecturer in mathematics at one of the Cambridge colleges. Thomson was a remarkable man. He saw further than his colleagues but even he couldn't imagine the profound effect of his discovery on the lives of the people in the 20th century.

Thomson's discovery paved the way for many exciting new discoveries, for example, the discovery of the atomic nucleus and the proton by Ernest ['3:nist] Rutherford, the discovery of the neutron, and the invention of the particle accelerator by Rutherford's pupils.

These discoveries inspired the great physicists who were then formulating their revolutionary theories — Planck's quantum theory, Einstein's theory of relativity, Bohr's [bo:] model of the atom and others. Scientists are moving forward towards a better understanding of its laws. Electrons do wonderful things in calculating machines, which besides working hundreds of times faster than any human calculator, can hear, see, feel, and touch. It is hard to imagine how we could calculate without using electronic calculating machines.

More and more often we hear of scientists' using these machines in new fields. With the help of electronic calculating machines scientists succeeded in reading the language of an ancient people of Mexico.

Task 3. Fill in the blanks, using the words from the box:

Exciting, discovered, calculate, remarkable, things

1. Joseph John Thomson ... the electron.
2. Thomson's discovery paved the way for many ... new discoveries.
3. These discoveries inspired the great physicists.
4. It is hard to imagine how we could ... without using electronic calculating machines.
5. Electrons do wonderful ... in calculating machines.
6. Thomson was a ... man.

Task 4. Answer the questions:

1. Who discovered the electron?
2. What was J.J. Thomson?
3. What is Thomson's characteristic feature?
4. What was the result of Thomson's discovery?
5. Who discovered the neutron?
6. Whom did these discoveries inspire?
7. Who formulated quantum theory?
8. Who formulated theory of relativity?
9. Who discovered the model of the atom?

Task 5. Give the English equivalents:

1. преподаватель математики;
2. выдающийся человек;
3. вдохновлять;
4. теория относительности;
5. вычислительная машина;
6. древний народ;
7. атомное ядро

Task 6. Translate into English

1. Электрон был открыт Томсоном. 2. Его открытие Томсона смогло проложить дорогу многим открытиям. 3. Позднее были сформулированы квантовая теория Планка и теория относительности Эйнштейна. 4. Трудно представить себе нашу жизнь без использования электронных вычислительных машин. 5. Томсон не мог представить себе, какой глубокий эффект окажет открытие электрона. 6. Ученые добились успеха в изучении языка индейцев Мексики.

Task 7. Give a brief summary of the above text.

Текст 4 C. ELECTRON EMISSION

Task 1. Memorize the pronunciation of the following words:

barrier - препятствие;

| | |
|-------------------------------------|-----------------------------------|
| current carriers - носитель | thermionic - термоэлектронный; |
| электрического тока; | to attain - достигать; |
| electron tube - электронная лампа; | to escape — выходить, вырываться |
| field emission - электростатическая | to impart - передавать, давать; |
| эмиссия; холодная эмиссия; | to impart - передавать, наделять; |
| light beam - световой луч; | to knock out - выбивать |
| photoelectric emission - | to overcome — преодолеть |
| фотоэлектронная эмиссия; | unbound - свободный, несвязанный; |
| sufficient — достаточный; | voltage - напряжение |

Task 2. Skim the text to understand what it is about.

The electron tube depends for its action on a stream of electrons that act as current carriers. To produce this stream of electrons, a special metal electrode (cathode) is present in every tube. But at ordinary room temperatures the free electrons in the cathode cannot leave its surface because of certain restraining forces that act as a barrier.

To escape from the surface of the material, the electrons must perform a certain amount of work to overcome the restraining surface forces. To do this work, the electrons must have sufficient energy imparted to them from some external source of energy. There are four principal methods of obtaining electron emission from the surface of the material: thermionic emission, photoelectric emission, field emission, and secondary emission.

Thermionic emission. In this method, the metal is heated to sufficient temperature (about 2500°C) to enable the free electrons to leave the metal surface. The number of electrons emitted depends upon the temperature. The higher the temperature, the greater is the emission of electrons. This type of emission is employed in vacuum tubes.

Photo-electric emission. In this method, the energy of light falling upon the metal surface is transferred to the free electrons within the metal to enable them to leave the surface. The greater the intensity (i.e. brightness) of light beam falling on the metal surface, the greater is the photo-electric emission.

Field emission. In this method, a strong electric field (i.e. a high positive voltage) is applied at the metal surface which pulls the free electrons out of metal because of the attraction of positive field. The stronger the electric field, the greater is the electron emission.

Secondary emission. In this method, a high velocity beam of electrons strikes the metal surface and causes the free electrons of the metal to be knocked out from the surface.

Task 3. Give the English equivalents:

1. поток электронов
2. носитель тока
3. удерживающие силы
4. действует как барьер
5. внешний источник энергии
6. свободные электроны
7. энергия света
8. покинуть поверхность
9. сталкиваются со свободными электронами
10. выбивать с поверхности

Task 4. Fill in the blanks, using the words from the box.

Emitted, amount of, leave, surface, is applied, the greater

1. At ordinary room temperatures the free electrons in the cathode cannot ... its surface.
2. The electrons must perform a certain ... work to overcome the restraining surface forces.
3. There are four principal methods of obtaining electron emission from the surface of the material.
4. The number of electrons ... depends upon the temperature.
5. A strong electric field ... at the metal surface.
6. The stronger the electric field, ... is the electron emission.
7. The free electrons of the metal are knocked out from the .

Task 5. State the questions to the underlined words:

1. The first optical device appeared first in Florence about 1280.
2. Galileo Galilei announced the telescopic observations of the moon and planets.
3. Galileo quickly improved his telescope.
4. Sir Isaac Newton discovered some of the fundamental laws of mechanics.

Task 6. Give a brief summary of the above text.

GRAMMAR REVIEW

1. *Определите функцию it и переведите их.*

1. A material which allows electricity to flow through it is called a conductor. 2. It took five years to develop the machine. 3. The computer doesn't really remember, information is stored in it. 4. It is necessary to protect the human eye when laser beams are being used. 5. In Russia it was Lodygin who invented the electric lamp. 6. It is hard to overestimate the role of radio-electronics in technical progress. 7. Electronics is a young science. It belongs to the twentieth century. 8. I find it necessary to continue the experiment. 9. Electronics makes it possible to raise industrial automation to a higher level. 10. At present mathematics is the language of science and it becomes the stimulator of discoveries. 11. It is the computer that makes a machine a robot.

2. Переведите *it* в различных функциях на русский язык:

1. It is autumn. 2. It is the 3-rd of October. 3. it is dark in the morning and it is difficult to get up. 4. It is a new subject. It is very important for our future speciality. 5. We shall study it for two years. 6. It is known that the knowledge of general engineering subjects is the basis for the study of special subjects. 7. It is said that the chemistry laboratory of our institute is good. 8. It is important to understand the fundamentals of this science. 9. It is the knowledge of general engineering subjects that is the basis of engineering training. 10 The students find it difficult to translate such a text without a dictionary. 11. It seems that he works a lot. 12. It was not easy to study at the institute. 13. Mathematics is studied at all technological institutes because every engineer must know it well. 14. It is evident that research is becoming more specialized now. 15. The use of the new equipment made it possible to minimize the number of workers.

3. Переведите *one* в различных функциях на русский язык:

1. One must study a lot to become an engineer. 2. We must write only one exercise now. 3. Engineering is one of the most important professions, it is the one that is taught at technical institutes. 4. One must pass all the entrance exams well to enter the institute. 5. Last summer I read many English technical articles and my friend read some German ones. 6. This summer we shall spend in the country, the last one we spent in the city. 7. We translated many texts, but there is one more text to

translate. 8. The main purpose of education is that graduates must be able to work with the technology of tomorrow. 9. The new technologies that are being developed must be connected with the traditional ones. 10. One can take this magazine from the library. 11. We discussed the first industrial revolution, the one that took place some centuries ago. 12. The problem of pollution has become the most important one. 13. One must have a very good knowledge of general engineering subjects to become a good engineer.

4. Переведите *that* в различных функциях на русский язык:

1. That student studies in our group. 2. The professor that lectures on mechanics is the dean of our faculty. 3. The aim of today's policy is that peace in the world must be permanent. 4. The program for the first-year students differs from that of the third-year students. 5. There are many interesting articles in this journal, read those on your speciality. 6. It is the high qualification of future specialists that will determine the scientific and technological progress of any country. 7. New robots will have several manipulators that will carry out many functions. 8. It is the growth of industrialization that is changing the climate of the planet. 9. The simplest materials are those which have only one kind of atoms. 10. That the Earth is round was unknown for a long time. 11. It is found that the labour of a man with secondary education is 108 per cent more efficient than that of a man without that education. 12. Moreover, the work of a university or college graduate is 300 per cent more efficient than that of a specialist with secondary education. 13. That computers and industrial robots are important for industrial uses is well known to scientists and engineers.

5. Перевести следующие предложения на русский язык.

1. In Great Britain one can get higher education at colleges and universities. 2. Oxford, famous for its oldest university in Britain, is now one of the most important centres of the motor-car industry. 3. The speaker touched upon only one important problem - the state of higher education in Great Britain. 4. The training of mining engineers and geologists includes a comprehensive study of general subjects as well as special ones. 5. The calorific value of coal is 2-4 times greater than that of

wood. 6. The equipment that the postgraduates have used for carrying out their experiments is of the latest design. 7. It was clear that computers could perform the work that man could not. 8. The geological conditions of Wales differ from those of Scotland. 9. It is a new subject. It is very important for our future speciality. We shall study it for two years. 10. It is known that the knowledge of general engineering subjects is basis for the study of special subjects.

