

Министерство образования Республики Беларусь  
Учреждение образования  
«Белорусский государственный университет  
информатики и радиоэлектроники»

Кафедра иностранных языков №1

**МЕТОДИЧЕСКИЕ УКАЗАНИЯ И КОНТРОЛЬНЫЕ ЗАДАНИЯ №2–4  
ПО АНГЛИЙСКОМУ ЯЗЫКУ ДЛЯ СТУДЕНТОВ ФЗВиДО**

**METHODICAL DIRECTIONS AND TESTS №2–4  
IN ENGLISH FOR THE STUDENTS  
OF THE FACULTY OF EXTRAMURAL, EVENING  
AND DISTANCE EDUCATION**

Минск БГУИР 2009

УДК 811.111(076)  
ББК 81.2Англ я7  
М54

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Методические указания и контрольные задания №2–4 по английскому  
М54 языку для студ. ФЗВиДО = Methodical directions and tests №2–4 in English  
for the students of the Faculty of Extramural, Evening and Distance Education /  
сост. Г. Ф. Табакова [и др.]. – Минск : БГУИР, 2009. – 64 с.

ISBN 978-985-488-435-6

Настоящая разработка является продолжением «Методических указаний и  
контрольного задания №1 по английскому языку для студентов ФЗВиДО», изданных  
кафедрой иностранных языков №1. Включает контрольные задания №2–4. Для студентов  
факультета заочного, вечернего и дистанционного обучения.

**УДК 811.111(076)**  
**ББК 81.2 Англ я7**

**ISBN 978-985-488-435-6**

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информатики и радиоэлектроники», 2009

## Контрольное задание №2

Для того чтобы выполнить задания, необходимо освоить следующие разделы по грамматике:

### I. Видовременные формы глагола:

а) активный залог формы Simple (Present, Past, Future); формы Continuous (Present, Past, Future); формы Perfect (Present, Past, Future);

б) пассивный залог и способы перевода пассивного сказуемого.

Обратите внимание на особенности перевода пассивных конструкций на русский язык:

It is said – говорят; It is known – известно.

*Examples:* In 1837 Morse invented the electrical tube. invented – Past Indefinite Active (изобрел).

In 1912 Zworykin was allowed to continue his education. was allowed – Past Indefinite Passive (разрешили).

### II. Модальные глаголы

Модальные глаголы, выражающие возможность: can (could), may (might) и их эквиваленты (can – to be able to; may – to be allowed to); глагол must, выражающий долженствование и его заменитель – to have to, а также глагол should.

### III. Простые неличные формы глагола: Participle I, Participle II, Gerund

*Examples:* Based on their pioneering efforts in radio he tried to convince them to do research in television. based – Participle II.

Morse demonstrated a recording telegraph. recording – Participle I.

He earned money by painting portraits. painting – Gerund.

### IV. Определительные и дополнительные придаточные предложения

*Example:* Their argument which continued throughout the night was finally resolved. which continued throughout the night – определительное придаточное предложение.

## Вариант 1

**I. Перепишите предложения, выбрав подходящий модальный глагол. Переведите предложения на русский язык.**

*Example:* These samples (may/ have to/ is to) be chosen deliberately. – Эти образцы могут быть отобраны (можно отобрать) произвольно.

1. There are several ways a digital or analog signal (may/ must/ had better) be transmitted, including coaxial and fiber-optic cables.

2. For the first time, a signal (should/ have to/ could) be sent faster than any other mode of transportation.

3. Laser beams (have to/ may/ might) ultimately replace cables in telecommunications.

4. He (*is not able/ mustn't/ couldn't*) to complete this work himself.

**II. Перепишите предложения, подчеркните слова, которые выражены Participle I, Participle II или Gerund, указав, чем они являются (из вышеназванных). Переведите предложения на русский язык.**

*Example:* There are several ways of obtaining this substance (Gerund). – Существует несколько способов получения этого вещества.

1. Einstein didn't enjoy talking very much; in fact, he waited till he was three before he started to talk.

2. When studying elements Mendeleev found that they could be divided into nine groups.

3. New technologies reduce the number of workers needed.

4. Some of the first communications satellites were designed to operate in a passive mode.

**III. Перепишите предложения, выбрав подходящие по смыслу видовременные формы глагола. Переведите предложения на русский язык. Укажите время и залог выбранных форм глаголов.**

*Example:* The engineer was asked/ asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. The professor *describe/ has described* achievements in robotics to his students.

2. The new engine *is testing/ is being tested* in the laboratory now.

3. Our industry *will introduce/ will be introduced* complex robots with minicomputers into production in the future.

4. The students *allowed/ were allowed* to watch a new robot model in operation.

**IV. Определите глаголы-сказуемые в предложениях. Перепишите предложения, преобразуя глаголы-сказуемые из активного в пассивный залог, сохраняя временные формы глаголов. Переведите предложения на русский язык.**

*Example:* A.S. Popov *invented* the radio in 1895. – The radio *was invented* by A.S. Popov in 1895. – Радио было изобретено А. С. Поповым в 1895 году.

1. The technician was testing a new device from 11 till 12 yesterday.

2. Computers will find wide applications in different branches of engineering soon.

3. Lasers use the properties of bound electrons.

4. Scientists have made a lot of important developments in technology over the last 10 years.

**V. Перепишите предложения и переведите их на русский язык, обращая внимание на определительные и дополнительные придаточные предложения.**

*Example:* We understand *that this problem must be solved*. – Мы понимаем, что эту задачу надо решить.

1. Experiments show that there is very little attraction between the molecules of any gas.
2. Students asked the teacher what amplifiers were called linear.
3. This is the laboratory which we attend twice a week.
4. A number whose value is to be found is called an unknown number.

### Работа над текстом

#### I. Ознакомьтесь с новыми словами к тексту.

claim	//kleɪ m//	заявление
to contribute	//kɒn'trɪ bjʊt//	внести вклад (в)
to award	//q'wɔ:d//	награждать
to be responsible (for)	//rɪ'spɒnsəb(ə)l//	отвечать (за), способствовать
to reverse	//rɪ'vɜ:s//	отклонять

#### II. Прочитайте текст, постарайтесь понять его содержание.

##### Who Invented the Radio?

1. Marconi's claim that he invented radio was always disputed by Nikola Tesla and Alexander Popov.

Although many scientists and inventors contributed to the invention of wireless telegraphy, including Michael Faraday, Heinrich Rudolf Hertz, Alexander Popov, Nikola Tesla, Thomas Alva Edison, and others, Marconi's practical system achieved widespread use, so he is often credited as the "father of radio."

2. Marconi was awarded the patent for Radio communications with British Patent GB12039, "Improvements in transmitting electrical impulses and signals and in apparatus there-for" on 2 July 1897 (sometimes recognized as the World's first patent in radio telecommunication).

Marconi did develop a practical model and was responsible for the first successful exploitation of the invention practically at the same time with Alexander Popov, who described his findings in a paper published in 1895. Popov publicly demonstrated the transmission of radio waves between different campus buildings to the St. Petersburg Physical Society in March 1896. Actually, Marconi publicly demonstrated his system several months later, in September. Upon learning about Marconi's experiments, Popov effected ship-to-shore communication over a distance of 6 miles in 1898 and 30 miles in 1899. He died in 1905 and his claim was not pressed by the Russian government until 40 years later.

3. Tesla initially held the rights to radio, but the US Patent Office reversed its decision and awarded Marconi the patent for radio. Tesla fought to re-acquire his radio patent, but failed. A lawsuit regarding Marconi's numerous other radio patents was resolved by the U.S. Supreme Court, who overturned most of these (1943). Their decision was based on the proven prior work conducted by Sir Oliver Lodge, and others, from which the other Marconi's patents stemmed. Marconi's supporters stated that Marconi was not aware of the works of Nikola Tesla in the U.S. although the

presentation at the Franklin Institute was reported across America and throughout Europe. It is unlikely, though, that Marconi was unaware of Tesla's presentation, "On Light and Other High Frequency Phenomena", in Philadelphia.

However, the U. S. Supreme Court noted the primacy of Marconi's first patent stating, "Marconi's reputation as the man who first achieved successful radio transmission rests on his original patent, which became reissue No. 11,913, and which is not here in question." At the time, the United States Army was involved in a patent infringement lawsuit with Marconi's company regarding radio, leading some to posit that the government nullified Marconi's other patents in order to mute any claims for compensation (as, some posit, the government's initial reversal to grant Marconi the patent right in order to nullify any claims Tesla had for compensation).

4. Another pioneer of wireless communication was Prof. Jagdish Bose. In 1894, Bose ignited gunpowder and rang a bell at a distance using electromagnetic waves, confirming that communication signals can be sent without using wires.

**III. Укажите, какое из данных утверждений соответствует содержанию текста.**

1. Marconi was the only person who invented the radio.
2. A. Popov demonstrated his system several months later than Marconi.
3. Marconi was not aware of the works of Nicola Tesla.

**IV. Выберите правильные ответы на вопросы.**

1. Who is often credited as the "father of radio"?
  - a) Michael Faraday;
  - b) G. Marconi.
2. What did Marconi publicly demonstrate in September, 1896?
  - a) He demonstrated the topograph.
  - b) He demonstrated his first radio system.

**V. Прочитайте предложения. Выберите правильный вариант перевода.**

1. Marconi did develop a practical model.
  - a) Маркони все-таки создал практическую модель.
  - b) Именно Маркони создал практическую модель.
2. It is unlikely, though, that Marconi was unaware of Tesla's presentation, "On light and other High Frequency Phenomena", in Philadelphia.
  - a) Однако маловероятно, что Маркони не знал о докладе Н. Теслы «О свете и других высокочастотных явлениях», представленном в Филадельфии.
  - b) Тем не менее непохоже, что Маркони не слышал о докладе Н. Теслы «О свете и других высокочастотных явлениях» в Филадельфии.
3. Upon learning about Marconi's experiments, Popov effected ship-to-shore communication over a distance of 6 miles in 1898.
  - a) Узнав об экспериментах Маркони, Попов в 1898 году установил связь «корабль–берег» на расстоянии 6 миль.

б) В 1898 году, изучив эксперименты Маркони, Попов ввел в действие связь «корабль–берег» на расстоянии 6 миль.

**VI. Переведите письменно абзацы 3 – 4 текста.**

**Вариант 2**

**I. Перепишите предложения, выбрав подходящий модальный глагол. Переведите предложения на русский язык.**

*Example:* These samples (may/ have to/ is to) be chosen deliberately. – Эти образцы могут быть отобраны (можно отобрать) произвольно.

1. Morse partnered with Alfred Vail and (must/ was able to/ may) commercialize the technology with financial support from the US government.

2. Bell received the patent for the first telephone, but he (should/ must/ had to) fight numerous legal challenges.

3. When Rontgen first noticed the new rays he (shouldn't/ could not/ may not) understand their nature.

4. No one (could/ have to/ may) enter the laboratory while the test is going on.

**II. Перепишите предложения, подчеркните слова, которые выражены Participle I, Participle II или Gerund, указав, чем они являются (из вышеназванных). Переведите предложения на русский язык.**

*Example:* There are several ways of obtaining this substance (Gerund). – Существует несколько способов получения этого вещества.

1. In spite of not having a very exciting childhood, Einstein later appeared to have a vivid memory of it.

2. The electric current passing through a wire will heat that wire.

3. The beam of a laser can be focused very precisely.

4. Network hardware is made up of the physical components that connect computers.

**III. Перепишите предложения, выбрав подходящие по смыслу видовременные формы глагола. Переведите предложения на русский язык. Укажите время и залог выбранных форм глаголов.**

*Example:* The engineer was asked/ asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. New methods of obtaining polymers applied/ had been applied at our plant.

2. Radio telescopes supplied/ are supplied with a precise control system.

3. The engineers were being carried out/ were carrying out an important experiment at 10 o'clock last Tuesday.

4. We will discuss/ will be discussed all advantages and disadvantages of the Internet at tomorrow's conference.

**IV. Определите глаголы-сказуемые в предложениях. Перепишите предложения, преобразуя глаголы-сказуемые из активного в пассивный**

**злог, сохраняя временные формы глаголов. Переведите предложения на русский язык.**

*Example:* A.S. Popov *invented* the radio in 1895. – The radio *was invented* by A.S. Popov in 1895. – Радио было изобретено А. С. Поповым в 1895 году.

1. Our scientists are developing new units for these reactors now.
2. By the end of 19<sup>th</sup> century scientists had made the first attempts to obtain synthetic materials.
3. We use metals for a variety of engineering purposes.
4. He will publish the results of the experiment next month.

**V. Перепишите предложения и переведите их на русский язык, обращая внимание на определительные и дополнительные придаточные предложения.**

*Example:* We understand *that this problem must be solved*. – Мы понимаем, что эту задачу надо решить.

1. The text which the student is reading is about space explorations.
2. The students wanted to know whether colour television sets were produced at this plant.
3. My friend said that he wanted to become an engineer.
4. Al. Bell found an assistant who was a specialist in electrical engineering.

### **Работа над текстом**

**I. Ознакомьтесь с новыми словами к тексту.**

to solder	//sPlɔq//	паять
an operating system		операционная система
to update	//ʌpdeɪt//	обновлять, корректировать
node	//nɔʋd//	зд. Центр
directory	//daɪ'rekt(ɔ)ri//	директория, каталог, справочник
Web browser	//brʌʋzɔq//	Web-браузер
editor	//edɪtɔq//	редактор

**II. Прочитайте текст, постарайтесь понять его содержание.**

### **Sir Tim Berners-Lee**

1. Sir Timothy ("Tim") John Berners-Lee, is the inventor of the World Wide Web and director of the World Wide Web Consortium, which oversees its continued development.

Berners-Lee was born in London, the son of Conway Berners-Lee and Mary Lee Woods. His parents, who were both mathematicians, were employed together on the team that built the Manchester Mark I, one of the earliest computers. Berners-Lee attended Emanuel School in Wandsworth. He is an alumnus of Queen's College, Oxford University, where he built a computer with a soldering iron, TTL gates, an



M6800 processor and an old television. While at Oxford, he was caught hacking with a friend and was subsequently banned from using the university computer.