6. Поставьте специальные вопросы к предложениям с глаголом-сказуемым в форме 3-го лица ед. числа Present Indefinite / Simple:

1. Our chief goes abroad twice a month (where, why).
2. Success often comes when you're not looking for it (when, why).
3. A good friend corrects you when you make a mistake (when, how, why).
4. The naked truth looks better than a well-dressed lie (why, how, when).
5. My cousin likes to go sailing in the Ionian Sea (where, when, why, what).
6. My aunt goes to the church by bicycle every Sunday (where, when, why).
7. An orchestra needs a conductor at every performance (where, when, why, whom).
8. A male ostrich usually protects a nest of eggs at nighttime (when, what, why, how).
9. Our colleague spends most of his work time online (where, how, why).
10. Our secretary eats only nuts and apples to lose weight (what, why).

7. Поставьте специальные вопросы к предложениям с глаголом-сказуемым в форме Past Indefinite / Simple.

1. Dinosaurs lived on the Earth between 230 and 65 million years ago (where, when, who).
2. My cousin decided to study a social science at the university (who, where, what, why).
3. We washed our car at the nearest self-service car wash (who, where, what, why).
4. Our managers received many words of thanks from the customers last week (who, what, when, why).
5. We all appreciated the meal at a restaurant last night (who, where, when, what).

9. Поставьте общие и специальные вопросы к данным предложениям с глаголом-сказуемым в форме Present и Past Continuous Passive:

1. A current conflict is being discussed in the public media now.
2. A new treatment for migraine is being offered at Cromwell Hospital.
3. Employees are being provided with free training at some companies.
4. The works of Confucius are being

translated into all European languages. 5. Some stone monuments are being damaged by dirt and air pollution. 6. My former email address was being used to send spam letters. 7. A tropical storm was approaching Santiago, and hotel guests were being kept informed. 8. The Mayan Indians were possibly being visited by some supreme beings who shared their knowledge with them.

10. Заполните пропуски глаголами в форме страдательного залога группы

Indefinite и Continuous:

1. Our online orders ... usually ... on the next day (to deliver). 2. Our online order ... now (to deliver). 3. All serious matters ... usually ... by us after a lunch break (to discuss). 4. A serious matter ... by us now (to discuss). 5. I ... often ... by my colleagues (to praise). 6. I ... by my colleagues for my work all the time this week (to praise). 7. Business letters ... usually ... by my colleague without using a dictionary (to translate). 8. A business letter ... by my colleague without using a dictionary now (to translate). 9. I ... usually ... by my first name (to call).

12. Определите функцию *it, that (those), one (ones)* и переведите их.

1. It is necessary for all the students to know the fundamental laws of mechanics. 2. The term “engineering” is used in many specialties, it has many meanings. 3. We do not know much about it. 4. It was in the 19th century, that there appeared electrical engineering. 5. Energy that is produced by atomic station is used for various needs of national economy. 6. Do you know that man? He is a famous professor that delivers lectures on mechanics. 7. It is well known that personal experience depends on practical work. 8. The development of mechanical engineering began earlier than that of electrical one. 9. The materials that are used for refrigeration devices differ from those that are used for radio equipment. 10. I have only one English book. 11. He gave me a number of English books and some German ones. 12. One can see the Admiralty building on the left bank of the Neva. 13. The green car is mine and the black one is hers. 14. There was one more problem to solve - the problem of acceleration.

UNIT 5

Текст 5 A. What are Electromagnetic Waves?

Текст 5 B. Different types of waves

Текст 5 C The Discovery of X-Rays

Grammar:

Времена группы Perfect (Active and Passive).

Функции глагола to have

Текст 5 A. WHAT ARE ELECTROMAGNETIC WAVES?

Task 1. Memorize the pronunciation of the following words:

| | |
|---------------------------------|--------------------------------|
| accelerated wave — ускоренная | simultaneous - одновременный; |
| волна | transverse waves - поперечные |
| earthquake waves - сейсмические | волны; |
| волны; | ultimately - в конце концов, в |
| frequency - частота; | конечном счёте; |
| inversely related to - обратно | wavelength - длина волны |
| пропорциональный | |

Task 2. Read the text and do the exercises that follow it.

A wave is a vibration that travels through space. Many natural phenomena exhibit wavelike behavior. Mechanical waves such as water waves, earthquake waves and sound waves require a medium or substance to propagate.

As the name “electromagnetic” suggests, an electromagnetic wave is formed when an electric field combines with a magnetic field. Electromagnetic waves are transverse waves created by changing electric and magnetic fields that oscillate perpendicular to each other and to the direction of the wave propagation.

The phenomena associated with electricity and magnetism was studied over most of the nineteenth century. But, the knowledge that the two fields were interdependent began with the fantastic discovery by Hans Christian Ørsted ['ɔ:rstɛd] (Øрстед) in the early 1820's.

He learned that magnetism is ultimately caused by moving electric charges or current, when he observed a magnetic compass needle to react to a current flowing through a wire placed near it.

Later on, the simultaneous, but separate discoveries made by Michael Faraday and Joseph Henry concerning electromagnetic induction in the 1830's led to the theory of James Clerk Maxwell, which united electricity, magnetism, and optics into one grand theory of light: the explanation of electromagnetic waves.

The Relation between Wavelength and Frequency

All periodic waves, whether they are electromagnetic or mechanical, are characterized by such properties as wavelength, frequency, and speed.

For electromagnetic waves, wavelength measures the distance between the successive pulses of electric or magnetic fields.

A waves' frequency represents how many wave pulses pass by a given point each second and is measured in cycles per second or waves per second and is measured in cycles per second or waves per second.

One wave per second is called one Hertz. Electromagnetic waves travel at the speed of light in vacuum, but they travel more slowly when they pass through various media such as air, glass, and water.

A relationship among frequency, wavelength, and speed exists for electromagnetic waves; the product of frequency and wavelength equals the speed of light. Thus, wavelength and frequency are inversely related. The longer the frequency, lower is the wavelength, and vice versa.

<https://sciencestruck.com/electromagnetic-waves-origin-theory>

Task 3. Answer the questions:

1. What is a wave?
2. When is an electromagnetic wave formed?
3. When was the phenomena associated with electricity and magnetism studied?
4. What is magnetism caused by?
5. What are all periodic waves are characterized by?
6. What does wavelength measure?
7. What speed do electromagnetic waves travel at?

Task 4. Give the English equivalents:

1 - природное явление; 2 - требовать; 3 – магнитное поле; 4- распространение волн; 5- измерять; 6 - последовательные импульсы; 7 - произведение частоты и длины волны

Task 5. Give the Russian equivalents:

1- wavelike behavior; 2- to combine with; 3- wave propagation; 4- associated with electricity; 5 - to be caused by; 6 - compass needle; 7- successive pulses; 8 - at the speed of light; 9- wavelength; 10 - vice versa.

Task 6. State the questions to the underlined words:

1. Mechanical waves require a medium or substance to propagate. 2. Many examples illustrated the rule. 3. He was reading a book when I came. 4. The meeting took place that day. 5. She has already visited the exhibition.

Task 7. Make an annotation to the text.

Text 5 B DIFFERENT TYPES OF WAVES

1. Make sure if you can read the words correctly:

Microwaves ['maɪkrə(u)weɪv]

Infrared [ɪnfrə red]

Ultraviolet [ʌltrə'veɪələt]

Microscope ['maɪkrəskoʊp]

Task 2. Memorize the pronunciation of the following words:

assign - определять, устанавливать;

giant - громадный, гигантский;

break apart — разбить на

pulsars — пульсар;

составляющие, разъединить;

sidewalk - тротуар, пешеходная

bumblebees — шмели;

дорожка;

cancer - рак;

supernova explosion — взрыв

celestial - небесный;

сверхновой звезды;

cone - колбочка (сетчатки глаза);

transparent - прозрачный,

decay — распад;

проницаемый;

explosions - взрыв;

water vapor — водяной пар;

food irradiation — облучение

wavelength — длина волны

пищевых продуктов;

Task 3. Skim the text to understand what it is about.

1. Radio Waves -longest wavelength. AM/FM, TV.

2. Microwaves - 2nd longest wavelength. Radar, Microwaves.
3. Infrared Waves - 3rd longest wavelength. Infrared photography, night vision.
4. Visible Light -4th longest wavelength. Microscope, astronomy.
5. Ultraviolet Light -5th longest wavelength. Sterilization.
6. X Rays -6th longest wavelength. Medical exam of teeth and bones.
7. Gamma Rays -Shortest wavelength. Used in cancer treatment and food irradiation.

Radio Waves

Radio waves have the longest wavelengths in the electromagnetic spectrum. These waves can be longer than a football field or as short as a football. Radio waves do more than just bring music to your radio. They also carry signals for your television and cellular phones.

Objects in space, such as planets and comets, giant clouds of gas and dust, and stars and galaxies, emit light at many different wavelengths. Some of the light they emit has very large wavelengths - sometimes as long as a mile! These long waves are in the radio region of the electromagnetic spectrum.

Infrared Light

Infrared light lies between the visible and microwave portions of the electromagnetic spectrum.

Far infrared waves are thermal. In other words, we experience this type of infrared radiation every day in the form of heat! The heat that we feel from sunlight, a fire, a radiator or a warm sidewalk is infrared.

Shorter, near infrared waves are not hot at all - in fact you cannot even feel them. These shorter wavelengths are the ones used by your TV's remote control.

To make infrared pictures we can use special cameras and film that detect differences in temperature, and then assign different brightnesses or false colors to them. This provides a picture that our eyes can interpret.

Visible Light Waves

Visible light waves are the only electromagnetic waves we can see. We see these waves as the colors of the rainbow. Each color has a different wavelength.

Red has the longest wavelength and violet has the shortest wavelength. When all the waves are seen together, they make white light.

When white light shines through a prism, the white light is broken apart into the colors of the visible light spectrum. Water vapor in the atmosphere can also break apart wavelengths creating a rainbow.

Cones in our eyes are receivers for these tiny visible light waves. The Sun is a natural source for visible light waves and our eyes see the reflection of this sunlight off the objects around us. The color of an object that we see is the color of light reflected. All other colors are absorbed.

Ultraviolet Waves

Ultraviolet (UV) light has shorter wavelengths than visible light. Though these waves are invisible to the human eye, some insects, like bumblebees, can see them!

Scientists have divided the ultraviolet part of the spectrum into three regions: the near ultraviolet, the far ultraviolet, and the extreme ultraviolet. The three regions are distinguished by how energetic the ultraviolet radiation is, and by the "wavelength" of the ultraviolet light, which is related to energy.

Our Sun emits light at all the different wavelengths in electromagnetic spectrum, but it is ultraviolet waves that are responsible for causing our sunburns.

Though some ultraviolet waves from the Sun penetrate Earth's atmosphere, most of them are blocked from entering by various gases like Ozone. Some days, more ultraviolet waves get through our atmosphere. Scientists have developed a UV index* to help people protect themselves from these harmful ultraviolet waves.

*Notes:** ультрафиолетовый индекс (УФ или UV-индекс) - специальный параметр, сигнализирующий об уровне солнечной радиации на поверхности Земли.

X-Rays

When you get an X-ray taken at a hospital, X-ray sensitive film is put on one side of your body, and X-rays are shot through you.

Because your bones and teeth are dense and absorb more X -rays than your skin does, silhouettes of your bones or teeth are left on the X-ray film while your skin appears transparent.

Many things in space emit X-rays, among them are black holes, neutron stars, binary star systems, stars, the Sun, and even some comets!

Gamma Rays

Gamma rays have the smallest wavelengths and the most energy of any other wave in the electromagnetic spectrum. These waves are generated by radioactive atoms and in nuclear explosions. Gamma-rays can kill living cells, a fact which medicine uses to its advantage, using gamma-rays to kill cancerous cells.

Gamma-rays are the most energetic form of light and are produced by the hottest regions of the universe. They are also produced by such violent events as supernova explosions or the destruction of atoms, and by less dramatic events, such as the decay of radioactive material in space. Things like supernova explosions (the way massive stars die), neutron stars and pulsars, and black holes are all sources of celestial gamma-rays.

Speed of Electromagnetic Waves

All electromagnetic waves move at the speed of light

Remember...

Speed= wavelength x frequency

Only the wavelength and frequency change

This change decides which type of electromagnetic wave it is (radio, gamma, etc.)

We use 3×10^8 m/s which equates to 300 million meters per second!

<http://studylib.net/doc/9529829/electromagnetic-waves>

Task 4. Put 7 questions to the text.

Task 5. Make a plan for the text

Task 6. Make an annotation to the text.

Текст 5 С THE DISCOVERY OF X-RAYS

Task 1. Memorize the following words and word- combinations:

cardboard - картон;

chemicals - химические вещества,
химики;

due to - благодаря, из-за;

flesh - тело;

glow - свечение, свет;

laboratory bench - рабочий стол в
лаборатории

light-proof - светонепроницаемый;

to be puzzled - быть озадаченным;

to cast shadows - отбрасывать тени;

to emerge - появляться, возникать;

to penetrate - проникать, проходить;

to the benefit of - на пользу;

valuable – ценный, важный

Task 2. Read the text and make a short outline

At the end of 1895 there was no radio, the cinema was only one year old, the first motor-cars had just appeared and the population thought they were horseless monsters.

At that very time there appeared an announcement that a German professor, Wilhelm Konrad Roentgen had discovered a new kind of rays. The rays were invisible, they could pass through skin and flesh, through clothes, but the cast shadows of the bones could be seen on a photographic plate.

Doctor Wilhelm Konrad Roentgen came to his discovery working with cathode ray tubes of Joseph Thompson Crookes who was very much interested in the composition and possibilities of cathode rays, discovered by him.

Scientists thought these rays were valuable only for scientific research. But Crookes's cathode ray tubes played a very important role in Roentgen's discovery of his all penetrating rays.

On this particular day Roengen was working in his darkened laboratory. Interested in the fact that Crookes's cathode rays caused certain chemicals to glow in the dark when they were brought close to the window through which the rays were emerging, Roentgen decided to find the reason for it.

Cathode rays could not penetrate the thin black cardboard in which Roentgen enclosed his Crookes tube. But when he switched on the current to his tube to make sure that his black box was light-proof, the scientist was puzzled again when he noticed a strange glow at the far corner of his laboratory bench. He switched on the current again and again and every time he saw a glow. At last he was sure that the

glow had come from a small fluorescent screen which was lying there. What mysterious unknown rays caused this fluorescent effect?

Roentgen found that this effect was not due to the cathode rays; these unknown rays were able to penetrate the air much more strongly than the cathode rays came through his lightproof cardboard box, all sorts of opaque materials which he placed between the source of the new discovered rays and the fluorescent screen. These X - rays as he called them, passed through wood, thin sheets of aluminum, the flesh of his own hand and some other materials.

One more detail attracted the scientist's attention: X- rays were completely stopped by the bones of his hand. When he had tested their effect on photographic plates he saw that they were darkened on exposure to the X-rays.

Roentgen's discovery contributed much to the benefit of science. The first science to realize its importance was medicine. But medicine is only one field of their wide application. X-ray examination has found application in various kinds of industrial processes.

Task 3. Answer the questions.

1. When did Roentgen live?
2. Was he studying the properties of cathode rays when he came to his discovery of X- rays?
3. Did Crookes's invention follow Roentgen's discovery or did Roentgen's discovery follow Crookes's invention?
4. What could X-rays penetrate?
5. Is medicine the only field of X-rays application?

Task 4. Agree or disagree with the following statements.

1. Roentgen was able to explain the nature of the new rays when he first noticed them.
2. All scientists had heard much about the all-penetrating rays before Roentgen discovered them.
3. People realized the advantages of the newly discovered rays shortly after their discovery.
3. X-Rays examination finds application in various kinds of industrial process.

4. There were a lot of materials in Roentgen's lab, which could stop the unknown rays.

Task 5. Fill in the blanks, using the words from the box:

*Kind, photographic, cathode ray, invisible, closing, to glow, computer, trigger,
software*

1. In the ... month of 1895 the world was such as this. 2. Wilhelm Konrad Roentgen discovered a new .of rays which were 3. These rays could pass through skin and ... through clothes but the cast shadows of the bones could be seen on a .plate. 4. Roentgen came to his discovery working with ... tubes of Joseph Thompson Crookes. 5. Crookes's cathode rays caused certain chemicals to ... in the dark.

Task 6. Make up a summary of the text (5-7 sentences).

GRAMMAR REVIEW

1. Объясните употребление времен группы Perfect, переведите.

1. This is a very good book, I have just read it with pleasure. 2. He has been absent this week. He has been ill. 3. I haven't seen you for a long time. Where have you been all this time? 4. We haven't heard about her since 1989. 5. By the beginning of the lecture the laboratory assistant had brought all the necessary diagrams. 6. Before we came to the next lecture we had studied the material of the first one. 7. Have you already finished your diploma work? No, I shall have finished it by the end of June.

8. They will not have passed their exams by the time you return. 9. Many students have been enroled into universities this year. 10. The translation has not been finished yet. It will have been finished by the end of the month. 11. Have you brought these journals with you? No, these journals had been brought by my sister before I returned from St.Petersburg. Don't you know that?

2. A. Выберите правильную форму сказуемого.

1. He (has graduated, graduated) from the institute this year. He (graduated, will have graduated) from the institute in 6 years. 2. She (saw, has seen) us in the morning yesterday. She (saw, has seen) us this morning. 3. I (have met, met) him last year. I never (had met, have met) him before. 4. Our group (will do, will have

done) a lab work tomorrow. 5. This problem (is discussed, has been discussed) much in the press lately. This problem (was discussed, had been discussed) yesterday.

В. Переделайте предложения из действительного в страдательный залог.

1. The students have done their homework very well. 2. Bob has left his notebook at home. 3. I have told you about a lecture. 4. The laboratory assistant had prepared the experiment by 2 o'clock. 5. She had finished her test when we came. 6. The teacher will have corrected our dictation by the end of the week. 7. They have not made any mistakes.

3. Определите функции глагола *to have*, переведите.

1. Electricity has many useful properties: it is clean and generates no by as well as in our houses. 3. The latest laser devices have found application in medicine. 4. Electricity has provided mankind with the most efficient source of energy. 5. No other source of energy has been so widely used as electricity. 6. We have many various electric devices in our houses. 7. Our lives have been completely transformed with the appearance of electricity. 8. The generator replaced batteries that had been used before. 9. The consumption of electricity has doubled every ten years.

4. Раскройте скобки, употребляя глаголы в требующейся форме, так чтобы получить Present Continuous или Present Perfect.

1. What are you (to talk) about? 2. We have just (to talk) about it. 3. He has just (to say) something about it. 4. She is (to tell) them some interesting story. 5. He has (to tell) us nothing about it, 6. She has (to tell) them some stories about dogs. 7. We have (to have) two lessons today. 8. They are (to have) a meeting. 9. She has not (to speak) yet. 10. They have (to ask) me several questions. 11. He has already (to learn) the rule. 12. I am (to write) an exercise. 13. What is he (to do)? -- He is (to read) a newspaper. 14. Have you (to | read) any stories by Jack London? 15. What are you (to do) here? -- I am (to write) a letter to my friends.