2. He worked at Plessey Telecommunications Limited in 1976 as a programmer, and in 1978, he worked at the D.G. Nash Limited where he did typesetting software and an operating system.

He is now living in the Boston, Massachusetts area with his wife and two children.

3. In 1980, while an independent contractor at CERN from June to December 1980, Berners-Lee proposed a project based on the concept of hypertext, to facilitate sharing and updating information among researchers. With help from Robert Cailliau he built a prototype system named Enquire.

4. After leaving CERN in 1980 to work at John Poole's Image Computer Systems Ltd., he returned in 1984 as a fellow. By 1989, CERN was the largest Internet node in Europe, and Berners-Lee saw an opportunity to join hypertext with the Internet. He used similar ideas to those underlying the Enquire system to create the World Wide Web, for which he designed and built the first web browser, editor and Web server, called httpd (short for HyperText Transfer Protocol daemon).

5. The first Web site built was at <http://info.cern.ch/> and was first put online on August 6, 1991. It provided an explanation about what the World Wide Web was, how one could own a browser and how to set up a Web server. It was also the world's first Web directory.

In 1994, Berners-Lee founded the World Wide Web Consortium (W3C) at the Massachusetts Institute of Technology. It comprised various companies willing to create standards and recommendations to improve the quality of the Internet. Many of the World Wide Web Consortium's achievements are able to be seen in many Web sites on the Internet.

6. The University of Southampton was the first to recognize Berners-Lee's contribution to developing the World Wide Web with an honorary degree in 1996 and he is currently a Chair of Computer Science at the University of Southampton's School of Electronics and Computer Science department, and is a Senior Research Scientist there. He is a Distinguished Fellow of the British Computer Society, an Honorary Fellow of the Institution of Electrical Engineers, and a member of the American Academy of Arts and Sciences.

In 2002, the British public named him among the 100 Greatest Britons of all time.

On July 21, 2004 he was presented with an Honorary Doctor of Science (honoris causa) from Lancaster University. On January 27, 2005 he was named Greatest Briton of 2004 for his achievements as well as displaying the key British characteristics of "diffidence, determination, a sharp sense of humour and adaptability" as put by David Hempleman-Adams.

### ***III. Укажите, какое из данных утверждений соответствует содержанию текста.***

1. Manchester Mark 1, one of the earliest computers, was built by Tim Berners-Lee.

2. Tim Berners-Lee was awarded by the University for his success in hacking.

3. The Enquire was built by T. Berners-Lee in collaboration with other inventors.

**IV. Выберите правильные ответы на вопросы.**

1. What did Berners-Lee build when he was studying at Queen's College?
  - a) He built his own computer.
  - b) He built a new TV-set.
2. What ideas did Berners-Lee use to create the World Wide Web?
  - a) He used his parents' ideas on Mark I, one of the earliest computers.
  - b) He used his own ideas on the development of his Enquire System.

**V. Прочитайте предложения. Выберите правильный вариант перевода.**

1. His parents, who were both mathematicians, were employed together on the team that built the Manchester Mark I, one of the earliest computers.

a) Его родители, которые были математиками, нанялись в команду по созданию Марка I в Манчестере, который был одним из ранних компьютеров.

b) Его родители, которые оба были математиками, входили в состав команды, которая создала в Манчестере Марк I, один из первых компьютеров.

2. In 1980 Burners-Lee proposed a project based on the concept of hypertext, to facilitate sharing and updating information among researchers.

a) В 1980 году Бернерс-Ли предложил проект на основе концепции гипертекста для того, чтобы способствовать обмену информацией между исследователями и ее корректировке.

b) В 1980 году Бернерс-Ли предложил проект, позволяющий обмен информацией между исследователями и ее обновление.

3. The first Web-site provided an explanation about what the WWW was, how one could own a browser and how to set up a Web server.

a) Первый Web-сайт предоставлял объяснение, что такое WWW и как можно настроить браузер и установить Web сервер.

b) Первый Web-сайт разъяснял, что представляет собой WWW и как нужно установить браузер и Web сервер.

**VI. Переведите письменно абзацы 1 – 4 текста.**

**Вариант 3**

**I. Перепишите предложения, выбрав подходящий модальный глагол. Переведите предложения на русский язык.**

*Example:* These samples (may/ have to/ is to) be chosen deliberately. – Эти образцы могут быть отобраны (можно отобрать) произвольно.

1. Bell (can/ was able to/ must) make his prototype telephone work and attract financial backers, and his company grew.

2. Telegraph messages (should/ had to/ can) be deciphered by trained operators.

3. The quality of these metal parts (is to/ is able to / had better) be very high.

4. He (might not/ should / couldn't) complete his research in time as he worked very slowly.

**II. Перепишите предложения, подчеркните слова, которые выражены Participle I, Participle II или Gerund, указав, чем они являются (из вышеназванных). Переведите предложения на русский язык.**

*Example:* There are several ways of obtaining this substance (Gerund). – Существует несколько способов получения этого вещества.

1. Reading English technical magazines is important for an engineer.
2. While being still young Lomonosov displayed great abilities for learning.
3. The first TV set produced in 1939 was a tiny nine-by-twelve inch box.
4. Logical connections are created by network protocols and allow data sharing between applications on different types of computers.

**III. Перепишите предложения, выбрав подходящие по смыслу видовременные формы глагола. Переведите предложения на русский язык. Укажите время и залог выбранных форм глаголов.**

*Example:* The engineer was asked/ asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. The laboratory assistant *was writing/ was being written* down all the data during our experiment.
2. The plant *was reconstructed/ reconstructed* three years ago.
3. Much research *has been carried out/ carried out* in our laboratory since its foundation.
4. The students *will compile/ compiles* a new program in a month.

**IV. Определите глаголы-сказуемые в предложениях. Перепишите предложения, преобразуя глаголы-сказуемые из активного в пассивный залог, сохраняя временные формы глаголов. Переведите предложения на русский язык.**

*Example:* A.S. Popov *invented* the radio in 1895. – The radio *was invented* by A.S. Popov in 1895. – Радио было изобретено А. С. Поповым в 1895 году.

1. The students had performed a series of experiments by the end of the week.
2. Our plant is producing some new chemical apparatus.
3. They provided later-model computers with the capability of handling input devices directory.
4. Our engineers will design and construct a new thermal power station.

**V. Перепишите предложения и переведите их на русский язык, обращая внимание на определительные и дополнительные придаточные предложения.**

*Example:* We understand *that this problem must be solved*. – Мы понимаем, что эту задачу надо решить.

1. The heat which a body contains is the kinetic energy of its molecules.
2. We didn't know whether the development of television had continued during the war.
3. Chemistry is the science that deals with the structure of matter and its changes.

4. We know who took part in the design of the flood defense system.

### Работа над текстом

#### *I. Ознакомьтесь с новыми словами к тексту.*

device	/dI 'vaI s/	устройство, прибор
to deflect	/dI 'flekt/	отклонять
current	/'kʌrɒnt/	ток
wire	/waI q/	провод
multiplexing	/'mʌltI pleksI N/	уплотнение
cell	/sel/	клетка, ячейка
to dial	/'daI ql/	набирать (номер по телефону), звонить

#### *II. Прочитайте текст, постарайтесь понять его содержание.*

##### **The Beginning of Electronic Communications**

1. In 1825, British inventor William Sturgeon (1783-1850) exhibited a device that laid the foundations for large-scale electronic communications: the electromagnet. Sturgeon displayed its power by lifting nine pounds with a seven-ounce piece of iron wrapped with wires through which the current of a single cell battery was sent.

In 1830, an American, Joseph Henry (1797-1878), demonstrated the potential of Sturgeon's device for long distance communication by sending an electronic current over one mile of wire to activate an electromagnet which caused a bell to strike. Thus the electric telegraph was born.

2. Henry's invention was successfully exploited by Samuel Morse. While a professor of arts and design at New York University in 1835, Samuel Morse proved that signals could be transmitted by wire. He used pulses of current to deflect an electromagnet, which moved a marker to produce written codes on a strip of paper – the invention of Morse Code. The following year, the device was modified to emboss the paper with dots and dashes. He gave a public demonstration in 1838, but it was not until five years later that Congress funded \$30,000 to construct an experimental telegraph line from Washington to Baltimore, a distance of 40 miles.

3. Six years later, members of Congress witnessed the sending and receiving of messages over part of the telegraph line. Before the line had reached Baltimore, the Whig party held its national convention there, and on May 1, 1844, nominated Henry Clay. This news was hand-carried to Annapolis Junction, where Morse's partner, Alfred Vail, wired it to the Capitol. This was the first news dispatched by electric telegraph.

4. The message, "What hath God wrought?" sent later by "Morse Code" from the old Supreme Court chamber in the United States Capitol to his partner in Baltimore, officially opened the completed line of May 24, 1844. Morse's early system produced a paper copy with raised dots and dashes, which were translated later by an operator.

5. The original Morse telegraph printed code on tape. However, in the United States the operation developed into sending by key and receiving by ear. A trained

Morse operator could transmit 40 to 50 words per minute. Automatic transmission, introduced in 1914, handled more than twice that number.

In 1913 Western Union developed multiplexing, which made it possible to transmit eight messages simultaneously over a single wire (four in each direction). Teleprinter machines came into use about 1925. Varioplex, introduced in 1936, enabled a single wire to carry 72 transmissions at the same time (36 in each direction). Two years later Western Union introduced the first of its automatic facsimile devices. In 1959 Western Union inaugurated TELEX, which enables subscribers to the teleprinter service to dial each other directly.

Until 1877, all rapid long-distance communication depended upon the telegraph. That year, a rival technology developed that would again change the face of communication – the telephone.

6. By 1879, patent litigation between Western Union and the infant telephone system was ended in an agreement that largely separated the two services.

Samuel Morse is best known as the inventor of the telegraph, but he is also esteemed for his contributions to American portraiture. His painting is characterized by delicate technique and vigorous honesty and insight into the character of his subjects.

**III. Укажите, какое из данных утверждений соответствует содержанию текста.**

1. British inventor W. Sturgeon exhibited the telephone in 1825.
2. Henry's invention, the telegraph, was not exploited by anyone.
3. Morse's early system printed code on tape and it needed an operator to translate it.

**IV. Выберите правильные ответы на вопросы.**

1. Who used W. Sturgeon's device demonstrating its potential for long distances?
  - a) Alfred Vail did it;
  - b) Joseph Henry did it.
2. What invention of the 19<sup>th</sup> century changed the way of communication?
  - a) the telephone;
  - b) the telegraph.

**V. Прочитайте предложения. Выберите правильный вариант перевода.**

1. He used pulses to deflect an electromagnet, which moved a marker to produce written codes on a strip of paper.

а) Он применял электрический ток для изменения направления электромагнита, который управлял маркером, чтобы отпечатывать шифр на бумажной ленте.

б) Он использовал импульсы тока, чтобы отклонять электромагнит, печатающий шифр на электромагнитной ленте.

2. Morse's early system produced a paper copy with raised dots and dashes, which were translated later by an operator.

a) Первый аппарат Морзе воспроизводил на бумаге выпуклые точки и тире, которые затем расшифровывались оператором.

b) Первая система Морзе создавала на бумаге копию с выпуклыми точками и тире, которые затем расшифровывал оператор.

3. In 1959 Western Union inaugurated Telex, which establishes subscribers to dial each other directly.

a) В 1959 году Western Union ввел Telex, который позволяет подписчикам звонить друг другу напрямую.

b) В 1959 году Western Union представил Telex, который дает возможность абонентам общаться непосредственно друг с другом.

#### **VI. Переведите письменно абзацы 4 – 6 текста.**

#### **Вариант 4**

#### **I. Перепишите предложения, выбрав подходящий модальный глагол. Переведите предложения на русский язык.**

*Example:* These samples (may/ have to/ is to) be chosen deliberately. – Эти образцы могут быть отобраны (можно отобрать) произвольно.

1. The telephone was a vast improvement over the telegraph system, which (could/ may/ is able to) only transmit coded words and numbers.

2. You (has to/ is to/ may) use this instrument for measuring gas pressure.

3. We (couldn't/ can't/ had to) compare the properties of these substances now.

4. We (will be able to/ could/ might) experiment with different metals next week.

#### **II. Перепишите предложения, подчеркните слова, которые выражены Participle I, Participle II или Gerund, указав, чем они являются (из вышеназванных). Переведите предложения на русский язык.**

*Example:* There are several ways of obtaining this substance (Gerund). – Существует несколько способов получения этого вещества.

1. In 1887 Heinrich Hertz, while trying to prove the existence of radio waves, discovered the photoelectric effect.

2. We can start testing the materials as soon as we receive them.

3. Newton's great work published in 1687 is called "Principia".

4. The technology of microwave radio is carried one step further by the use of communications satellites.

#### **III. Перепишите предложения, выбрав подходящие по смыслу видовременные формы глагола. Переведите предложения на русский язык. Укажите время и залог выбранных форм глаголов.**

*Example:* The engineer was asked/ asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. We are studying/ will be studying various electrical devices all the morning tomorrow.

2. Magnetic tape *was used/ used* for input, output or for storing data.
3. Our engineers *have been developed/ have developed* many new devices.
4. The experiments *will be completed/ will complete* by the end of the week.

**IV. Определите глаголы-сказуемые в предложениях. Перепишите предложения, преобразуя глаголы-сказуемые из активного в пассивный залог, сохраняя временные формы глаголов. Переведите предложения на русский язык.**

*Example:* A.S. Popov *invented* the radio in 1895. – The radio *was invented* by A.S. Popov in 1895. – Радио было изобретено А. С. Поповым в 1895 году.

1. Scientists used lasers to measure the size of pollutants in the air.
2. The solar battery is converting the energy of sun rays directly into electric energy.
3. The students of our university study the basic concepts in computer science.
4. The students will have completed an experiment by 12 o'clock.

**V. Перепишите предложения и переведите их на русский язык, обращая внимание на определительные и дополнительные придаточные предложения.**

*Example:* We understand *that this problem must be solved*. – Мы понимаем, что эту задачу надо решить.

1. It should be noted that plastics are widely used in everyday life.
2. The laboratory is the place where experiments as well as scientific research may be carried out.
3. The invention which A.S. Popov made did not interest the government.
4. Can you tell me whether satellites are used for telephone communications?

### Работа над текстом

**I. Ознакомьтесь с новыми словами к тексту.**

electronic device	//dI 'vaI s//	электронное устройство
to process	//'prqVses//	обрабатывать
issue	//'I sjH, 'I SH//	вопрос
to evolve	//I 'vPlv//	развиваться
vacuum tube	//'vxkjV (q)mtjHb//	электровакuumная лампа
to incorporate	//I n'kLpqreI t//	объединять, включать
circuitry	//'sWkI tri//	схемы
large scale integration	//'I ntI 'greI S (q) n//	высокая степень интеграции
artificial intelligence	//'R tI 'fl S (q) l//	искусственный интеллект

**II. Прочитайте текст, постарайтесь понять его содержание.**

## **The Evolution of Computers**

1. A computer is an electronic device used to process information. It is this function of the computer that placed it at the center of our transition from the industrial period of our society to the information age. Some of the key issues regarding the role and usage of today's computers are summarized below. Today, we encounter computers in almost every aspect of society. Computers are highly visible in such professions as education, science, medicine, and business, but they also can be found behind-the-scenes at the grocery store, in our automobiles, microwave ovens, and VCRs.

2. Computers have evolved through several generations. Each new generation is based on technological innovations and new methods of processing data. The first generation began with the development of the earliest large mainframe computers. These room-sized computers, such as the UNIVAC 1, were based on electromechanical devices and vacuum-tube technology.

3. Computers based on the transistor, which was invented in the late 1950s, mark the beginning of the second generation of computers. Transistors brought about the development of smaller, faster, and more efficient computers.

The third generation of computers used integrated circuits which opened the door for the creation of even smaller and faster computers. These smaller computers were known as minicomputers and were the first to incorporate operating systems which automated many of the computer's operational tasks, tasks that had been formerly handled by humans.

4. The fourth generation of computers is characterized by large-scale integration of computer circuitry and small microprocessors. Microcomputers (also called personal computers or PCs) were based on these microprocessors and they put computing power into the hands of individual users. In the future, computers that utilize artificial intelligence technologies will be able to make decisions based on accumulated evidence.

5. Although the technological innovations that mark the different generations in the evolution of the computer are generally concerned with the central processing capabilities of the computer, a computer system is actually an integrated set of computing components. A computer system requires input devices (keyboard, mouse, scanners, etc.) to get information into the computer and output devices (monitor, printer, etc.) to get information out of the computer. These physical components of the computer are known as hardware. The set of instructions or programs that are created by programmers to control the computer's response to user input are known as software.

***III. Укажите, какие из данных утверждений соответствуют содержанию текста.***

1. The fourth generation of computers is associated with the use of large scale integrated circuits and microprocessors.

2. Minicomputers were the first computers that included the operating systems, which automated a number of computer's tasks previously performed by humans.



3. Input and output devices of the computer are known as software.

**IV. Выберите правильные ответы на вопросы.**

1. What were the first generation computers based on?

- a) on vacuum tube technology;
- b) on integrated circuits.

2. What is the development of smaller, faster and more efficient computers associated with?

- a) with transistors;
- b) with large scale integration.

**V. Прочитайте предложения. Выберите правильный вариант перевода.**

1. Those room sized computers, such as the UNIVAC 1, were based on electromagnetic devices and vacuum tube technology.

a) Эти компьютеры, такие как UNIVAC 1, были размером с комнату, на электромагнитных устройствах и вакуумных лампах.

b) Компьютеры, такие как UNIVAC 1, занимали целые помещения, и создавались на основе электромагнитных устройств и вакуумных лампах.

2. These smaller computers were known as minicomputers and were the first to incorporate operating systems.

a) Эти уменьшенные компьютеры назывались мини-компьютерами и впервые включали в себя операционные системы.

b) Эти меньшие компьютеры были известны как мини-компьютеры и впервые объединяли операционные системы.

3. A computer system is actually an integrated set of computing components.

a) В действительности компьютер – это совокупность компонентов интегральных схем.

b) Компьютер, в действительности, является совокупностью вычислительных компонентов.

**VI. Переведите письменно абзацы 3 – 5 текста.**

**Вариант 5**

**I. Перепишите предложения, выбрав подходящий модальный глагол. Переведите предложения на русский язык.**

*Example:* These samples (may/ have to/ is to) be chosen deliberately. – Эти образцы могут быть отобраны (можно отобрать) произвольно.

1. A typical e-mail address (must/ might/ have to) be susan@mail.ru.

2. Two stations far enough apart (can/ should/ might) receive different messages transmitted on the same frequency.

3. The engineers (may/ mustn't/ might not) work with faulty devices.

4. She (will be able to/ had better/ is able to) explain the properties of this group of alloys now.

**II. Перепишите предложения, подчеркните слова, которые выражены Participle I, Participle II или Gerund, указав, чем они являются (из вышеназванных). Переведите предложения на русский язык.**

*Example:* There are several ways of obtaining this substance (Gerund). – Существует несколько способов получения этого вещества.

1. There also exists an idea to use laser for solving the problem of controlled thermonuclear reaction.
2. While working at a new transmitter for deaf people Bell invented a telephone.
3. The results obtained are published in a monthly magazine.
4. Satellite links are used regularly in long-distance callings.

**III. Перепишите предложения, выбрав подходящие по смыслу видовременные формы глагола. Переведите предложения на русский язык. Укажите время и залог выбранных форм глаголов.**

*Example:* The engineer was asked/ asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. New methods of research *use/ are being used* in our lab.
2. The engineers *had designed / had been designed* first robot systems by the end of the 19<sup>th</sup> century.
3. The technicians usually *install/ are installed* new computers in our laboratory.
4. The future machine tools *will make/ will be made* faster and more precise.

**IV. Определите глаголы-сказуемые в предложениях. Перепишите предложения, преобразуя глаголы-сказуемые из активного в пассивный залог, сохраняя временные формы глаголов. Переведите предложения на русский язык.**

*Example:* A.S. Popov *invented* the radio in 1895. – The radio *was invented* by A.S. Popov in 1895. – Радио было изобретено А. С. Поповым в 1895 году.

1. The new device will reduce the time of the operation.
2. They are making an increasing use of computer networks of various sizes now.
3. By the beginning of the lecture the laboratory assistant had brought all the necessary diagrams.
4. Mechanical devices increased labour productivity in industry.

**V. Перепишите предложения и переведите их на русский язык, обращая внимание на определительные и дополнительные придаточные предложения.**

*Example:* We understand *that this problem must be solved*. – Мы понимаем, что эту задачу надо решить.

1. We understood what gigantic experimental work was made before the adoption of the project.
2. They wanted to build a machine which people could use to talk over long distances.

3. Scientists wanted to find out if electricity could be used for a long-distance communication.

4. A television screen and camera that will be used with usual telephone are very small.

## Работа над текстом

### I. Ознакомьтесь с новыми словами к тексту.

to perform	//pq'fLm//	выполнять
a set	//set//	совокупность, набор
to develop	//dI'velqp//	создавать, разрабатывать
input	//I npVt//	устройство ввода
output	//aVtpVt//	устройство вывода
store	//stL//	память (компьютера)
available	//q'veI lqb(q)l//	доступный
to distinguish	//dI s'tI NgwI S//	различать
a compiler	//kqm'paI lq//	компилятор

### II. Прочитайте текст, постарайтесь понять его содержание.

#### The Structure of a Computer

1. The general-purpose computer is a very powerful device, its power deriving from the fact that it can be turned into a machine for performing any particular specific calculating task. This transformation is effected by providing the computer with a program which is a set of instructions defining precisely the calculation to be performed. The language in which a program is expressed is called a programming language. There are a number of these in existence.

2. A programming language provides a special set of rules and a vocabulary that is related to a computer's operation. If this set of rules and specialized vocabulary is known to both the computer programmer and the computer itself, they can be used to create a computer program.

Early in the computer's evolution, the rules and vocabulary of computer programming were known to only a very few people. But today, programming languages have been developed that are easier to use, and there are now hundreds of different English-like programming languages that can be used to program a computer.

3. Let us look at the broad structure of a computer. It consists of five components (input, store, arithmetic-logic, control, output). The program is held in a part of the store and we assume that it is there initially. The machine is always under the control unit which has a very simple operation: it takes an instruction from the store and causes it to be obeyed; then it takes the next instruction from the store and causes it to be obeyed, and so on. The instructions may:

a) cause some data to be read into the (other part of the) store;

b) cause some appropriate operations to take place on data held in the store.

4. We have assumed here that the program is initially in the store and that the data is available at input. The question is: how does the program get into the machine? The answer is it is read by another program which resides in the machine, called a compiler. The compiler not only reads in the program, but also converts it from the so-called source language into the language of the machine (the so-called object language).

5. We must, at this point, distinguish carefully the roles of the program and the data. In real life a program, once written, will be used unchanged on different sets of data perhaps over an extended time. Thus we conceive of the program as the very general component and the data as the component which makes it specific. The program, once properly developed, will reside, like the compiler, within the system and data will be presented at the input whenever the program is to be run. In an environment where programs are being developed, however, we tend to use very simple data and present program and data together to the machine.

### ***III. Укажите, какие из данных утверждений соответствуют содержанию текста.***

1. The programming languages used today are much more difficult in use in comparison with the early computer programming languages, thus few people know them.

2. The compiler reads in the programme and converts it into the machine language.

3. Usually written computer programmes are used unchanged on different sets of data even over a long period of time.

### ***IV. Выберите правильные ответы на вопросы.***

1. What are the calculations to be performed defined by?

- a) by a programme;
- b) by a computer language.

2. What unit is the operation of the computer controlled by?

- a) by control;
- b) by output.

### ***V. Прочитайте предложения. Выберите правильный вариант перевода.***

1. The programme is held in a part of the store and we assume that it is there initially.

a) Программа хранится в памяти, и мы предполагаем, что она находится там изначально.

b) Программа хранится в разделе памяти и мы допускаем ее туда изначально.

2. The instructions may cause some data to be read into store.

- a) Команды могут направить некоторую информацию в память.
- b) Инструкции могут приказать памяти считать некоторую информацию.

3. The compiler not only reads in the programme, but also converts it.  
a) Компилятор не только распознает программу, но и изменяет ее.  
b) Компилятор не только считывает программу, но и преобразует ее.

**VI. Переведите письменно абзацы 3 – 5 текста.**

**Контрольное задание №3**

При выполнении данной работы следует обратить внимание на следующие грамматические явления:

**I. Страдательный залог (Passive Voice)**

Сказуемое, выраженное глаголом в страдательном залоге, указывает на то, что действие совершается над лицом или предметом, выраженным подлежащим.

1. Образование. Страдательный залог образуется при помощи вспомогательного глагола **to be** в соответствующем времени и **Participle II** смыслового глагола (или третьей формы смыслового глагола).

2. Особенности перевода.

a) глагола-сказуемого:

– сочетанием глагола “быть” (в прошедшем или будущем времени) и краткой формой причастия страдательного залога.

This book **was published** last year. Эта книга **была опубликована** в прошлом году.

– глаголом несовершенного вида, оканчивающимся на -ся, -сь:

The experiments **were made** last year. Опыты **проводились** в прошлом году.

– неопределенно-личной формой глагола в действительном залоге в третьем лице множественного числа (при отсутствии действующего лица):

The paper **was translated** a week ago. Эту статью **перевели** неделю назад.

– личной формой глагола в действительном залоге (при наличии дополнения с предлогом **by**). Дополнение с предлогом **by** часто переводится на русский язык подлежащим:

The student **was helped** by the professor. Профессор **помог** студенту.

б) подлежащего:

– существительным (или местоимением) в именительном или винительном падежах (когда после сказуемого стоит косвенное или предложное дополнение):

**The student** *was sent* to the professor. **Студент** *был послан* к профессору.

**Студента** *послали* к профессору.

– существительным (местоимением) в дательном падеже (когда после сказуемого стоит прямое дополнение):

**We** *were sent* all the necessary equipment. **Нам** *послали* все необходимое

оборудование.

– предлогом, стоящим после глагола в страдательном залоге и не относящимся к следующим за ним словам; при переводе на русский язык ставится перед тем словом, которое в английском языке является подлежащим:

**The man can be relied upon.**

**На этого человека** можно положиться.

## II. Указательные местоимения, местоимение *it*, употребление слова *one*

К указательным местоимениям относятся местоимения: **this, that, these, those**. Функции и значение указательных местоимений в предложении:

1. Указательные местоимения:

**That** is my pen.

**Это (то)** моя ручка.

**These (those)** are the pictures of our friends.

**Это** картины наших друзей.

2. Союз, союзное слово вводит придаточные предложения: дополнительные, определительные, подлежащие, обстоятельственные.

We know **that** a computer is a complex electronic device.

Мы знаем, что вычислительная машина является сложным электронным устройством.

3. Слово-заместитель для замены упомянутого ранее существительного:

The story of the telephone is similar to **that** of the telegraph.

История развития телефона схожа с историей развития телеграфа.

### Особенности употребления местоимения *it*.

1. Личное местоимение:

I like this doll. **It** is nice.

Мне нравится эта кукла. **Она** хорошенькая.

2. Формальное подлежащее в безличных предложениях:

**It** is necessary to carry out this experiment.

Необходимо провести этот эксперимент.

3. Формальное дополнение (после глаголов *find, make, think* + *прилагательное*). В таких случаях они не переводятся.