5. Раскройте скобки, употребляя глаголы в Present Perfect или Past Simple.

1. We (to travel) around Europe last year. 2. My father knows so much because he (to travel) a lot. 3. I (to see) Pete today, 4. She (to see) this film last Sunday. 5. Alex (to meet) his friend two hours ago. 6. I just (to meet) our teacher. 7. The children already (to decide) what to do with the books. 8. Yesterday they (to decide) to help their grandmother. 9. Helen speaks French so well because she (to live) in France. 10. She (to live) there last year. 11. The rain (to stop) and the sun is shining in the sky again. 12. The rain (to stop) half an hour ago. 13. Mary (to buy) a new hat. 14. I (to buy) a pair of gloves yesterday. 15. The wind (to blow) off the man's hat, and he cannot catch it. 16. The weather (to change), and we can go for a walk. 17. The wind (to change) in the morning.

6. Раскройте скобки, употребив нужную форму глагола

I. You (see) this film? 2. He (be) at the cinema with you? 3. You (taste) the cake? 4. The pupils (not, do) their exercises yet. 5. I (not, meet) my school friend for many years. 6. She told me everything about him after he (leave). 7. When we arrived, the concert already (begin). 8. I asked him what countries he (visit). 9. I hope you (come) home from school by 2 o'clock. 10. I (finish) everything by the time you get back tomorrow. 11. If we don't hurry the sun (set) before we reach the top.

7. Раскройте скобки, употребляя глаголы в Present Perfect, Present Continuous, Present Simple или Past Simple.

1. Please give me a pencil, I (to lose) mine. 2. I (not to meet) Peter since Monday. 3. Nina just (to finish) work. 4. Where Sergei (to be)? -- He (to go) home. He (to leave) the room a minute ago. 5. What you (to read) now? -- I (to read) "Jane Eyre" by Charlotte Bronte. 6. They (to read) "Ivanhoe" by Walter Scott a month ago. What about you? You (to read) "Ivanhoe"? 7. My watch (to stop). There (to be) something wrong with it. 8. You (to see) Jack today? -- Yes, I (to see) him at the institute. 9. You (to hear) the new symphony by M.? -- Yes, I.... -- When you (to hear) it? -- I (to hear) it last Sunday. 10. You (to change) so much. Anything (to happen)? 11. What you (to do) here at such a late hour? You (to write) your composition? -- No, I (to write) it already. I (to work) at my report. -- And when you (to write) your composition? -- I (to finish) it two days ago. 12. I say, Tom, let's have dinner. -- No,

thank you, I already (to have) dinner. 13. What the weather (to be) like? It still (to rain)? -- No, it (to stop) raining.

8. Передайте следующие предложения в Passive Voice.

1. The children have scattered about a lot of things. 2. The girl has put all the books into the bookcase. 3. Snow will cover the fields in winter. 4. They will hand in the homework tomorrow. 5. I don't think we shall finish all the preparations today. 6. She always invites me to her dinner parties. 7. She showed me the dress which her daughter had made. 8. They did not invite her to the party. 9. I did not leave the window open. 10. They did not turn off the light. 11. I have invited some friends to tea. 12. She has given me an English book. 13. Have you written the letter yet? 14. They have told us a lot of interesting things. 15. The students have written the paper without mistakes. 16. We discussed the matter some days ago. 17. Someone wants you on the phone. 18. She found my book on the windowsill. 19. They have built excellent shelters for tourists in these mountains. 20. Have you given out the exercises to all the students? 21. The boy was angry because his mother did not allow him to go to the stadium. 22. Why have you put my books on this table?

9. Передайте следующие предложения в Active Voice. Введите любые подходящие подлежащие.

1. Invitations have been sent to all the old pupils to be present at the school's thirtieth anniversary. 2. All the passengers in the bus were listening to the story of the boy who had been saved from drowning by the quickness of the driver. 3. The work was finished in time. 4. The child is taken care of. 5. This book must be read by every student. 6. This film can be seen at our cinema. 7. Spartan children were taught by their parents to endure all hardships. 8. Which article was translated by your brother? 9. They were being taught drawing at that lesson. 10. This name was seldom mentioned in his novels. 11. I am often told about it. 12. This man has never been spoken of. 13. When was it done? 14. What museums were visited last year?

10. Перевести предложения, обращая внимание на функцию глагола to have

1. They have already passed the examination in electrical engineering. 2. Automated systems have a number of advantages. 3. Our district has now been

transformed into a big construction site. 4. Gamma rays have no electric charge. 5. Cosmic television has a great future. 6. He had to work hard to complete his investigation in time. 7. The engineer will have to improve the accuracy of this machine-tool. 8. A new method has been used in order to investigate this problem. 9. I have to do this work now. 10. We had to repeat the experiment. 11. Our planet has powerful sources of energy. 12. You will have to go to the library to get this book. 13. I had to leave early because I didn't feel well. 14. We've got a new teacher. 15. She has a lot of character and energy. 16. Yesterday I had a bad headache. 17. She will have many new subjects next term. 18. The scientist had to stop the experiment. 19. Besides literature, we have to study history and philosophy. 20. The electron has almost the same mass as the proton.

11. Укажите, в каких функциях употреблен глагол *to have* в следующих предложениях. Переведите предложения.

1. You will have to deliver the goods in five days. 2. They have just signed all the documents. 3. Many people have a current account in the bank. 4. The banking industry has changed radically over the last 10 years. 5. Britain has a largely free-market economy. 6. Our exports have increased. The increase will give us an opportunity to repay the credit. 7. The country has always imported these goods. 8. He often has to write letters to foreign companies. 9. They have already discussed the time of delivery of goods. 10. The firm has extended its resources through the use of credit. 11. They had to agree to this plan. 12. The owner has invested some of his money into new businesses. 13. The firm has no securities. 14. New credits have increased the income of the purchaser.

UNIT VI

Text 6 A. The first calculating devices

Text 6 B. What is a computer?

Text 6 C. Charles Babbage

Grammar Review:

Revision of units 1-5

Text 6 A. THE FIRST CALCULATING DEVICES

Task 1. Memorize the following words and word-combinations:

| | |
|--|---|
| abacus - счеты; | punched card - перфокарта; |
| altogether - всецело, совсем; | slide rule - логарифмическая линейка; |
| calculating device - вычислительное устройство; | to cut out - вытеснить, исключить; |
| calculus - исчисление; | to manipulate - обрабатывать, преобразовывать; |
| data processing - обработка информации; | to perform - выполнять; |
| general-purpose - общего назначения, универсальный; | to punch the holes - пробивать отверстия; |
| keyboard terminals — терминал (вывод) с клавиатурой; | to tabulate the census - занести данные по переписи (населения) в таблицу; means of coding - средства кодирования (шифровки); |
| logarithm table - логарифмическая таблица; | unit of data - единица информации |
| merge - слияние; | |
| proliferation - распространение. | |

Task 2. Read the text and do the exercises that follow it.

The very first calculating device used was the ten fingers of a man's hands. Therefore today we still count in tens and multiples of tens.

Then the abacus was invented. People went on using some form of abacus well into the 16th century, and it is still being used in some parts of the world because it can be understood without knowing how to read.

During the 17th and 18th centuries many people tried to find easy ways of calculating. J. Napier, a Scotsman, invented a mechanical way of multiplying and dividing, which is now the modern slide rule works. Henry Briggs used Napier's ideas to produce logarithm tables which all mathematicians use today.

Calculus, another branch of mathematics, was independently invented by both Sir Isaac Newton, an Englishman, and Leibnitz, a German mathematician. The first real calculating machine appeared in 1820 as the result of several people's experiments.

In 1830 Charles Babbage, a gifted English mathematician, proposed to build a general-purpose problem-solving machine that he called "the analytical engine". This machine, which Babbage showed at the Paris Exhibition in 1855, was an attempt to cut out the human being altogether, except for providing the machine with the necessary facts about the problem to be solved. He never finished this work, but many of his ideas were the basis for building today's computers.

By the early part of the twentieth century electromechanical machines had been developed and were used for business data processing. Dr. Herman Hollerith, a young statistician from the US Census Bureau successfully tabulated the 1890 census. Hollerith invented a means of coding the data by punching holes into cards. He built one machine to punch the holes and others - to tabulate the collected data. Later Hollerith left the Census Bureau and established his own tabulating machine company.

Through a series of merges the company eventually became the IBM Corporation.

Until the middle of the twentieth century machines designed to manipulate punched card data were widely used for business data processing. These early electromechanical data processors were called unit record machines because each punched card contained a unit of data.

In the mid—1940s electronic computers were developed to perform calculations for military and scientific purposes. By the end of the 1960s commercial models of these computers were widely used for both scientific computation and

business data processing. Initially these computers accepted their input data from punched cards. By the late 1970s punched cards had been almost universally replaced by keyboard terminals. Since that time advances in science have led to the proliferation of computers throughout our society.

Task 3. Answer the following questions:

1. What was the very first calculating device? 2. What is the abacus? 3. What is the modern slide rule? 4. Who gave the ideas for producing logarithm tables? 5. How did Newton and Leibnitz contribute to the problem of calculation? 6. When did the first calculating machine appear? 7. What was the main idea of Ch. Babbage's machine? 8. How did electromechanical machines appear and what were they used for? 9. What means of coding the data did Hollerith invent? 10. What was the name of this electromechanical machine and why? 11. What kind of computers appeared later?

Task 4. Find the English equivalents to Russian words and word combinations:

Вычислительное устройство; легкий способ вычисления; поэтому (вот почему); кратное десяти; изобрести механический способ умножения и деления; логарифмическая линейка; составить таблицы логарифмов; математический анализ; изобрести независимо (друг от друга); в результате; полностью исключить человека; кроме (за исключением); обработка деловой информации; средство кодирования информации; перфокарты; пробивать отверстия; оформить собранные данные в таблицу; работать с данными на перфокарте; устройство, записывающее информацию блоками; единица информации; выполнять вычисления; для научных целей; клавишный терминал

Task 5. Form derivatives from verbs:

Example: to calculate - calculating, calculator, calculation.