Radioelectronics has made **it** possible to test various equipments.

Радиоэлектроника дала возможность испытывать различное оборудование.

4. Указательное местоимение:

**It** is a dictionary.

**Это** словарь.

5. Вводное слово в предложениях с эмфатической конструкцией **it is (was) ... that (who)**:

**It is** silver **that** is the best conducting material.

Именно серебро является лучшим проводящим металлом.

### Употребление слова *one*:

1. Числительное. На русский язык переводится «один»:

I have **one** dollar.

У меня один доллар.

2. Неопределенно-личное местоимение в функции подлежащего. Не переводится.

**One** must be careful when crossing the

Нужно быть осторожным, переходя

street.

улицу.

3. Заместитель существительного. Переводится местоимением *that, she, he*, а во множественном числе – *they* или совсем не переводится на русский язык.

This book is more interesting than the **one** we read last week.

Эта книга значительно интереснее, чем та (книга), которую мы читали на прошлой неделе.

### III. Глаголы *to have, to be, to do*

**Глагол to have.** Основные формы: **have – had – had.** Употребление:

1. В качестве смыслового глагола в значении «иметь», «обладать».

We **have (got)** a computer.

У нас **есть** компьютер.

2. В качестве вспомогательного глагола в сочетании с Past Participle для образования различных видовременных форм глагола.

**Have** you heard the new rock-group?

Вы слушали новую рок-группу?

3. В качестве модального глагола в значении долженствования. Сочетания *have to* в таких случаях переводится *должен, нужно, надо, приходится*.

He **has to** take a bus to get to his office.

Ему приходится ехать автобусом до своей работы.

**Глагол to be.** Основные формы: **be – was/ were – been.** Употребление:

1. В качестве смыслового глагола. Переводится *быть, находиться, существовать* или не переводится.

I **am** at home.

Я (нахожусь) дома.

She **was** at the Institute yesterday.

Она была в институте вчера.

2. В качестве вспомогательного глагола для образования форм продолженных времен и продолженных совершенных времен, а также для образования страдательного залога.

They **are reading** now.

Они читают книгу.

A new magazine **was bought**.

Новый журнал купили.

3. В качестве глагола-связки (быть, являться).

I **am** a full-time student.

Я студент дневного отделения.

4. Глагол **to be** в конструкции **TO BE + инфинитив:**

– в качестве глагола-связки:

Her dream **is to go** to Italy.

Ее мечта – поехать в Италию.

– в качестве модального глагола со значением “должен”:

You **are to come** tomorrow.

Ты должен прийти завтра.

**Глагол to do.** Основные формы: **do – did – done.** Употребление:

1. В качестве смыслового глагола и переводится “делать”.

I **do** everything myself.

Я все **делаю** сам.

2. В качестве вспомогательного глагола для образования вопросительной и отрицательной форм глаголов в *Present, Past Simple*.

**Do** you like music?

Ты любишь музыку?

3. В повелительном наклонении при образовании отрицательных форм.

**Don't** drink cold water!

Не пейте холодную воду!

4. Во избежание повторения предыдущего основного глагола (тогда глагол **do** переводится тем же глаголом, который он заменяет) основной глагол может опускаться при переводе.

She danced well. – Yes, she **did**.

Она танцевала хорошо. – Да (хорошо).

She lives in a hostel but I **don't**.

Она живет в общежитии, а я нет.

5. Усиление.

Come on, be honest – who **did** tell you?

Ну давай, будь честным – так кто же тебе сказал?

#### IV. Инфинитив

Инфинитив, или неопределенная форма глагола, относится к неличным формам глагола и сочетает в себе свойства глагола и существительного. Инфинитив отвечает на вопросы “что делать?”, “что сделать?": **to read** – читать, **to write** – писать, **to promise** – обещать и т.д.

Формальным признаком инфинитива является частица **to**, которая стоит перед ним. В некоторых случаях **to** опускается.

#### *Субъектный инфинитивный оборот (Complex Subject).*

В конструкции “субъектный инфинитивный оборот” действие, совершаемое подлежащим, выражается инфинитивом. Глагол-сказуемое лишь указывает на отношение к этому действию. Перевод предложения следует начинать со сказуемого (неопределенно-личным оборотом) и, если требуется по смыслу, вводится союз “что”.

**These elements are known to have been found** twenty years ago. *Известно, что эти элементы были открыты* двадцать лет назад.

Между компонентами сложного подлежащего может стоять сказуемое, выраженное:

а) глаголом в форме страдательного залога: **to be said, to be reported, to be known, to be stated, to be supposed, to be considered, to be seen, to be expected, to be believed** и др.;

б) глаголом в форме действительного залога: **to seem** – казаться, **to appear, to prove** – оказываться, **to happen** – случайно оказаться;

в) сочетаниями: **to be likely** – вероятно, возможно, **to be unlikely** – маловероятно, **to be sure** – несомненно, **to be certain** – безусловно.

**The group is believed to complete the research** next month. *Считают, что группа закончит исследование* в следующем месяце.

#### Вариант 1

**I. Выберите правильный вариант видовременной формы глагола, перепишите предложения и переведите их на русский язык, указав, в какой видовременной форме находится выбранный вами глагол.**

*Example:* The engineer ... to test the device.



a) was asked; b) have been asked; c) are asking; d) has asked.

The engineer was asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. An ever-increasing volume of information ... in digital form.

a) are transmitted; b) are been transmitted; c) is transmitted; d) transmits.

2. The digital pulses ... perfectly after they become attenuated with distance.

a) can be regenerated; b) can been regenerated; c) could have be regenerated; d) being regenerated.

3. Access to knowledge ... far easier recently by computerized indexes of scientific and technical journals.

a) were made; b) has been made; c) are made; d) make.

4. Your watch is not ready yet. It ... still ... .

a) are ... being repaired; b) was ... being repaired; c) is ... repairing; d) is ... being repaired.

**II. Прочитайте предложения, перепишите их, выделив указательные местоимения. Переведите письменно предложения на русский язык.**

*Example:* We know that a computer is a complex electronic device. – Мы знаем, что вычислительная машина является сложным электронным устройством.

1. That machine is quite automatic – it does everything by itself.

2. There are computers that can do many jobs.

3. Two of these elements, germanium and silicon, are especially important.

4. The story of the telephone is similar to that of the telegraph.

**III. Прочитайте предложения, перепишите их, обращая внимание на выделенное местоимение it, переведите предложения на русский язык.**

*Example:* We find it necessary to repeat the experiment (формальное дополнение). – Мы считаем необходимым повторить этот эксперимент.

1. It was in 1869 that Mendeleev published his Periodic Table.

2. Automation makes it possible to obtain and develop new sources of energy.

3. This is a complex problem, but we can solve it.

4. It is evident that electricity will be the energy of the future.

5. It is our future specialty, but we do not know much about it at present.

**IV. Прочитайте предложения, перепишите их, обращая внимание на выделенные слова ones, one, переведите предложения на русский язык.**

*Example:* One should be very careful. – Нужно быть очень осторожным.

1. One must know that these rays produce a harmful effect on man.

2. One may work in this laboratory only observing certain rules.

3. The new technologies that are being developed must be connected with traditional ones.

4. One of the wonderful applications of electronics is radar.

**V. Перепишите предложения, употребив глаголы в правильной видовременной форме, переведите предложения на русский язык. Обратите внимание на функции глаголов to have, to do, to be в предложениях.**

*Example:* This material (*to have*) many valuable qualities. – This material *has* many valuable qualities. – Этот материал имеет много ценных свойств.

1. A good conductor (*to have*) many free electrons.
2. The duration of the pulse (*to have*) to be approximately a thousand-millionth of a second.
3. The Internet (*to be*) composed of a large number of smaller interconnected networks called internets.
4. They (*to be*) to prepare everything for the experiment.
5. Scientists (*to do*) a lot of research recently.
6. (*to do*) semiconductors conduct electric current worse than metals?

**VI. Перепишите предложения, подчеркните инфинитив. Переведите предложения на русский язык.**

*Example:* To solve the problem is very important. – Решить эту проблему – очень важно.

1. The problems to be solved are of great importance.
2. To make this experiment you should use the new device.
3. They seem to have made a mistake in their measurements.
4. To study this phenomenon requires much knowledge.

**VII. Перефразируйте следующие предложения, употребив субъектный инфинитивный оборот. Напишите их и переведите на русский язык.**

*Example:* It is expected that the experiment will be over soon. – The experiment is expected to be over soon. – Предполагают, что эксперимент скоро закончится.

1. It is reported that the research has been carried out successfully.
2. It is said that optical technology is cost-effective and versatile.
3. It was thought that the chemicals convey important information to the brain.
4. It is expected that the new method will appear in future.

### **Работа над текстом**

**I. Читайте текст, используя пояснения к нему. Выполните упражнения к тексту.**

#### **Integrated Circuits (1)**

1. Integrated circuits were made possible by experimental discoveries which showed that semiconductor devices could perform the functions of vacuum tubes, and by mid-20<sup>th</sup>-century technology advancements in semiconductor device fabrication. The integration of large numbers of tiny transistors into a small chip was an enormous improvement over the manual assembly of circuits using discrete electronic components. The integrated circuit's mass production capability,

reliability, and building-block approach to circuit design ensured the rapid adoption of standardized ICs in place of designs using discrete transistors.

2. There are two main advantages of ICs over discrete circuits: cost and performance. Cost is low because the chips, with all their components, are printed as a unit by photolithography and not constructed a transistor at a time. Performance is high since the components switch quickly and consume little power, because the components are small and close together. Chip areas range from a few square mm to around 250 mm<sup>2</sup>, with up to 1 million transistors per mm<sup>2</sup>.

3. Among the most advanced integrated circuits are the microprocessors, which control everything from computers to cellular phones to digital microwave ovens. Digital memory chips are another family of integrated circuits that is crucially important to the modern information society. While the cost of designing and developing a complex integrated circuit is quite high, when spread across typically millions of production units the individual IC cost is minimized. The performance of ICs is high because the small size allows short traces which in turn allows low power logic (such as CMOS) to be used at fast switching speeds.

4. ICs have consistently migrated to smaller feature sizes over the years, allowing more circuitry to be packed on each chip. This increased capacity per unit area can be used to decrease cost and/or increase functionality of Moore's law. In general, as the feature size shrinks, almost everything improves—the cost per unit and the switching power consumption go down, and the speed goes up.

5. Only a half century after their development was initiated, integrated circuits have become commonly used. Computers, cellular phones, and other digital appliances are now inextricable parts of the structure of modern societies. That is, modern computing, communications, manufacturing and transport systems, including the Internet, all depend on the existence of integrated circuits. Indeed, many scholars believe that the digital revolution brought about by integrated circuits was one of the most significant occurrences in the history of mankind.

#### Notes:

vacuum tubes	электронная лампа
discrete	отдельный, дискретный
CMOS (complementary metal-oxide semiconductor)	комплементарная МОП-структура
shrink	сокращаться, уменьшаться (в размерах)
photolithography	фотолитография
performance	работа, (рабочая) характеристика

#### *II. Укажите, какие из данных утверждений соответствуют содержанию текста.*

1. It was shown that integrated circuits could perform the functions of vacuum tubes.

2. There are two main advantages of ICs over discrete circuits: cost and speed.

3. Advanced integrated circuits are incorporated into all modern electronic devices.

4. The ICs size has remained the same for years.

5. Scientists believe that the digital revolution brought by ICs was one of the most important events in the history of mankind.

### ***III. Выберите правильные ответы на вопросы:***

1. What ensured the rapid adoption of ICs?

a) The IC's mass production capability, reliability and building-block approach;

b) ICs high speed;

c) ICs low power consumption.

2. Why is the ICs cost low?

a) because they are constructed a transistor at a time;

b) because they are printed as a unit by photolithography;

c) because they consume little power.

3. What has consistently been decreased in ICs?

a) their functionality;

b) their speed;

c) their feature size.

### ***IV. Прочитайте предложения. Выберите правильный вариант перевода.***

1. The integration of large numbers of tiny transistors into a small chip was an enormous improvement over the manual assembly of circuits using discrete electronic components.

a) Интеграция большего числа маленьких транзисторов на небольшой схеме явилась величайшим усовершенствованием по отношению к ручному собранию схем из отдельных компонентов.

b) Интеграция большого количества крошечных транзисторов на небольшой пластине имела большое преимущество над ручной сборкой, использующей дискретные электронные компоненты.

c) Интеграция большого количества крошечных транзисторов на одной маленькой схеме представляла огромное усовершенствование по сравнению с ручной сборкой схем из отдельных электронных элементов.

2. There are two main advantages of ICs over discrete circuits: cost and performance.

a) ИС имеют два главных преимущества над дискретными схемами: стоимость и представление.

b) Двумя главными преимуществами ИС над дискретными схемами являются стоимость и выступление.

c) Двумя главными преимуществами ИС над дискретными схемами являются стоимость и производительность.

3. The increased capacity per unit area can be used to decrease cost and/ or increase functionality of Moore's law.

а) Увеличение емкости на единицу площади можно использовать для уменьшения стоимости и/ или увеличение функциональности закона Мура.

б) Увеличенная емкость на единице площади может быть использована, чтобы уменьшить стоимость и/ или увеличить функциональность закона Мура.

с) Увеличенная емкость на площадь может использоваться для уменьшения стоимости и/ или увеличения функциональности закона Мура.

**V. Переведите письменно абзацы 3 – 5 текста.**

### Вариант 2

**I. Выберите правильный вариант видовременной формы глагола, перепишите предложения и переведите их на русский язык, указав, в какой видовременной форме находится выбранный вами глагол.**

*Example:* The engineer ... to test the device.

a) was asked; b) have been asked; c) are asking; d) has asked.

The engineer was asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. The Internet, a global computer network ... to survive a nuclear war in 1969.

a) had being designed; b) are designed; c) was designed; d) designed.

2. If polished metal ... a negative charge and then is flooded with ultraviolet radiation, it steadily loses the charge.

a) are given; b) is given; c) will give; d) are been give.

3. Advanced phones with keyboards and small screens ... to access the Internet and send and receive e-mail.

a) have already being developed; b) have already been developed; c) are already developing; d) have already developed.

4. The working principles of electronics ... by tracing the history of radio tubes and photoelectric cells.

a) can been demonstrate; b) could demonstrate; c) can be demonstrating; d) can be demonstrated.

**II. Прочитайте предложения, перепишите их, выделив указательные местоимения. Переведите письменно предложения на русский язык.**

*Example:* We know **that** a computer is a complex electronic device. – Мы знаем, что вычислительная машина является сложным электронным устройством.

1. These parts come from Japan, but we put them together here in Italy.

2. The electrical qualities of semiconductors lie half-way between those of insulators and conduction.

3. Advanced phones with keyboards and small screens are now in development that can access the Internet and send and receive e-mail.

4. The price of a colour TV set was still eight times as much as that of a black-and-white receiver.

**III. Прочитайте предложения, перепишите их, обращая внимание на выделенное местоимение *it*, переведите предложения на русский язык.**

*Example:* We find *it* necessary to repeat the experiment (формальное дополнение). – Мы считаем необходимым повторить этот эксперимент.

1. The term “engineering” is used in many specialties; *it* has many meanings.
2. He thinks *it* important to begin the experiment under working conditions.
3. *It* seemed to us that the computer was out of order.
4. *It* is the system known as a remote control.
5. *It* is the gravitation that makes the satellites move round the Earth.

**IV. Прочитайте предложения, перепишите их, обращая внимание на выделенные слова *ones, one*, переведите предложения на русский язык.**

*Example:* *One* should be very careful. – Нужно быть очень осторожным.

1. I know only *one* solution of this problem.
2. The second satellite was launched about a month after the first *one*.
3. The floods destroyed some smaller bridges, but left the main *ones* untouched.
4. *One* can easily regulate the speed of this machine.

**V. Перепишите предложения, употребив глаголы в правильной видовременной форме, переведите предложения на русский язык. Обратите внимание на функции глаголов *to have, to do, to be* в предложениях.**

*Example:* This material (*to have*) many valuable qualities. – This material *has* many valuable qualities. – Этот материал имеет много ценных свойств.

1. He (*to have*) to demonstrate a new machine tomorrow.
2. The table of elements (*to have*) gaps, but Mendeleev predicted that they would be filled by elements not yet discovered.
3. Steps (*to be*) to be taken to purify the substance.
4. The Internet (*to be*) based on the concept of a client-server relationship between computers, also called a client.
5. Semiconductor devices let electric current pass through them only in one direction and (*to do*) conduct it at all in the other.
6. I (*to do*) a huge amount yesterday. I finished the report, I ordered some new textbooks.

**VI. Перепишите предложения, подчеркните инфинитив. Переведите предложения на русский язык.**

*Example:* To solve the problem is very important. – Решить эту проблему – очень важно.

1. To make this experiment is very important.
2. There is no doubt that in time scientists will realize some new projects.
3. To know physics well you must study hard.
4. Do you know how to use the machine or would you like me to show you?

**VII. Перефразируйте следующие предложения, употребив субъектный инфинитивный оборот. Напишите их и переведите на русский язык.**

*Example:* It is expected that the experiment will be over soon. – The experiment is expected to be over soon. – Предполагают, что эксперимент скоро закончится.

1. It is expected that this method will offer some advantages.
2. It has been claimed that the Earth is shrinking by ten meters each year.
3. It is known that the power station is situated on the Angara River.
4. It is considered that this device has been designed in that laboratory.

### **Работа над текстом**

***I. Прочитайте текст, используя пояснения к нему. Выполните упражнения к тексту.***

#### **Integrated Circuits (2)**

1. A monolithic integrated circuit (also known as IC, microchip, silicon chip, computer chip or chip) is a miniaturized electronic circuit (consisting mainly of semiconductor devices, as well as passive components) which has been manufactured in the surface of a thin substrate of semiconductor material.

2. Integrated circuits were made possible by experimental discoveries which showed that semiconductor devices could perform the functions of vacuum tubes, and by mid-20<sup>th</sup>-century technology advancements in semiconductor device fabrication. The integration of large numbers of tiny transistors into a small chip was an enormous improvement over the manual assembly of circuits using discrete electronic components.

3. Integrated circuits can be classified into analog, digital and mixed signal (both analog and digital on the same chip).

4. Digital integrated circuits can contain anything from one to millions of logic gates, flip-flops, multiplexers, and other circuits in a few square millimeters. The small size of these circuits allows high speed, low power dissipation, and reduced manufacturing cost compared with board-level integration. The latest server processor from Intel had 4 billion transistors on a chip.

Analog integrated circuits perform analog functions like amplification, active filtering, demodulation, mixing, etc.

5. ADCs and DACs are the key elements of mixed signal ICs. They convert signals between analog and digital formats.

6. ICs generally can be classified into analog ICs and digital ICs, according to the element's (circuit) function. Analog ICs, like sensors, power management circuits, and operational amplifiers, work by processing continuous signals, while digital ICs like microprocessors, DSPs, and micro controllers work using binary math to process "one" and "zero" signals. However, today's ICs often combine both analog and digital circuits on a single chip to create functions such as A/D converters and D/A converters. Such circuits offer smaller size and lower cost, but must carefully account for signal interference (see signal integrity).

7. The growth of complexity of integrated circuits follows a trend called "Moore's Law", first observed by Gordon Moore of Intel. Moore's Law in its modern interpretation states that the number of transistors in an integrated circuit doubles

every two years. By the year 2000 the largest integrated circuits contained hundreds of millions of transistors. It is difficult to say whether the trend will continue.

**Notes:**

vacuum tubes	электронная лампа
substrate	подложка
logic gates	логический затвор
DAC (digital-to-analog converter)	цифроаналоговый преобразователь
ADC (analog –to-digital converter)	аналого-цифровой преобразователь
flip-flop	триггер
dissipation	рассеивание
DSP (digital signal processor)	цифровой обработчик сигналов

**II. Укажите, какие из данных утверждений соответствуют содержанию текста.**

1. Microchip, silicon chip, chip are also the names of a monolithic IC.
2. ICs have been replaced by transistors.
3. ICs can be only digital.
4. Mixed signal ICs contain ADCs and DACs key elements.
5. According to “Moore’s Law” the number of transistors in an integrated circuit trebles every two years.

**III. Выберите правильные ответы на вопросы:**

1. Where can monolithic ICs be manufactured?
  - a) in microprocessors;
  - b) in the surface of a thin substrate of semiconductor material;
  - c) in vacuum tubes.
2. What components can an integrated circuit contain?
  - a) only transistors;
  - b) logic gates, flip-flops, multiplexers;
  - c) capacitors.
3. According to what are ICs generally classified?
  - a) the number of transistors per chip;
  - b) the size of circuits;
  - c) according to the circuit functions.

**IV. Прочитайте предложения. Выберите правильный вариант перевода.**

1. A monolithic integrated circuit has been manufactured in the surface of a thin substrate of semiconductor material.
  - a) Монолитная интегральная схема производилась на поверхности тонкого субстрата полупроводникового материала.
  - b) Монолитная интегральная схема производится на тонкой подложке полупроводникового материала.
  - c) Монолитная интегральная схема была изготовлена в поверхности тонкой подложки полупроводникового материала.



2. The latest server processor from Intel had 4 billion transistors on a chip.
- Последний процессор модели Intel имел 4 млрд транзисторов на схеме.
  - Интегральная схема последней модели процессора Intel включала 4 млрд транзисторов.
  - Последний процессор от Intel содержит 4 млрд транзисторов на каждой схеме.
3. Today's ICs often combine both analog and digital circuits on a single chip.
- Современные интегральные схемы часто комбинируют аналоговые и цифровые схемы на одном кристалле.
  - Современные интегральные схемы часто совмещают обе аналоговые и цифровые схемы на одном кристалле.
  - В современных интегральных схемах часто совмещаются как аналоговые, так и цифровые схемы на одном кристалле.

**V. Переведите письменно абзацы 1 – 5 текста.**

### Вариант 3

**I. Выберите правильный вариант видовременной формы глагола, перепишите предложения и переведите их на русский язык, указав, в какой видовременной форме находится выбранный вами глагол.**

*Example:* The engineer ... to test the device.

a) was asked; b) have been asked; c) are asking; d) has asked.

The engineer was asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. Digital disks ... of plastic coated with aluminum and the information is recorded by using a powerful laser.

a) is made; b) make; c) have being made; d) are made.

2. At present high-capacity optical transmission systems ... between many major cities at a rapid rate.

a) are installing; b) are being installed; c) have installed; d) installed.

3. Telegraphs ... by other forms of telecommunications such as fax machines and electronic mail, but they are still used in some parts of the world to send messages.

a) has largely replaced; b) are replacing largely; c) have been largely replaced; d) are being largely replaced.

4. Resulting changes in the plate current ... by passing the signal through more tubes.

a) can be amplified; b) can be amplified; c) could be amplified; d) can be amplifying.

**II. Читайте предложения, перепишите их, выделив указательные местоимения. Переведите письменно предложения на русский язык.**

*Example:* We know **that** a computer is a complex electronic device. – Мы знаем, что вычислительная машина является сложным электронным устройством.

1. The work of a university or college graduate is more efficient than that of a specialist with secondary education.

2. The first solar battery operated on semiconductor crystals similar to those used in transistors.

3. Broadcast radio and cellular radio telephones are examples of devices that create signals by modulating radio waves.

4. These two metal sections are then bolted together to make one.

**III. Прочитайте предложения, перепишите их, обращая внимание на выделенное местоимение *it*, переведите предложения на русский язык.**

*Example:* We find *it* necessary to repeat the experiment (формальное дополнение). – Мы считаем необходимым повторить этот эксперимент.

1. This is a small car, but *it* has a powerful engine.

2. Electronics makes *it* possible to raise industrial automation to a higher level.

3. *It* is a new subject; we shall study *it* for two years.

4. *It* is necessary to carry out this experiment.

5. *It* was Einstein who provided a new conception of time, space and gravitation.

**IV. Прочитайте предложения, перепишите их, обращая внимание на выделенные слова *ones, one*, переведите предложения на русский язык.**

*Example:* *One* should be very careful. – Нужно быть очень осторожным.

1. Silicon is *one* of the plentiful elements in the world.

2. *One* can easily understand why the profession of an engineer requires a special college training.

3. Only time will tell if the decisions we have taken are the correct *ones*.

4. Our laboratory equipment was much worse than the new *one*.

**V. Перепишите предложения, употребив глаголы в правильной видовременной форме, переведите предложения на русский язык. Обратите внимание на функции глаголов *to have, to do, to be* в предложениях.**

*Example:* This material (*to have*) many valuable qualities. – This material *has* many valuable qualities. – Этот материал имеет много ценных свойств.

1. The first television invention that (*to have*) practical consequences was the “electrical telescope”.

2. Some materials with useful qualities (*to have*) to be sent by ship in a week.

3. For some time it (*to be*) possible to conduct meetings by video with colleagues across town or across the world.

4. One of the most interesting developments in telecommunication (*to be*) in the rapid progress of optical communication.

5. With recent advances in technology, we can (*to do*) things we couldn't have dreamed of 10 years ago.

6. What (*to do*) you do to get such high amplification of the signal?

**VI. Перепишите предложения, подчеркните инфинитив. Переведите предложения на русский язык.**

*Example: **To solve** the problem is very important. – Решить эту проблему – очень важно.*

1. To prove this law experimentally is very difficult.
2. In the next few years laser will become one of the main technological tools.
3. I regret to notify you that the model you want is out of stock.
4. Signals to be measured must be strong enough.

**VII. *Перепаразируйте следующие предложения, употребив субъектный инфинитивный оборот. Напишите их и переведите на русский язык.***

*Example: It is expected that the experiment will be over soon. – The experiment is expected to be over soon. – Предполагают, что эксперимент скоро закончится.*

1. It can be said that the world is in the midst of an electronic revolution.
2. It seems that the results of the solar project are very important.
3. It is unlikely that engineers will find a solution to the problem quickly.
4. It is known that sound travels through the air in waves.

### **Работа над текстом**

**I. *Прочитайте текст, используя пояснения к нему. Выполните упражнения к тексту.***

#### **From the History of ICs**

1. The integrated circuit was first conceived by a radar scientist, Geoffrey W.A. Dummer (born 1909), working for the Royal Radar Establishment of the British Ministry of Defence.

The first integrated circuits contained only a few transistors. Called "Small-Scale Integration" (SSI), they used circuits containing transistors numbering in the tens. SSI circuits were crucial to early aerospace projects. Both the Minuteman missile and Apollo program needed lightweight digital computers; the Apollo guidance computer motivated the integrated-circuit technology, while the Minuteman missile forced it into mass-production.

2. The next step in the development of integrated circuits, taken in the late 1960s, introduced devices which contained hundreds of transistors on each chip, called "Medium-Scale Integration" (MSI).

They were attractive economically because while they cost little more to produce than SSI devices, they allowed more complex systems to be produced using smaller circuit boards, less assembly work (because of fewer separate components), and a number of other advantages.

3. Further development, driven by the same economic factors, led to "Large-Scale Integration" (LSI) in the mid 1970s, with tens of thousands of transistors per chip. LSI circuits began to be produced in large quantities around 1970, for computer main memories and pocket calculators.

4. The final step in the development process, starting in the 1980s and continuing on, was "Very Large-Scale Integration" (VLSI), with hundreds of thousands of transistors, and beyond (well past several million in the latest stages).

For the first time it became possible to fabricate a CPU on a single integrated circuit, to create a microprocessor. In 1986 the first one megabit RAM chips were introduced, which contained more than one million transistors. Microprocessor chips produced in 1994 contained more than three million transistors.