To compute, to invent, to know, to multiply, to divide, to depend, to solve, to provide, to process, to code, to punch, to collect, to design, to store, to contribute, to use, to manipulate, to assemble, to connect, to consume, to rely, to divide, to multiply, to inform, to instruct, to discover, to operate.

Text 6 В WHAT IS A COMPUTER?

Task 1. Memorize the following words and word-combinations:

| | |
|---|---|
| addition - сложение; | tape drive - накопитель на магнитной ленте; |
| cathode-ray tube - электроннолучевая трубка; | to input / to feed in — вводить (информацию); |
| disk drive - дисковод; | to make decisions - принимать решения; |
| division - деление; | to manipulate - управлять, манипулировать; |
| electronic circuit - электронная цепь, схема; | to operate switches — приводить в действие переключатели; |
| exponentiation - возведение в степень; | to store - запоминать, сохранять; |
| input device - устройство ввода; | to supply - подавать, снабжать, обеспечивать; |
| instantaneously - мгновенно. | to turn off = to switch off - выключать; |
| intricate - сложный, запутанный; | to turn on = to switch on – включать. |
| multiplication - умножение; | |
| subtraction - вычитание; | |

Task 2. Read the text, get its central idea and note the important details

WHAT IS A COMPUTER?

A computer is a machine with an intricate network of electronic circuits that operate switches or magnetize tiny metal cores. The switches, like the cores, are capable of being in one or two possible states, that is, on or off; magnetized or demagnetized. The machine is capable of storing and manipulating numbers, letters, and characters (symbols).

The basic idea of a computer is that we can make the machine do what we want by inputting signals that turn certain switches on and turn others off, or magnetize or do not magnetize the cores.

The basic job of computers is to process the information. For this reason computers can be defined as devices which accept information in the form of instructions, called a program, and characters, called data, perform mathematical

and / or logical operations on the information, and then supply results of these operations. The program, or part of it, which tells the computers what to do and the data, which provide the information needed to solve the problem are kept inside the computer in a place called memory.

It is considered that computers have many remarkable powers. However most computers have three basic capabilities. First, computers have circuits for performing arithmetic operations, such as: addition, subtraction, division, multiplication and exponentiation.

Second, computers have a means of communicating with the user. After all, if we couldn't feed information in and get results back, these machines wouldn't be of much use. Some of the most common methods of inputting information are to use terminals, diskettes, disks and magnetic tapes. The computer's input device (a disk drive or tape drive) reads the information into the computer. For outputting information two common devices used are: a printer, printing the new information on paper, and a cathode-ray-tube display, which shows the results on a TV-like screen.

Third, computers have circuits which can make decisions. The kinds of decisions which computer circuits can make are not of the type: «Who would win the war between two countries?» or «Who is the richest person in the world?»

Unfortunately, the computer can only decide three things, namely: Is one number less than another? Are two numbers equal? Is one number greater than another?

A computer can solve a series of problems and make thousands of logical decisions without becoming tired. It can find the solution to a problem in a fraction of the time it takes a human being to do the job.

A computer can replace people in dull, routine tasks, but it works according to the instructions given to it. There are times when a computer seems to operate like a mechanical 'brain', but its achievements are limited by the minds of human beings. A computer cannot do anything unless a person tells it what to do and gives it the necessary information; but because electric pulses can move at the speed of light, a

computer can carry out great numbers of arithmetic-logical operations almost instantaneously.

Task 3. Answer the following questions:

1. What is a computer? 2. What are the two possible states of the switches? 3. What are the main functions of a computer? 4. In what way can we make the computer do what we want? 5. What is the basic task of a computer? 6. In what form does a computer accept information? 7. What is a program? 8. What are data? 9. What is memory? 10. What three basic capabilities have computers? 11. What are the ways of inputting information into the computer? 12. What is the function of an input device? 13. What devices are used for outputting information? 14. What decisions can the computer make? 15. What are the computer's achievements limited by?

Task 4. Find the English equivalents to Russian words and word combinations:

Сложная сеть электронных цепей; управлять (приводить в действие) переключателями; возможные состояния; хранить (запоминать) числа; обрабатывать символы; посредством ввода сигналов; включать; выключать; размагничивать сердечники; обработка информации; информация в виде команд; символы, называемые данными; выполнять математические операции; выдавать результаты; обеспечивать необходимую информацию; иметь замечательные возможности; основные свойства; сложение, вычитание, деление, умножение; возведение в степень; средства для общения с пользователем; устройство ввода; дисковод; считывать информацию; вывод информации; катодолучевая трубка; принимать решения; выполнять тысячи логических операций; без устали; находить решение задачи; нудная рутинная работа; в соответствии с введенной программой; вырабатывать свои суждения; возможности ограничены программой, заложенной в него человеком; дать требуемую информацию; со скоростью света; мгновенно производить огромное количество математических операций.

Task 5. Make couples or groups of synonyms from the list given below.

Example: A. to perform, to exercise, to carry out; B. a man, a person, a human being;

Verbs: to turn on, to provide, to type, to accept, to help, to learn, to observe, to call, to tell, to keep, to feed, to solve, to relate, to switch off, to communicate, to receive, to supply, to switch on, to assist, to print, to study, to input, to turn off, to decide, to store, to say, to name, to watch.

Nouns: work, machine, fundamentals, display, application, capabilities, job, storage, screen, state, basics, use, concept, specialist, journal, character, memory, idea, expert, magazine, position, symbol, command, data, solution, device, instruction, powers, information, decision.

Adjectives: basic, tiny, common, small, main, significant, routine, general, remarkable, uninterested, intricate, important, wonderful, complex, little.

Adverbs: rapidly, probably, instantaneously, in a moment, quickly, perhaps.

Task 6. Retell the text 6 B in 13-15 sentences

Text 6 C. Read the text without the dictionary CHARLES BABBAGE

CHARLES BABBAGE

The first suggestion that a machine for mathematical computation could be built was made more than a hundred years ago by the mathematician Charles Babbage. We now realize that he understood clearly all the fundamental principles of modern computers.

Babbage was born in Devonshire, England, 1792. He did not receive a good education, but he taught himself mathematics so well that when he went in Cambridge, he found that he knew more algebra than his tutor.

At that time mathematics in Cambridge was still under the influence of Newton and was quite unaffected by the contemporary developments on the continent. Charles Babbage was outstanding among his contemporaries because he insisted on practical application of science and mathematics. For example, he wrote widely on the economic advantages of mass productions and on the development of machine tools.

In 1812 he was sitting in his room looking at a table of logarithms which he knew to be full of mistakes, when an idea occurred to him of computing all tabular

functions by machinery. Babbage constructed a small working model which he demonstrated in 1822.

The Royal Society supported the project and Babbage was promised a subsidy.

In 1833 he began to think of building a machine which was in fact the first universal digital computer, as the expression is understood today.

Babbage devoted the rest of his life to an attempt to develop it. He had to finance all of the work himself and he was only able to finish part of the machine though he prepared thousands of detailed drawings from which it could be made.

Babbage wrote more than 80 books and papers, but he was misunderstood by his contemporaries and died a disappointed man in 1871.

He tried to solve by himself and with his own resources a series of problems which in the end required the united efforts of two generations of engineers.

After his death his son continued his work and built part of an arithmetic's unit, which printed out its results directly on paper.

Task 1. Translate the words from Russian into English

Математические вычисления, основные принципы, хорошее образование, практическое применение науки и математики, экономические преимущества производства, логарифм, подсчет функций при помощи машины, конструировать, рабочая модель, цифровой компьютер, арифметический центр, распечатать результаты, основные принципы современных компьютеров, математик, финансировать.

Task 2. Complete the sentences.

- 1) Babbage was born.... 2) Charles Babbage was outstanding because3)
- Babbage constructed 4) In 1833 he began ... 5) When he went to Cambridge
- 6) Babbage devoted 7) Babbage wrote8) He was misunderstood ... 9)
- Babbage was promised10) His son built11) Babbage did not receive ... 12)
- He understood clearly

Task 3. Translate the sentences.

1) Первый компьютер был разработан Чарльзом Беббиджем более 100 лет назад. 2) В 1822 г. Беббидж сконструировал небольшую рабочую модель. 3) Ч.Беббидж написал более 80-и книг. 4) В 1833 г. он начал разрабатывать первый универсальный цифровой компьютер. 5) После его смерти сын продолжил его работу.

Task 4. Retell the text in 10-12 sentences

GRAMMAR REVIEW

Упражнения на все изученные времена

1. Раскройте скобки, употребляя глаголы в одном из следующих времен: Present, Past, Future Simple; Present, Past Continuous; Present, Past Perfect.

1. We (to go) to school every day. 2. Nick (to do) his homework by seven o'clock yesterday. 3. You (to help) your father tomorrow? 4. We (to bring) a lot of berries from the wood. Now we shall make jam. 5. Look! Jane (to swim) across the river. 6. What you (to do) at six o'clock yesterday? 7. You ever (to see) the Pyramids? 8. I (to go) to the Caucasus two years ago. 9. When Nick (to come) home yesterday, his mother (to return) and (to cook) dinner in the kitchen. 10. When I (to go) to school yesterday, I suddenly (to remember) that I (to forget) to take my English exercise-book. 11. Yesterday grandfather (to tell) us how he (to work) at the factory during the war.