5. This step was largely made possible by the codification of "design rules" for the CMOS technology used in VLSI chips, which made production of working devices much more of a systematic endeavour. To reflect further growth of the complexity, the term ULSI that stands for "Ultra-Large Scale Integration" was proposed for chips of complexity more than 1 million of transistors. However there is no qualitative leap between VLSI and ULSI, hence normally in technical texts the "VLSI" term covers ULSI as well, and "ULSI" is reserved only for cases when it is necessary to emphasize the chip complexity, e.g. in marketing.

6. The most extreme integration technique is wafer-scale integration (WSI), which uses whole uncut wafers containing entire computers (processors as well as memory). The WSI technique failed commercially, but advances in semiconductor manufacturing allowed for another attack on IC complexity, known as System-on-Chip (SOC) design. In this approach, components traditionally manufactured as separate chips to be wired together on a printed circuit board are designed to occupy a single chip that contains memory, microprocessor(s), peripheral interfaces, Input/Output logic control, data converters, and other components, together composing the whole electronic system.

#### Notes:

IC	интегральная схема
small (medium, large) IC	интегральная схема с маленькой (средней, большой) степенью интеграции
CPU	центральное процессорное устройство
CMOS	комплементарная МОП-структура
RAM	запоминающее устройство с произвольным доступом

#### *II. Укажите, какие из данных утверждений соответствуют содержанию текста.*

1. The first IC contained a huge amount of transistors.
2. Two US aerospace projects were interested in integrated-circuit technology.
3. In the late 1960s there appeared LSI circuits.
4. At the final step in the IC technology development process VLSI circuits were fabricated and, thus, it was quite possible to develop and produce CPU.

5. In SOC design circuits all components are wired on a printed circuit board and compose the whole electronic system.

#### *III. Выберите правильные ответы на вопросы.*

1. Why were the first ICs called SSI circuits?
  - a) because they were of small size;
  - b) because they contained only tens of transistors;

- c) because they were of little use.
- 2. What were the advantages of MSI circuits?
  - a) they cost less;
  - b) they needed no further development;
  - c) they allowed to produce more complex systems and needed less assembly work.
- 3. What is the most extreme integrated technique?
  - a) ULSI;
  - b) WSI;
  - c) SOC design.

#### ***IV. Прочитайте предложения. Выберите правильный вариант перевода.***

- 1. The Apollo guidance computer motivated the integrated-circuit technology, while the Minuteman missile forced it into mass production.
  - a) Компьютер наведения ракет Apollo продвинул технологию интегральных схем, а ракета Minuteman ускорила ее массовое производство.
  - b) Компьютер наведения ракет Apollo мотивировал технологию интегральных схем, а ракета Minuteman форсировала ее массовое производство.
  - c) Компьютер Apollo выдвинул технологию интегральных схем, в то время как Minuteman ускорил ее массовое производство.
- 2. For the first time it became possible to fabricate a CPU on a single IC.
  - a) Впервые стало возможным фабриковать ЦПУ на одной ИС.
  - b) Впервые стало возможным создавать ЦПУ на одиночной ИС.
  - c) Впервые представилась возможность создавать ЦПУ на одной ИС.
- 3. The term ULSI that stands for "Ultra-Large Integration" was proposed for chips of complexity more than 1 million transistors.
  - a) Термин СБИС, который подразумевает интегральную схему со сверхбольшой степенью интеграции, был предложен для схем, содержащих более чем 1 миллион транзисторов.
  - b) Название СБИС, означающее сверхбольшую интегральную схему, было предложено для схем со степенью интеграции более 1 миллиона транзисторов.
  - c) Название СБИС было предложено для чипов со степенью интеграции более 1 миллиона транзисторов.

#### ***V. Переведите письменно абзацы 3 – 5 текста.***

### **Вариант 4**

***I. Выберите правильный вариант видовременной формы глагола, перепишите предложения и переведите их на русский язык, указав, в какой видовременной форме находится выбранный вами глагол.***

*Example:* The engineer ... to test the device.

a) was asked; b) have been asked; c) are asking; d) has asked.

The engineer was asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. The first digital disks ... in 1982 as compact disks for music.

a) were produce; b) are produced; c) were produced; d) were been produced.

2. Satellite transmission ... for international telegraphy.

a) is now widely used; b) have now widely used; c) is now widely using; d) is now been used widely.

3. When the conditions for fusion ..., the energy released appears as intense ultraviolet radiation which heats up the surface of the reactor wall.

a) have been met; b) have met; c) are been met; d) were been met.

4. The intensity of a laser ... to encode very complex signals.

a) can rapidly changed; b) can be rapidly changing; c) can be rapidly changed; d) can have rapidly changed.

**II. Прочитайте предложения, перепишите их, выделив указательные местоимения. Переведите письменно предложения на русский язык.**

*Example:* We know **that** a computer is a complex electronic device. – Мы знаем, что вычислительная машина является сложным электронным устройством.

1. That new mechanism could control many operations.

2. Telecommunications embraces all devices and systems that transmit electronic signals across long distances.

3. Two of these elements, germanium and silicon, are especially important.

4. Each hole will behave in a manner similar to that of an electron.

**III. Прочитайте предложения, перепишите их, обращая внимание на выделенное местоимение *it*, переведите предложения на русский язык.**

*Example:* We find **it** necessary to repeat the experiment (формальное дополнение). – Мы считаем необходимым повторить этот эксперимент.

1. The essential characteristic of a robot is that **it** can be programmed.

2. **It** is evident that a robot must imitate the manual actions of human beings.

3. Vacuum tubes make **it** possible to convert part of their output in visible light.

4. **It** was Mendeleev who formulated the periodic law.

5. **It** is the most interesting article on this subject.

**IV. Прочитайте предложения, перепишите их, обращая внимание на выделенные слова *ones, one*, переведите предложения на русский язык.**

*Example:* **One** should be very careful. – Нужно быть очень осторожным.

1. **One** of the most interesting uses of laser is in the world of newspapers.

2. **One** can associate the term “robot” with the manipulator.

3. Nowadays, many people have a mobile phone, but I’ve never used **one**.

4. The new technologies that are being developed must be connected with traditional **ones**.

**V. Перепишите предложения, употребив глаголы в правильной видовременной форме, переведите предложения на русский язык. Обратите внимание на функции глаголов to have, to do, to be в предложениях.**

*Example:* This material (**to have**) many valuable qualities. – This material **has** many valuable qualities. – Этот материал имеет много ценных свойств.

1. Computer integrated telephony, for example, (**to have**) great applications for telephone banking.

2. All of this work (**to have**) to be done before the end of the day.

3. The form of energy most required by us (**to be**) mechanical energy.

4. The professor (**to be**) to make a report at the conference.

5. The pressure changed, so (**to do**) the temperature.

6. I think, David (**to do**) something to the computer. I can't get it to work.

**VI. Перепишите предложения, подчеркните инфинитив. Переведите предложения на русский язык.**

*Example:* **To solve** the problem is very important. – Решить эту проблему – очень важно.

1. This method is accurate enough to give reliable results.

2. He can complete all the necessary measurements himself.

3. The idea to use this new substance didn't leave us.

4. To form the image a second disk will be needed.

**VII. Перефразируйте следующие предложения, употребив субъектный инфинитивный оборот. Напишите их и переведите на русский язык.**

*Example:* It is expected that the experiment will be over soon. – The experiment is expected to be over soon. – Предполагают, что эксперимент скоро закончится.

1. It is likely that energy crises will soon begin.

2. It was assumed that the gas was poisonous.

3. It is known that the sun represents a mass of compressed gases.

4. It is reported that the new rocket will go into operation next year.

### Работа над текстом

**I. Прочитайте текст, используя пояснения к нему. Выполните упражнения к тексту.**

#### Semiconductor

1. A semiconductor is a solid whose electrical conductivity can be controlled over a wide range, either permanently or dynamically. Semiconductors are tremendously important technologically and economically. Semiconductors are essential materials in all modern electrical devices, from computers to cellular phones to digital audio players. Silicon is the most commercially important semiconductor.

2. Semiconductors are very similar to insulators. The two categories of solids differ only in that insulators have larger band gaps energies that electrons must acquire to be free to flow. In semiconductors at room temperature, just as in

insulators, very few electrons gain enough thermal energy to leap the band gap, which is necessary for conduction. For this reason, pure semiconductors and insulators, in the absence of applied fields, have roughly identical electrical properties. The smaller band gaps of semiconductors, however, allow for many other means besides temperature to control their electrical properties.

3. Semiconductors' intrinsic electrical properties are very often permanently modified by introducing impurities, in a process known as doping. Upon the addition of a sufficiently large proportion of dopants, semiconductors conduct electricity nearly as well as metals.

4. In certain semiconductors, when electrons fall from the conduction band to the valence band (the energy levels above and below the band gap), they often emit light. This photoemission process underlies the light emitting diode (LED) and the semiconductor laser, both of which are tremendously important commercially. Conversely, semiconductor absorption of light in photodetectors excites electrons from the valence band to the conduction band, facilitating reception of fiber optic communications, and providing the basis for energy from solar cells.

5. Semiconductors may be elemental materials, such as silicon, compound semiconductors such as gallium arsenide, or alloys, such as silicon germanium or aluminium gallium arsenide.

#### **Notes:**

semiconductor	полупроводник
silicon	кремний
insulator	диэлектрик
band gap	запрещенная зона
impurity	примесь
light-emitting diode	светодиод

#### **II. Укажите, какие из данных утверждений соответствуют содержанию текста.**

1. A semiconductor is a liquid which electric conductivity can't be controlled.
2. A semiconductor possesses the same properties as insulators.
3. Electric properties of semiconductors can't be modified by anything.
4. Electric properties of semiconductors are modified by applying electric fields and doping.
5. Some semiconductors can emit light.

#### **III. Выберите правильные ответы на вопросы.**

1. What is a semiconductor?
  - a) a gas;
  - b) a solid;
  - c) a liquid.
2. How are semiconductors' intrinsic electrical properties modified?
  - a) by doping;



- b) by oxidation;
  - c) by etching.
3. What materials represent semiconductors?
- a) elemental materials;
  - b) alloys;
  - c) elemental materials, compound semiconductors or alloys.

**IV. Прочитайте предложения. Выберите и запишите правильный вариант их перевода.**

1. Silicon is the most commercially important semiconductor, though dozens of others are important as well.

- a) Кремний – самый промышленно важный полупроводник, хотя десятки других важны также.
- b) Кремний – самый важный широко распространенный полупроводник, хотя десятки других также важны.
- c) Кремний – распространенный полупроводник, хотя дюжины других также важны.

2. Semiconductor's intrinsic electrical properties are very often permanently modified by introducing impurities in a process known as doping.

- a) Очень часто собственные электрические свойства полупроводников постоянно видоизменяются внесением примесей в процесс, известный как легирование.
- b) Собственные электрические свойства полупроводников очень часто постоянно изменяются представлением примесей посредством процесса, называемого легированием.
- c) Собственные электрические свойства полупроводников постоянно изменяются посредством внесения примесей в процессе допинга.

3. This photoemission process underlies the light emitting diode (LED) and the semiconductor laser, both of which are tremendously important commercially.

- a) Этот процесс фотоэффекта лежит в основе светодиода и полупроводникового лазера, оба из которых чрезвычайно важны коммерчески.
- b) Этот процесс фотоэффекта лежит в основе светодиода и полупроводникового лазера, оба из которых чрезвычайно важны для широкого применения.
- c) Этот процесс фотоэффекта лежит в основе светодиода и полупроводникового лазера, каждый из них чрезвычайно важен для торговли.

**V. Переведите письменно абзацы 2 – 4 текста.**

**Вариант 5**

**I. Выберите правильный вариант видовременной формы глагола, перепишите предложения и переведите их на русский язык, указав, в какой видовременной форме находится выбранный вами глагол.**

*Example:* The engineer ... to test the device.

a) was asked; b) have been asked; c) are asking; d) has asked.

The engineer was asked to test the device (Past Simple, Passive Voice). – Инженера попросили испытать механизм.

1. In the late 18<sup>th</sup> century optical telegraphs ... by Claude Chappe in France and by George Murray in England.

a) has been invented; b) were invented; c) invented; d) is being invented.

2. In radio telephones such as cellular mobile telephones, voice signals ... across town or over long distances by microwaves.

a) are sent; b) is being sent; c) have sent; d) have being sent.

3. Some projects ... into effect, because of the great technological difficulties to be overcome.

a) have not yet put; b) have not yet been put; c) are not yet putting; d) are not yet been put.

4. Since satellite systems do not require the construction of intermediate relay or repeater stations they ... into service much more rapidly.

a) can be put; b) can put; c) can had put; d) can being put.

**II. Прочитайте предложения, перепишите их, выделив указательные местоимения. Переведите письменно предложения на русский язык.**

*Example:* We know that a computer is a complex electronic device. – Мы знаем, что вычислительная машина является сложным электронным устройством.

1. Those steps which can be programmed in advance offer the best opportunity for automation.

2. That radio doesn't receive the BBC World Service very well.

3. Telecommunications usually involve a sender of information by a technology, such as a telephone system, that transmits information from one place to another.

4. The television audio signals are received by equipment similar to that used in other forms of radio.

**III. Прочитайте предложения, перепишите их, обращая внимание на выделенное местоимение it, переведите предложения на русский язык.**

*Example:* We find it necessary to repeat the experiment (формальное дополнение). – Мы считаем необходимым повторить этот эксперимент.

1. It is clear that the device is out of order.

2. It is one of the most important branches of science.

3. Electronics is a rather young science. It belongs to the twentieth century.

4. The use of the new equipment made it possible to minimize the number of workers.

5. It was Russian scientist A.S. Popov who discovered the principles of radio communication.

**IV. Прочитайте предложения, перепишите их, обращая внимание на выделенные слова ones, one, переведите предложения на русский язык.**

*Example: One* should be very careful. – Нужно быть очень осторожным.

1. *One* of the first types of laser was called a ruby laser.
2. *One* can hardly find a sphere where power is not used.
3. Some substances are efficient conductors, others – poor *ones*.
4. The simplest materials are those which have only *one* kind of atoms.

**V. Перепишите предложения, употребив глаголы в правильной видовременной форме, переведите предложения на русский язык. Обратите внимание на функции глаголов to have, to do, to be в предложениях.**

*Example: This material (to have) many valuable qualities. – This material has many valuable qualities. – Этот материал имеет много ценных свойств.*

1. Fax (*to have*) the advantage of speed.
2. The road (*to have*) to be built to take traffic away from the city centre.
3. They (*to be*) to prepare everything for the experiment three days ago.
4. The Internet (*to be*) a computer-based worldwide information network.
5. He (*to do*) not like publicity, and prefers to stay firmly in the background.
6. Semiconductors (*to do*) possess many wonderful properties.

**VI. Перепишите предложения, подчеркните инфинитив. Переведите предложения на русский язык.**

*Example: To solve* the problem is very important. – Решить эту проблему – очень важно.

1. The laser's most important potential may be its use in communications.
2. In 1887 Heinrich Hertz tried to prove the existence of radio waves.
3. Neil Armstrong was the first person to walk on the moon.
4. To recognize a problem is the first step to its solution.

**VII. Перефразируйте следующие предложения, употребив субъектный инфинитивный оборот. Напишите их и переведите на русский язык.**

*Example: It is expected that the experiment will be over soon. – The experiment is expected to be over soon. – Предполагают, что эксперимент скоро закончится.*

1. It was proved that the telephone was better than the telegraph.
2. It is reported that an optical equivalent of a transistor has been produced.
3. It is said that he is one of the most promising nuclear physicists.
4. It is known that the operator works well.

### **Работа над текстом**

**I. Прочитайте текст, используя пояснения к нему. Выполните упражнения к тексту.**

### **Doping and Dopants**

1. The property of semiconductors that makes them most useful for constructing electronic devices is that their conductivity may easily be modified by introducing impurities into their crystal lattice. The process of adding controlled impurities to a semiconductor is known as doping. The amount of impurity, or dopant, added to an

intrinsic (pure) semiconductor varies its level of conductivity. Doped semiconductors are often referred to as extrinsic.

2. The materials chosen as suitable dopants depend on the atomic properties of both the dopant and the material to be doped. In general, dopants that produce the desired controlled changes are classified as either electron acceptors or donors. A donor atom that activates (that is, becomes incorporated into the crystal lattice) donates weakly-bound valence electrons to the material, creating excess negative charge carriers. Semiconductors doped with donor impurities are called n-type, while those doped with acceptor impurities are known as p-type.

3. The concentration of dopant introduced to an intrinsic semiconductor determines its concentration and indirectly affects many of its electrical properties. The most important factor that doping directly affects is the material's carrier concentration. In an intrinsic semiconductor under thermal equilibrium, the concentration of electrons and holes is equivalent. Intrinsic carrier concentration varies between materials and is dependent on temperature. Silicon's  $n_i$ , for example, is roughly  $1 \times 10^{10} \text{ cm}^{-3}$  at 300 Kelvin (room temperature).

4. In general, an increase in doping concentration affords an increase in conductivity due to the higher concentration of carriers available for conduction. Degenerately (very highly) doped semiconductors have conductivity levels comparable to metals and are often used in modern integrated circuits as a replacement for metal. Often superscript plus and minus symbols are used to denote relative doping concentration in semiconductors. It is useful to note that even degenerate levels of doping imply low concentrations of impurities with respect to the base semiconductor.

**Notes:**

doping	легирование
dopant	легирующая примесь
intrinsic	собственный полупроводник
acceptor	акцептор, акцепторная примесь
impurity	примесь
valence	валентность

**II. Укажите, какие из данных утверждений соответствуют содержанию текста.**

1. The conductive properties of semiconductors may be modified.
2. A donor atom takes weakly – bound valence electrons off the material.
3. Semiconductors doped with donor impurities are called p-type.
4. The concentration of dopant introduced to an intrinsic semiconductor determines its electric properties.
5. Doped semiconductors have conductivity levels comparable to metals.

**III. Выберите правильные ответы на вопросы.**

1. How is the process of introduction of impurities into the crystal lattice of semiconductors called?
  - a) etching;
  - b) doping;
  - c) oxidation.
2. What does the choice of materials as dopants depend on?
  - a) the atomic properties;
  - b) the electric properties;
  - c) the weight of materials.
3. What is the most important factor that doping directly affects?
  - a) the temperature of the material;
  - b) the presence of an electric field in the material;
  - c) material's carrier concentration.

#### ***IV. Прочитайте предложения. Выберите правильный вариант перевода.***

1. The materials chosen as suitable dopants depend on the atomic properties of both the dopant and the material to be doped.

a) Выбор подходящего для легирования материала зависит от атомных свойств как примеси, так и легируемого материала.

b) Материалы в качестве легирующих зависят от атомных свойств обоих материалов: и примеси, и легируемого.

c) Выбор подходящих для легирования материалов зависит как от примесного, так и легируемого материалов.

2. Therefore, a silicon crystal doped with boron creates a p-type semiconductor, whereas one doped with phosphorus result in n-type material.

a) Таким образом, кристалл кремния, легируемый бором создает p-тип полупроводника, в то время, как он, легируемый фосфором, результирует в n-тип материала.

b) Таким образом, в результате легирования бором кристалла кремния создается полупроводник p-типа, а он же, легируемый фосфором, создает материал n-типа.

c) Таким образом, кристалл кремния, легируемый бором, создает полупроводник p-типа, а он же, легируемый фосфором, создает материал n-типа.

3. It is useful to note that even degenerate levels of doping imply low concentrations of impurities with respect to the base semiconductor.

a) Следует отметить, что даже высокие степени легирования подразумевают низкие концентрации примесей по отношению к основному полупроводнику.

b) Следует отметить, что даже высокие степени легирования предполагали низкие концентрации примесей по отношению к основному полупроводнику.

с) Следует отметить, что даже высокие уровни легирования предполагают низкие концентрации примесей по отношению к базовому полупроводнику.

*V. Переведите письменно абзацы 1 – 3 текста.*

#### Контрольное задание №4

При выполнении данной работы следует обратить внимание на следующие грамматические явления:

##### I. Сложные формы инфинитива: **Passive Infinitive** и **Perfect Infinitive**

а) **Passive Infinitive** (пассивный инфинитивный) образуется при помощи инфинитива “to be” и третьей формы смыслового глагола (**Participle II**).

*Example:* to be asked, to be transmitted, to be recorded.

**Passive Infinitive** называет действие, которое направлено на лицо или предмет, обозначенный подлежащим.

*Example:* It's the research **to be done**.

б) **Perfect Infinitive** (перфектный инфинитив) образуется при помощи инфинитива “to have” и третьей формы смыслового глагола (**Participle II**).

*Example:* to have invited, to have reported, to have encoded.

Перфектный инфинитив употребляется, чтобы выразить действие, предшествующее какому-либо другому действию или ситуации.

*Example:* I remember **to have met** this person.

##### II. Причастие (**Participle I, II**)

В английском языке есть два причастия: Причастие I (настоящего времени) и Причастие II (прошедшего времени).

Причастие I выражает действие, одновременное с действием, выраженным сказуемым предложения.

*Example:* Optical fibers are **replacing** conventional telephone wires and cables.

Причастие I в предложении может выполнять различные функции:

1. She went out, **shutting** the door behind her (обстоятельство).
2. The **resulting** electron pairs are called vessel covalent bonds (определение).
3. Telephone and computer technologies are **converging** (часть простого глагольного сказуемого).

Причастие II выражает действие, законченное по отношению к действию, выраженному сказуемым.

*Example:* The ideally **built** crystalline structure is seldom found in nature.

Причастие II выполняет в предложении те же функции, что и Причастие I.

1. The space station was **opened** (часть сказуемого).
2. The device **invented** showed good performance (определение).
3. When **heated** the polymer changed its properties completely (обстоятельство).

**III. Независимый причастный оборот** обычно состоит из существительного в общем падеже, личного местоимения в именительном падеже и причастия I или II.

*Examples: It being late*, we decided to have a rest. – Поскольку было поздно, мы решили отдохнуть.

*He coming very late*, we missed the train. – Так как он пришел поздно, мы опоздали на поезд.

#### **IV. Условные предложения**

В английском языке существуют 3 типа условных предложений.

1. **I тип.** Сказуемое обозначает реальное действие. Как правило, это сложноподчиненное предложение, где главное и придаточные предложения соединены союзами *if (whether), unless*. В главном предложении употребляется время *Future Simple*, а в придаточном – *Present Simple*.

*Example: If I find a better job, I'll take it.* – Если я найду лучшую работу, я приступлю к ней.

2. **II тип.** Сказуемое употребляется в сослагательном наклонении и выражает предполагаемое действие, которое может относиться либо к настоящему, либо к будущему времени. В главном предложении сказуемое выражается при помощи *would (should) + простой инфинитив*. В придаточном предложении используется *Past Simple*.

*Example: If you painted the walls white, the room would be much brighter.* – Если бы ты покрасил стены в белый цвет, комната выглядела бы ярче.

3. **III тип.** Сказуемое обозначает предполагаемое действие, которое относится к прошлому. Это нереальное или невыполнимое действие. В главном предложении сказуемое представлено глаголом *would (should) + перфектный инфинитив*. В придаточных предложениях используется *Past Perfect*.

*Example: Nothing would have happened if he had kept silent.* – Ничего не случилось бы, если бы он промолчал.

#### **Вариант 1**

**I. Перепишите следующие предложения. Определите, является ли подчеркнутая форма инфинитивом, причастием или герундием. Переведите письменно предложения на русский язык.**

*Example: The falling water has kinetic energy. Falling* – Причастие I. Падающая вода обладает кинетической энергией.

1. To recognize a substance it isn't necessary to examine all its properties.

2. The kinetic theory of gases assumes a gas to be made up of particles moving about with random motion.

3. Vacuum tubes are known to have been the principal building blocks of electronic circuits until 1955.

4. The engineers were glad to have obtained such good results.

**II. Раскройте скобки, используя Participle I или Participle II. Переведите предложения на русский язык.**

*Example:* (**Heat**) magnet loses some of its magnetism. – Heated magnet loses some of its magnetism.

1. Central (**process**) unit – is the heart of the processor.
2. They saw new types of machine-tools at one of the plants (**visit**).
3. We need highly (**develop**) electronics and new materials to make supercomputers.
4. This (**vary**) current is carried along a wire to a receiver.

**III. Перефразируйте данные сложные предложения, употребив независимый причастный оборот. Переведите письменно полученные предложения.**

*Example:* As the weather was fine, we went for a walk. – The weather being fine, we went for a walk. – Так как погода была хорошая, мы пошли гулять.

1. When temperature rises, more and more electrons in the valence band acquire sufficient energy to break bonds.
2. As the temperature reached the boiling point, the heater was switched off.
3. If the resistance is very high, the current in the circuit is very low.

**IV. Прочитайте и перепишите следующие предложения. Определите, к какому типу условного предложения относится каждое из них. Переведите письменно предложение.**

*Example:* Ice will turn into water if you heat it. – Условное предложение I типа. – Лед превратится в воду, если его нагревать.

1. If a solid body or a liquid is heated, it will usually expand.
2. If the Earth were as hot as Venus, the oceans would vapour.
3. Marconi wouldn't have succeeded to transmit his first transoceanic message if he had attempted to transmit an entire sentence.

**Работа над текстом**

**I. Прочитайте текст. Постарайтесь понять его содержание. Выполните задания после текста.**

**CAD**

1. Designers have long used computers for their calculations. Initial developments were carried out in the 1960s within the aircraft and automotive industries in the area of 3D surface construction and NC programming, most of it independent of one another and often not publicly published until much later.

It is argued that a turning point was the development of SKETCHPAD system in 1963 by Ivan Sutherland.

The distinctive feature of SKETCHPAD was that it allowed the designer to interact with computer graphically: the design can be fed into the computer by drawing on a



CRT monitor with a light pen. Effectively, it was a prototype of graphical user interface, an indispensable feature of modern CAD.

2. First commercial applications of CAD were in large companies in the automotive and aerospace industries, as well as in electronics. Only large corporations could afford the computers capable of performing the calculations. The most influential event in the development of CAD was the founding of MCS (Manufacturing and Consulting Services Inc.) in 1971 by Dr. P. J. Hanratty, who wrote the system ADAM (Automated Drafting And Machining).

3. As computers became more affordable, the application areas have gradually expanded. The development of CAD software for personal desk-top computers was the impetus for almost universal application in all areas of construction. Other key points in the 1960s and 1970s would be the foundation of CAD systems United Computing, Intergraph, IBM in 1974. CAD implementations have evolved dramatically since then. Initially, with 2D in the 1970s, it was typically limited to producing drawings similar to hand-drafted drawings.

4. The 1980s' advances in programming and computer hardware have allowed more versatile applications of computers in design activities. Starting the late 1980s, the development of readily affordable CAD programs that could be run on personal computers began a trend of massive downsizing in drafting departments in many small to mid-size companies. As a general rule, one CAD operator could readily replace at least four or five drafters using traditional methods. Additionally, many engineers began to do their own drafting work, further eliminating the need for traditional drafting departments. This trend mirrored that of the elimination of many office jobs traditionally performed by a secretary as word processors, spreadsheets, databases, etc. became standard software packages that "everyone" was expected to learn.

Today CAD is not limited to drafting and rendering, and it ventures into many more "intellectual" areas of a designer's expertise. Computer aided design is used in many businesses and organizations around the world.

**Notes:**

indispensable	неотъемлемый
commercial	общепризнанный
perform	выполнять
implantation	реализация, внедрение
draft	проект, чертеж
eliminate	устранять (ошибки), удалять
CAD (computer-aided design)	компьютерное проектирование
3D (3-dimensional)	трехмерный
downsizing	сокращение штатов

**II. Укажите, какие из данных утверждений соответствуют содержанию текста.**

1. The developments in the area of 3D surface construction and NC programming were carried out in the late 1970s.
2. SKETCHPAD system allowed the designer to interact with computer graphically.
3. The computer applications have been continuously expanding.
4. Today CAD tasks are multipurpose.
5. Computer aided design is used only in some spheres of our life.