2. Раскройте скобки, употребляя глаголы в одном из следующих времен: Present, Past, Future Simple; Present, Past Continuous; Present, Past Perfect.

1. I always (to come) to school at a quarter to nine. 2. Yesterday I (to come) to school at ten minutes to nine. 3. Tomorrow Nick (not to go) to the cinema because he (to go) to the cinema yesterday. He already (to be) to the cinema this week. Look! He (to cry). 4. What your brother (to do) now? 5. My friend (to like) pies. He (to eat) pies every day. When I (to meet) him in the street yesterday, he (to eat) a pie. He (to tell) me that he (to buy) that pie at the corner of the street. Look at my friend now. He (to eat) a pie again.

3. Раскройте скобки, употребляя глаголы в одном из следующих времен: Present, Past, Future Simple; Present, Past Continuous; Present, Past Perfect.

1. When you (to come) to see us? -- I (to come) tomorrow if I (not to be) busy. 2. I (not to like) apples. 3. He (to come) home at five o'clock yesterday. 4. I (to ring) you up as soon as I (to come) home tomorrow. 5. I (to show) you my work if you (to like). 6. He (to come) home by six o'clock yesterday. 7. Pete certainly (to help) you with your English if you (to ask) him. 8. This little boy never (to see) a crocodile. 9. Send me a telegram as soon as you (to arrive). 10. Let's go for a walk. The rain (to stop) and the sun (to shine). 11. If you (to help) me, I (to do) this work well. 12. I always (to get) up at eight o'clock, but tomorrow I (to get) up a little later. 13. What you (to read) now? -- I (to read) Tom's book. I (to be) in a hurry. Tom soon (to come), and I (to want) to finish reading the book before he (to come). 14. As soon as you (to see) your friend, tell him that I (to want) to see him. 15. When I (to come) home yesterday, my brother (to sleep).

**4. Раскройте скобки, употребляя глаголы в одном из следующих времен:
Present, Past, Future Simple; Present, Past Continuous; Present, Past Perfect.**

1. You (to go) for a walk with me? -- I (to be) sorry, I can't. I (to do) my homework. I (not yet to write) the English exercise. If you (to wait) for me, I (to go) with you in half an hour. I (to want) to go for a walk very much, because I (not to go) for a walk yesterday. 2. Don't go to Nick's place now, he (to work). He (to finish) his homework at seven o'clock. If you (to come) after seven, he (to be) very glad. 3. Pete (to go) to the cinema? -- Yes, I (to think) so. He usually (to play) in the yard at this time, and now he (not to be) there. 4. He (to read) a book at five o'clock yesterday. 5. Yesterday the children (to do) all their homework before mother (to come) home, and when she (to come), they (to play) with the cat. 6. I (to lose) my key when I (to play) in the yard yesterday. 7. Ring me up as soon as you (to come) home. 8. Where you usually (to take) books for reading?

**5. Раскройте скобки, употребляя глаголы в одном из следующих времен:
Present, Past, Future Simple; Present, Past Continuous; Present, Past Perfect.**

It was eight o'clock in the morning and time for me to go to work. I (to look) out of the window. It (to rain) hard. "You (to get) wet through if you (to go) out now," said my mother. "No, I ... , " I answered, "I (to take) an umbrella." We (to have) five umbrellas

in the house, but when I (to want) to take one, I (to find) that there (to be) not one that I could use: they all (to be) torn or broken. So I (to take) them all and (to carry) them to the umbrella-maker, saying that I would call for the umbrellas on my way home in the evening. When I (to go) to have lunch in the afternoon, it still (to rain) very hard. I (to go) to the nearest cafe, and (to sit) down at a table. A few minutes later a young woman (to come) in and (to sit) down at the same table with me. When I (to finish) my lunch and (to be) ready to leave, I absent-mindedly (to take) her umbrella and (to start) for the exit. She (to stop) me saying that I (to take) her umbrella. I (to return) the umbrella with many apologies. In the evening I (to go) to the umbrella-maker, (to take) my five umbrellas and (to get) on the tram to go home. It so happened that the woman I (to meet) at the cafe (to ride) in the same tram. When she (to see) me with my five umbrellas, she (to say): "You (to have) a successful day today, (to have not) you?"

6. Поставьте подходящие возвратные местоимения (*myself, yourself, yourselves, ourselves, himself, herself, itself, themselves*).

1. The dog enjoyed ... with the children.
2. He cut ... while shaving in the bathroom.
3. Did you hurt ... ?
4. She introduced ... as Alice Brown.
5. Kids, it wasn't your fault. Please don't blame
6. Your face is dirty. Look at ... in the mirror.
7. I don't like people who usually talk about
8. I am the winner and I'm proud of

7. Выберите подходящие личные и притяжательные местоимения. Переведите.

1. Give ... (my, me, mine) a glass of water.
2. Who is sitting behind ... (our, we, us)?
3. Would you like to dance with ... (he, him, his)?
4. Joanna is going to meet ... (them, they, their).
5. It took ... (he, him, his) 5 days to get to ... (you, your).
6. Please help ... (I, me, my) with ... (me, my) homework.
7. This is ... (me, my, I) cat. ... (His, Her, Its) name is Tom.
8. She promised to help ... (us, our, we) and she will keep ... (she, her, he) word.

8. Выберите верный вариант местоимений и переведите получившиеся предложения.

1. Did you enjoy ... (myself, yourself, your) at the party? - Well. Nick did. But ... (I, my, me) didn't have a good time. I didn't know ... (someone, nobody, anyone) there. There were a lot of people and there was ... (anywhere, nowhere, somewhere) to sit. Fortunately there was much food, so I helped ... (myself, himself, yourself). 2. ... (What, Which, Who) of the two T-shirts do you like? — ... (I, Me, My) like both of ... (they, them, their). - And do you like ... (this, these, that) jeans? - I think ... (they, them, their) are awful. 3. I haven't got ... (some, any, no) sweets for the kids today. Have you got ... (some, any, no) sweets? - Don't worry. I've got ... (some, any, no). 4. This is ... (my, me, mine) garage. And the car is ... (my, me, mine). That is ... (our, ours, us) house. And the garden is ... (our, ours, us). 5. ... (This, These, That) two rings belong to ... (him, his, he) grandmother.

9. Выберите соответствующие местоимения.

1. Your dictionary is new, but (my, mine) is not. 2. She says that this dictionary is (her, hers). 3. You can do it without my help, but not without (theirs, their). 4. Will you help me to sort out the things? I cannot tell which are (your, yours) and which are (our, ours). 5. He is an old friend of (me, mine). 6. Do you know your lesson today? He does not know (him, his). 7. This is your notebook and this is his, but where is (her, hers)?

10. Определите время и залог глагола-сказуемого, переведите предложения.

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

B. 1. It is evident that electricity will be the energy of the future. 2. The transformer was invented and the first electric lines and networks were set up at the end of the 19th century. 3. New powerful electric stations must be built because it is

electricity that offers improved standards of life and work. 4. A combination of electric lines and networks are being set up throughout the country. 5. Electric power has become universal 6. Electricity is transmitted to distant parts of this country by a combination of electric networks. 7. Our power stations have been connected by high voltage transmission lines into several networks.

11. Поставьте предложения в вопросительной и отрицательной формах.

1. We were able to read that article in the library. 2. Some students will be permitted to take exams in December. 3. You have to read this book. 4. We shall be able to skate in winter. 5. My friends to take part in the conference. 6. The students of our group had to go to the plant last week. 7. They were allowed to continue their research.

12. Переведите предложения, обращая внимание на выделенные словосочетания.

1. It was found that proton and neutron have almost the same weight. 2. It was necessary to lay cables across the Atlantic Ocean as there were no radio or satellites at that time. 3. It is difficult to imagine the world we live in without radio, telephone and television. 4. It is possible to have a direct telephone talk with Vladivostok with the help of satellite systems. 5. This material has properties which make it useful for various space projects. 6. It should be said that computers become increasingly important in our life and work. 7. My adviser considers it necessary for me to read as much literature as possible before starting my work. 8. It is difficult to name all the branches of science and technology which are based on electronics. 9. It is well-known that «watt» is a unit named after James Watt, an inventor from Scotland. 10. It is impossible to solve many modern complex engineering problems without the help of computers.

13. Найдите предложения, где *it* является формальным подлежащим, личным местоимением или входит в состав усиительной конструкции; переведите.

1. It is dark here. Please, turn on the light. 2. It was Gagarin who was the first man to orbit the Earth. 3. Our students study strength of materials. It is a very difficult

subject. 4. Mathematics is studied at all technological institutes because every engineer must know it well. 5. It is the most interesting article on this subject. 6. It has become evident that ecological problems can be solved only on the global level. 7. Joint efforts of people throughout the world make it possible to achieve some progress in environment protection. 8. It is the development of robots that will solve some very complex problems of industry. 9. It is evident that research is becoming more specialized now. 10. The use of the new equipment made it possible to minimize the number of workers. 11. It is industrialization that is making ecological problems very serious.

14. Определите функции one и that переведите предложения.

1. The problem that has become the most important one is the problem of pollution.
2. One can easily understand why the profession of an engineer requires a special college training
3. The new technologies that are being developed must be connected with traditional ones.
4. That air and water pollution by industrialization is reaching dangerous levels is realized by everyone.
5. It is the invention of an engine that started the first industrial revolution.
6. The main purpose of education is that graduates must be able to work with the technology of tomorrow.
7. The education in Oxford and Cambridge is different in many ways from that in other universities.
8. We discussed the first industrial revolution, the one that took place some centuries ago.
9. New robots will have several manipulators that will carry out many functions.
10. That computers and robots are important for industrial uses is well known to scientists and engineers.
11. One must realize that the increasing number of cars brings about considerable pollution of the air.
12. It is the growth of industrialization that is changing the climate of the planet.
13. The essential feature of higher education in this country is that it combines theory with practice.
14. The simplest materials are those which have only one kind of atoms.
15. That the Earth is round was unknown for a long time.
16. It is found that the labour of a man with secondary education is 108 per cent more efficient than that of a man without that education.

15. Переведите предложения с союзами сравнения.

1. The bigger the cities are, the greater the pollution is. 2. The more computers and robots are used in industry, the quicker technological progress will be. 3. The more automobiles appear in the streets, the worse the air in the cities is. 4. The more effective is the technology, the quicker is the development of this country. 5. The quicker we joint our efforts in protecting the environment, the quicker the ecological problems are solved.

16. Переведите предложения, обращая внимание на перевод модальных глаголов.

1. Information or data can be stored in the computer's memory or storage. 2. An analog computer is able to calculate by using physical analogs of numerical measurements. 3. The first automatic computers could operate at the low speed. 4. Your paper may be published at our Institute. 5. My friend was happy when at last he might work at the computing centre. 6. Our students are allowed to visit the computing centre to see the operation of the computer ES- 1045. 7. Every student must know that a digital computer performs reasonable operations. 8. Some operations for this computer have to be changed and new instructions have to be added. 9. The instructions are recorded in the order in which they are to be carried out. 10. You should know the difference between the digital and analog computers. 11. We ought to help him to solve this problem by a personal computer. 12. According to (согласно) the time-table you are to begin your classes at 8 o'clock. 13. Every student of our speciality has to know what a hybrid computer is. 14. We were permitted to attend the conference on cybernetics.

17. Определите время и залог глагола-сказуемого, переведите предложения

1. These digits are easily multiplied. 2. I was asked many questions about my work. 3. They were explained how to solve this problem on a computer. 4. The sequence of reasonable operations has been performed by the computer. 5. The new department of mathematics has just been opened. 6. Many books on computers' organization and architecture had been translated from Russian into English by the end of last year. 7. The experiments on the new microcomputer were being carried out during the whole month. 8. All the digits are recorded on the paper tape when

addition is performed. 9. The new key adding machine was transferred into the next room yesterday. 10. The sequence of reasonable operations is now being carried out by this microcomputer. 11. The conference was addressed by a well-known scientist. 12. The invention of computers was spoken of at the last lecture.

18. Определите функции глагола *to have*, *to be* и переведите.

1. This ordinary adding machine has ten keys for each column of digits. 2. The main task of this article was to show the results of research work. 3. This personal computer has been constructed at our lab. 4. The lecture was to begin at 9 o'clock. 5. Our aim is to study hard and master our speciality. 6. Our lab assistant has to construct this electronic device (прибор). 7. The general purpose of this unit (block) is to perform different arithmetic operations. 8. The participants of the scientific conference are to arrive tomorrow. 9. You have to remember the names of the scientists who have contributed to the development of your speciality. 10. The results of the experiment have carefully been checked up today.

Supplementary Texts

1. PENCIL

It is a slender rod of a solid marking substance, such as graphite, enclosed in a cylinder of wood, metal, or plastic; used as an implement (орудие, инструмент) for writing, drawing, or marking.

Invention of the Pencil. In 1565 the German-Swiss naturalist Conrad Gesner first described a writing instrument in which graphite, then thought to be a type of lead, was inserted into a wooden holder. Gesner was the first to describe graphite as a separate mineral, and in 1779 the Swedish chemist Carl Wilhelm Scheele showed it to be a form of carbon.

The name graphite is from the Greek graphein, “to write.” The modern lead pencil (графитный карандаш) became possible when an unusually pure deposit (месторождение) of graphite was discovered in 1564 in Borrowdale, Cumberland, England.

The pure graphite was sawn (распилен) into sheets and then cut into square rods. The graphite rods were inserted into hand-carved wooden holders (держатель), forming pencils. They were called lead (свинцовый) pencils by mistake - at the time, the newly-discovered graphite was called black lead - it looked and acted like lead, and it was not known at the time that graphite consisted of carbon and not lead. The English had a monopoly on the production of pencils since no other pure graphite mines were known and no one had yet found a way to make graphite sticks.

The Germans manufactured graphite sticks (made from powdered graphite), but they were impractical. The breakthrough in pencil technology came when French chemist Nicolas Conte developed and patented the process used to make pencils in 1795. He used a mixture of clay (глина) and graphite that was fired before it was put in a wooden case. The pencils he made were cylindrical with a slot. The square lead was glued into the slot and a thin strip of wood was used to fill the rest of the slot. Conte’s method of kiln firing (обжиг) powdered graphite and clay allowed pencils to be made to any hardness or softness by varying the ratio of graphite to clay.

The more graphite used, the “softer,” or darker, is the mark made. Some pencil manufacturers use the letter “H” to indicate a hard pencil. Likewise, a pencil maker might use the letter “B” to designate the blackness of the pencil’s mark. Pencil makers also use combinations of letters - a pencil marked “HB” is hard and black; a pencil marked “HH” is very hard, and a pencil marked “HHBBB” is very hard and really, really black! In 1812 the American William Monroe invented a process still used today by which the graphite-clay mixture could be encased between two pieces of cedar |'si:ds| (кедр) wood.

In 1861, Eberhard Faber built the first pencil factory in the United States in New York City.

The mechanical pencil, patented in 1877, consists of a cylindrical piece of pencil lead inserted into a metal or plastic barrel against a movable rod that can be adjusted by a screwing motion to expose part of the lead. The basic design of the mechanical pencil changed little until a modification of a mechanical drafting pencil was introduced in 1976. Originally marketed as a trade tool for engineers, drafters, and artists, the thin-lead mechanical pencil is now used by the general population.

2. MORSE CODE

Morse code is a system of representing letters, numbers and punctuation marks by means of a code signal sent intermittently (периодически, с перерывами, время от времени). It was developed by Samuel Morse.

Although he is remembered as the inventor of the telegraph, Samuel Morse’s first career was as an artist. From 1810 through the 1830s he studied and taught painting in Europe and the United States.

On a trip from Europe, Morse met U.S. scientist Charles Thomas Jackson, who had been studying electricity and the electromagnet in Paris. Morse became interested in the idea that electricity could facilitate jfa'siliteitj (способствовать, облегчать) human communication.

Upon his return he broke from painting to work on developing an electric telegraph. European inventors were attempting similar projects, but Morse was the

one who, in May 1844, successfully transmitted the first telegraph message -“What hath God wrought” ("Вот что творит Бог!") - from Washington to Baltimore.

Morse code is a method for transmitting information, using standardized sequences of short and long marks or pulses - commonly known as “dots” and “dashes” - for the letters, numerals and special characters of a message.

Originally created for Samuel Morse’s electric telegraph in the mid-1830s, it was also extensively used for early radio communication beginning in the 1890s. However, with the development of more advanced communications technologies, the widespread use of Morse code is now largely obsolete, apart from emergency use and other specialized purposes, including navigational radio beacons (радиомаяк), and by CW (continuous wave - непрерывная волна) amateur radio operators.

Morse code is the only digital modulation mode designed to be easily read by humans without a computer, making it appropriate for sending automated digital data in voice channels, as well as making it ideal for emergency signaling, such as by way of improvised energy sources that can be easily “keyed” such as by supplying and removing electric power (e.g. by switching a breaker (выключатель, прерыватель) on and off).

Morse code can be transmitted in a number of ways: originally as electrical pulses along a telegraph wire, but also as an audio tone, as a radio signal with short and long pulses or tones, or as a mechanical or visual signal (*e.g. а - проблесковый огонь (маяка и т. п.)*) using devices like an Aldis lamp (*ручной сигнальный фонарь Олдиса назван по имени изобретателя А. Олдиса*) or a heliograph.

Because Morse code is transmitted using just two states - on and off - it was an early form of a digital code. What is called Morse code today actually differs somewhat from what was originally developed by Alfred Vail in collaboration with Morse. In 1848 a refinement (усовершенствование, улучшение) of the code sequences, including changes to eleven of the letters, was developed in Germany and eventually adopted as the worldwide standard as “International Morse”.

3. TOP 10 INVENTIONS THAT CHANGED THE WORLD

Every decade, or perhaps every year, brings with it some epic geniuses and their ground-breaking inventions in various fields. But then there are those inventions that, once invented, they consume us, alter the way the human species live and make the world smarter, better and sometimes even more fun. Here are just 10 such inventions that have metamorphosed the world we live in.

1. Steam engine

Inventor: James Watt

Although the first version of a steam engine dates back to 3rd century AD, it was not until the turn of the 19th century and the advent of the Industrial Age that a modern form of the internal combustion engine came into existence. It took decades of designing, the blueprints of which were made by James Watt, to create the mechanism where combustion of a fuel releases a high-temperature gas and as it expands it thereby applies pressure to a piston and moves it. This phenomenal invention played a pivotal role in invention of other machinery such as automobiles and airplanes that changed the face of the planet we live in.

2. Wheel

Inventor: Unknown

The idea of a symmetrical component moving in circular motion on an axis has existed in ancient Mesopotamia, Egypt and Europe separately in different time periods. Thus, it cannot be ascertained by whom and where the wheel emerged first, but this great invention appeared in 3500 BC and has grown to become one of mankind's most important inventions ever. It has been used to facilitate farming and transportation and discover other great inventions from clocks to vehicles.

3. Printing Press

Inventor: Johannes Gutenberg

Johannes Gutenberg invented the printing press in 1450 AD borrowing heavily from Chinese assets and applying them to a sophisticated machine. It wasn't until the 19th century that iron materials replaced wooden materials to speed up the process of printing. The cultural and industrial revolution in Europe would not have

been possible if it wasn't for the rapidity with which printing press allowed documents, books and newspapers to be disseminated to a much wider audience in Europe. These documents included the Bible and other important texts that allowed people to start questioning and reasoning by reading for themselves. By 1500, twenty million had been printed in Western Europe.

4. Computer

Inventor: Charles Babbage

The principal of the modern computer was first mentioned by Alan Turing and later the first mechanical computer was invented in early 19th century. This invention

has indeed accomplished amazing things in more areas of life than we realize. It has helped high performance military aircrafts to fly, put a spaceship into orbit, control medical equipment, create visual imagery, store vast amounts of information and allowed the functioning of car, phones and power plants.

5. Internet

Inventor: Vinton Cerf

The internet was first developed in 1973 by Vinton Cerf backed by the US Department of Defense Advanced Research Projects Agency (ARPA). Its initial use was to provide a network of communication within research labs and universities within United States and expanded overtime. This invention (along with the World Wide Web) has been the foremost revolutionary invention of the 20th century. In 1996, more than 25 million computers were connected through the internet across 180 countries.

6. World Wide Web

Inventor: Tim Berners-Lee

The World Wide Web as we know was first predicted by Arthur Clarke when he wrote that one day satellites would bring accumulated knowledge of the world to our fingertips, combining the telephone, photocopier, television and computer. However, the invention was made 19 years later in 1989 by a CERN employee, Tom Berners Lee. The web has transformed the way we work in various fields including

education, music, finance, reading, medicine, dating, networking, language and the like. The Web potentially trumps all the world's greatest inventions.

7. Television

Inventor: Vladimir K. Zworykin and Philo Farnsworth

Although the invention of the television cannot be attributed to one person, it is largely believed that the invention of the modern television was the work of two people: Vladimir Kosma Zworykin (1923) and Philo Farnsworth (1927). The television was also one of the greatest inventions which has been evolved from mechanical to electronic to colour to digital to smart and now 3D versions. People typically spend around 4-8 hours watching TV per day and it has drastically impacted family and social life.

8. Light Bulb

Inventor: Thomas Alva Edison

The invention of the light bulb developed throughout the 1800s with Thomas Edison attributed as the primary inventor of a bulb that lasted for 1500 hours without burning out in 1879. The idea was taken forward by many others to create a workable and bright light bulb that revolutionized indoor living.

9. Penicillin

Inventor: Alexander Fleming

Accidently discovered in a bacteria infested Petri dish by Nobel Prize winner, Alexander Fleming in 1928, Penicillin drug is a group of antibiotics that cures several infections in human beings without harming them. The Penicillin was mass produced during World War II to rid servicemen of venereal diseases and is still used as a standard antibiotic for infections. It was one of the most famous discoveries made in the field of medicine.

10. Telephone

Inventor: Alexander Graham Bell

In 1876, Alexander Graham Bell joined two cups with a thread at the bottom of both ends and used it to talk from one end and listen from the other. This laid the

foundation work for another revolutionary invention that is today the attachment that we all carry in our hands or pockets.

The telephone which later also developed as a mobile phone has had life-saving impact on mankind especially in the field of business and communication. The extension of audible speech from within one room and across the world is a work unrivaled till today.

<http://www.famousinventors.org/top-10-inventions-that-changed-the-world>

4. THOMAS ALVA EDISON

The name of Thomas Alva Edison needs no introduction. He was one of the greatest inventors of the 20th century with a staggering (ошеломительный) 1,093 inventions patented to his name. Born in Milan, Ohio in 1847, Edison suffered from scarlet fever (скарлатина) as a child which led to severe hearing impairment (ослабление). He received very little formal education and only stayed in school for 12 weeks. His teachers labeled him as a difficult and distracted child, so his mother pulled him out of school and educated him at home. Edison grew up reading a wide variety of books. He credits his mother as being the most important influence and driving force in his life.

Edison was eager to learn from the very beginning. He read the classics, English literature, world history, poetry, physics, chemistry, mathematics and practically anything he could get his hands on at the local library. His parents hired a private tutor to teach him physics and mathematics. At age 12, Edison got a job selling newspapers and snacks on the local railroad. At age 14 he started his own newspaper publication and used the additional income to set up a chemical laboratory in the basement (подвал, цокольный этаж) of his house. While working on the railroad, he also began conducting experiments in the train carriages. During this time, he saved the life of a 3 year old child and the child's father repaid Edison for his kindness by teaching him Morse code and how to use the telegraph. This skill led to his first invention called an "automatic repeater" which was a device used to transmit and decode telegraphic signals at the user's convenience.

Due to his family's poor financial situation, Edison moved to Boston to work as a telegrapher with Western Union. During this time, he also became well acquainted with other inventors such as Alexander Graham Bell and Benjamin B. Redding. His list of inventions is varied and includes, amongst other things, the phonograph, carbon telephone, practical electric lamp, electric generator, motion picture camera, alkaline battery, electric power meter and even a method of preserving fruit.

Thomas Alva Edison was awarded a medal of honor by the US Congress in 1928. He was married to a woman named Mina Miller and fathered three children. His health rapidly declined in the last stages of his life and he died at age 84 in Glenmont but his legacy as an inventor, businessman and a cultural icon still lives on.

<http://www.famousinventors.org/thomas-alva-edison>

5. ANTONIO MEUCCI

Antonio Santi Giuseppe Meucci (Антонио Меуччи) was an Italian inventor known for inventing a device much like the telephone before the same was invented and patented by Alexander Graham Bell in 1876.

Meucci was born in Florence in April 1808, the eldest of nine children. At the age of 15, he was admitted to the Florence Academy of Fine Arts to study mechanical and chemical engineering. He was the youngest student at the time, and pursued two years of full time studies before he had to temporarily withdraw due to lack of funds.

However, he soon took up part time studies again, while also working as a government official and later as a stage technician at the Teatro della Pergola opera house in Florence.

It was here that Meucci invented his first voice communication device in 1834. This was a type of acoustic telephone used to establish communication between the stage and the control room (диспетчерская, аппаратная) of the theatre. This device was based on the same principle used by pipe telephones established on ships. Meucci met his wife Esterre Mochi at the same theatre, where she worked as a costume designer. The couple married in August 1834.

In 1835, Meucci and his wife moved to Cuba where he worked at the Great Tacon Theater in Havana. Here he invented a water purification system, a therapy system that used electric shocks to treat patients suffering from rheumatism and a “talking telegraph” device to hear inarticulate voices more clearly.

In 1850, Meucci and his wife moved to the United States, where they stayed for the rest of their lives. He continued to study the principles of electromagnetism and in 1856, he built and installed his first voice transmission device that communicated through wires. The device connected his laboratory with the bedroom of his house. His purpose in developing it was to communicate with his wife who was ill with arthritis and could not move. In subsequent (последующие) years, Meucci fine tuned (настроил) and improved his device and developed more than 30 different versions of it.

None of Antonio Meucci's voice transmission devices could ever be patented and put into production. The foremost reason was a lack of capital. He was unable to obtain the necessary financing and even though he did eventually file a patent application (зарегистрировал заявку на патент), it was refused. He contested (опротестовывал) his patent rejection, which was granted to Alexander Graham Bell a few years later, but the case (дело) was dropped upon his death in 1889.

6. INVENTORS AND THEIR INVENTIONS

Edison is known as one of the greatest inventors of his time. He invented so much that it is difficult to say which of his achievements is the greatest. He was an experimenter and a practical man more than a theoretician. In 1868 Edison built his first patented invention - an electromagnetic device. All his inventions were the result of hard work. He sometimes made thousands of experiments. According to his words the idea that a genius works only by inspiration was absurd. “Genius is 2 per cent inspiration and 98 per cent perspiration,” he often said.

Samuel Colt was an American. He lived in the 19-th century. In 1836 he designed and patented a pistol. It was a pistol with a revolving barrel that could fire six bullets one after another. It was the first pistol of its kind. Later there came many other pistols with six bullets.

Rudolf Diesel was a German engineer. He was born in 1858 and died in 1913. In 1897 he invented a new internal combustion engine. This engine is known as a diesel. And it began a transport revolution in cars, lorries, trains and ships.

Samuel Finley Morse was born in 1791. He died in 1872. He was a portrait painter. Then he became an inventor. For twelve years he tried to perfect the telegraph and he was a success. Later he invented the telegraphic dot- and-dash alphabet. Now it is known as Morse code. Morse code was not only one in America of that time. There were some others. But now we use Morse code all over the world.

Charles Makintosh lived from 1766 to 1843. He lived in Scotland and was a chemist by profession. He worked in a textile industry. In 1823 he developed a rubber solution. This rubber solution was used for raincoat production. Raincoats with this rubber solution didn't allow water to penetrate. These raincoats were called makintoshes. Now people all over the world use them in spring and in autumn.

Charles Rolls was born in 1881 in Great Britain. He died in 1910. He was an aristocrat and businessman. He was especially interested in cars. Once he met another enthusiast of cars *Henry Royce*. Henry Royce was a famous car engineer. They decided to design the most comfortable and reliable car. At the beginning of the 20th century it seemed to be a fantasy. But they worked hard and at last in 1907 they created the famous Rolls-Royce car. It was so comfortable and reliable that one of the models of Rolls- Royce cars «Silver Ghost» hadn't changed greatly for 20 years since 1907.

Gottlieb Daimler and *Charles Benz* were two inventors. They lived in Germany. They were both interested in car production. At the end of the 19th century each of them designed a car. At the same time they organized two independent firms to produce them. All the cars produced by the firm of Daimler were called «Mercedes». Mercedes was a daughter's name of one of the stockholders of the firm. This man saved the firm of Daimler from financial crisis at the beginning of the 20th century. But after the World War I the firm of Daimler met with financial difficulties again.

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