### ***III. Выберите правильные ответы на вопросы.***

1. What tasks did SKETCHPAD allow designers to fulfill?
  - a) Computer graphics.
  - b) Computer calculations.
  - c) Commercial operations.
2. What was the impetus for a universal application of computers?
  - a) SKETCHPAD.
  - b) ADAM.
  - c) CAD software.
3. Where is CAD used today?
  - a) In businesses and organizations.
  - b) In IBM.
  - c) In drafting departments.

### ***IV. Прочитайте предложения. Выберите правильный вариант перевода.***

1. Designers have long used computers for their calculations.
  - a) Проектировщики давно используют компьютеры для вычислений.
  - b) Проектировщики долго используют компьютеры для вычислений.
  - c) Проектировщики давно использовали компьютеры для вычислений.
2. The design can be fed into the computer by drawing on a CRT monitor with a light pen.
  - a) Начертив проект на экране монитора световым карандашом, можно ввести его в компьютер.
  - b) Проект можно ввести в компьютер, начертив его световым карандашом на экране монитора.
  - c) Чертеж можно внести в компьютер, начертив его легким маркером на экране монитора.
3. The development of CAD software for personal desk-top computers was the impetus for almost universal application.
  - a) Развитие программ компьютерного проектирования для персональных компьютеров явилось толчком для почти всемирного применения.
  - b) Создание программ компьютерного проектирования для десктопов подтолкнуло их универсальное применение.
  - c) Разработка программ компьютерного проектирования для персональных компьютеров послужило началом их почти универсального применения.

**V. Переведите письменно абзацы 3 – 4 текста.**

**Вариант 2**

**I. Перепишите следующие предложения. Определите, является ли подчеркнутая форма инфинитивом, причастием или герундием. Переведите письменно предложения на русский язык.**

*Example: The falling water has kinetic energy. Falling – Причастие I. Падающая вода обладает кинетической энергией.*

1. Heat is a form of energy, that is, it is capable of doing work.
2. Early computers using vacuum tubes could perform computations in milliseconds.
3. The process to be treated subsequently in more detail is known as ionization.
4. You should have changed the current strength at all points of the circuit.

**II. Раскройте скобки, используя Participle I или Participle II. Переведите предложения на русский язык.**

*Example: (Heat) magnet loses some of its magnetism. – Heated magnet loses some of its magnetism.*

1. The first transistor (develop) was junction transistor.
2. The transistor is a semiconductor triode (possess) the characteristics as thermionic triodes.
3. Computer components (produce) should be very clean.
4. Crystal valves (use) silicon crystals were found to be more efficient for the very high frequency signals.

**III. Перефразируйте данные сложные предложения, употребив независимый причастный оборот. Переведите письменно полученные предложения.**

*Example: As the weather was fine, we went for a walk. – The weather being fine, we went for a walk. – Так как погода была хорошая, мы пошли гулять.*

1. As the quantity of kinetic energy depends on its mass and velocity, any moving object can do work.
2. Since the method of preparation is the best of the methods described, we used it in our work.
3. When reports were generated and files updated, new tapes were made.

**IV. Прочитайте и перепишите следующие предложения. Определите, к какому типу условного предложения относится каждое из них. Переведите письменно предложение.**

*Example: Ice will turn into water if you heat it. – Условное предложение I типа. – Лед превратится в воду, если его нагревать.*

1. The measurements will be correct if the necessary instruments are used.

2. If you applied your theoretical knowledge to your work, it would lead to better results.

3. If the transistor hadn't been developed, it would have been possible to produce integrated circuits.

### **Работа над текстом**

***II. Прочитайте текст. Постарайтесь понять его содержание. Выполните задания после текста.***

#### **Telecommunications Key Concepts**

1. Telecommunication is the transmission of signals over a distance for the purpose of communication. In modern times, this process almost always involves the sending of electromagnetic waves by electronic transmitters but in earlier years it may have involved the use of smoke signals, drums or semaphore. Today, telecommunication is widespread and devices that assist the process such as the television, radio and telephone are common in many parts of the world. There is also a vast array of networks that connect these devices, including computer networks, public telephone networks, radio networks and television networks. Computer communication across the Internet, such as e-mail and instant messaging, is just one of many examples of telecommunication.

2. The basic elements of a telecommunication system are: a transmitter that takes information and converts it to a signal for transmission; a transmission medium over which the signal is transmitted; a receiver that receives and converts the signal back into usable information.

For example, consider a radio broadcast. In this case the broadcast tower is the transmitter, the radio is the receiver and the transmission medium is free space. Often telecommunication systems are two-way and devices act as both a transmitter and receiver or transceiver. For example, a mobile phone is a transceiver. Telecommunication over a phone line is called point-to-point communication because it is between one transmitter and one receiver, telecommunication through radio broadcasts is called broadcast communication because it is between one powerful transmitter and numerous receivers.

3. Signals can either be analogue or digital. In an analogue signal, the signal is varied continuously with respect to the information. In a digital signal, the information is encoded as a set of discrete values.

A collection of transmitters, receivers or transceivers that communicate with each other is known as a network. Digital networks may consist of one or more routers that route data to the correct user. An analogue network may consist of one or more switches that establish a connection between two or more users. For both types of network, a repeater may be necessary to amplify or recreate the signal when it is being transmitted over long distances.

4. The shaping of a signal to convey information is known as modulation. Modulation is used to represent a digital message as an analogue waveform.

However, modulation is also used to boost the frequency of analogue signals. There are several different modulation schemes available to achieve this – some of the most basic being amplitude modulation and frequency modulation. An example of this process is a DJ's voice being superimposed on a 96 MHz carrier wave using frequency modulation (the voice would then be received on a radio as the channel “96 FM”).

**Notes:**

involve	включать, вовлекать
array	массив, множество, совокупность
instant	мгновенный
broadcast	вещать, передавать
point-to-point communication	двухпунктовая, прямая связь
router	маршрутизатор

**II. Укажите, какие из данных утверждений соответствуют содержанию текста.**

1. Telecommunication is a short-distance communication.
2. The basic elements of telecommunication system are a transmitter and a receiver.
3. Telecommunication over a phone line is multipoint communication.
4. A network is a collection of transmitters, receivers and transceivers.
5. Modulation is used to shape a signal.

**III. Выберите правильные ответы на вопросы.**

1. What devices assist the process of telecommunication?
  - a) antennas;
  - b) television, radio, telephone;
  - c) computers and printers.
2. How are two-way telecommunication systems called?
  - a) receivers;
  - b) transmitters;
  - c) transceivers.
3. What is modulation used for?
  - a) to amplify signals;
  - b) to boost the frequency of analogue signals;
  - c) to transmit signals.

**IV. Прочитайте предложения. Выберите правильный вариант перевода.**

1. Telecommunication is the transmission of signals over a distance for the purpose of communication.
  - a) Телекоммуникация – это передача сигнала на расстояние для осуществления коммуникации.

b) Телекоммуникация – это передача сигналов на расстоянии для осуществления связи.

c) Телекоммуникация – это передача сигналов на дистанцию с целью осуществления связи.

2. Telecommunication over a phone line is called point-to-point communication.

a) Телекоммуникация по телефонной линии называется прямой связью.

b) Телекоммуникация посредством телефонной линии называется прямой связью.

c) Телекоммуникация через телефонную линию называется связью от точки к точке.

3. A collection of transmitters, receivers or transceivers that communicate with each other is known as a network.

a) Совокупность передатчиков, приемников и трансиверов, которые связаны между собой, называется сетью.

b) Коллекция передатчиков, приемников и трансиверов, осуществляющих связь между собой, называется сетью.

c) Известно, что совокупность передатчиков, приемников и трансиверов, осуществляющих связь между собой, называется сетью.

**V. Переведите письменно абзацы 2 – 3 текста.**

### Вариант 3

**I. Перепишите следующие предложения. Определите, является ли подчеркнутая форма инфинитивом, причастием или герундием. Переведите письменно предложения на русский язык.**

*Example:* The falling water has kinetic energy. Falling – Причастие I. Падающая вода обладает кинетической энергией.

1. X-rays can't be reflected easily by a mirror.

2. The rays traveling through a layer of gas use part of their energy to ionize the gas they pass through.

3. Computers are widely used for controlling all kinds of processes.

4. You should have known wonderful features of computers long ago.

**II. Раскройте скобки, используя Participle I или Participle II. Переведите предложения на русский язык.**

*Example:* (Heat) magnet loses some of its magnetism. – Heated magnet loses some of its magnetism.

1. Water (heat) above 100° C boils.

2. Algol first (introduce) in Europe in 1960, is used for mathematical and scientific purposes.

3. The (result) electron pairs are called covalent bonds.

4. Triode is a vacuum tube (contain) three electrodes.

**III. Перефразируйте данные сложные предложения, употребив независимый причастный оборот. Переведите письменно полученные предложения.**

*Example:* As the weather was fine, we went for a walk. – The weather being fine, we went for a walk. – Так как погода была хорошая, мы пошли гулять.

1. When various media are used, we can communicate quickly.
2. When free electrons move along the conductor, an electric current is generated.
3. When the electric current passes through a wire, it will be heated.

**IV. Прочитайте и перепишите следующие предложения. Определите, к какому типу условного предложения относится каждое из них. Переведите письменно предложение.**

*Example:* Ice will turn into water if you heat it. – Условное предложение I типа. – Лед превратится в воду, если его нагревать.

1. If the new instrument hadn't been developed, this experiment wouldn't have been successful.
2. If the model fits well, the observed data will be correct.
3. If radioelectronics were not developed, there would be no cosmonautics, cybernetics and other sciences.

**Работа над текстом**

**I. Прочитайте текст. Постарайтесь понять его содержание. Выполните задания после текста.**

**A Perspective on Nanotechnology**

1. In his famous speech "There's Plenty of Room at the Bottom in 1959", Richard Feynman discussed the possibility of manipulating and controlling things on a molecular scale in order to achieve electronic and mechanical systems with atomic sized components. He concluded that the development of technologies to construct such small systems would be interdisciplinary, combining fields such as physics, chemistry and biology, and would offer a new world of possibilities that could radically change the technology around us.

2. A few years later, in 1965, Moore noted that the number of transistors on a chip had roughly doubled every other year since 1959, and predicted that the trend was likely to hold as each new generation of microsystems would help to develop the next generation at lower prices and with smaller components. Up till now, the semiconductor industry has been able to fulfill Moore's Law.

The impact on society and our lives of the continuous downscaling of systems is profound, and continues to open up new frontiers and possibilities. However, no exponential growth can continue forever, and the semiconductor industry will eventually reach the atomic limit for downsizing the transistor.

3. Today, as that limit still seems to be some 20 years in the future, the growth is beginning to take new directions, indicating that the atomic limit might not be the limiting factor for technological development in the future, because systems are

becoming more diverse and because new effects appear when the systems become so small that quantum effects dominate. The semiconductor devices show an increased diversification, dividing for instance processors into very different systems such as those for cheap disposable chips, low power consumption portable devices, or high processing power devices. Microfabrication is also merging with other branches of science to include for instance chemical and optical micro systems. In addition, microbiology and biochemistry is becoming important for applications of all the developing methods. This diversity seems to be increasing on all levels in technology and many of these cross-disciplinary developments are linked to nanotechnology.

4. As the components become so small that quantum effects become important, the diversity will probably further increase as completely new devices and possibilities begin to open up that are not possible with the bulk materials of today's technology.

The visions of Feynman are today shared by many others: when nanotechnology is seen as a general cross-disciplinary technology, it has the potential to create a coming "industrial" revolution that will have a major impact on society and everyday life, comparable or exceeding the impact of electricity and information technology.

**Notes:**

scale	масштаб, уровень
roughly	приблизительно
predict	предсказать
increase	увеличивать
for instance	например

**II. Укажите, какие из данных утверждений соответствуют содержанию текста.**

1. In 1959 Richard Feynman supposed that it was possible to manipulate and control things on a molecular scale.
2. In 1965 Moore noted that the number of transistors on a chip doubled every two years.
3. The semiconductor industry will never reach the atomic limit for downsizing the transistor.
4. Today, the semiconductor devices cannot find wide application.
5. The visions of Feynman are today shared by many other scientists.

**III. Выберите правильные ответы на вопросы.**

1. What did Richard Feynman conclude in 1959?
  - a) It would be possible to achieve atomic sized components of devices.
  - b) The size of device components would achieve their limits.
  - c) It would be possible shrink electronic devices twice.
2. Who noted the doubling in the number of transistors on a chip?
  - a) Richard Feynman;
  - b) Tomas Moore;
  - c) Isaac Newton.



3. What does today's diversity of semiconductor devices show?
- It will develop further.
  - It will reach its limits.
  - It will be increasing on all levels in technology.

**IV. Прочитайте предложения. Выберите правильный вариант перевода.**

- Moore predicted that the trend was likely to hold.
  - Мур предсказал, что эта тенденция, по всей видимости, будет удерживаться.
  - Мур предсказал, что, вероятно, эта тенденция останется неизменной.
  - Мур предсказал, что это направление будет неизменным.
- However, no exponential growth can continue forever.
  - Однако никакой экспоненциальный рост не может продолжаться вечно.
  - Однако видимые изменения не будут наблюдаться постоянно.
  - Однако видимый рост не будет продолжаться долго.
- Nanotechnology is seen as a general cross-disciplinary technology.
  - Нанотехнология рассматривается как междисциплинарная технология.
  - Нанотехнология рассматривается, как технология, связанная с другими дисциплинами.
  - Нанотехнология рассматривается, как технология, пересекающаяся с другими дисциплинами.

**V. Переведите письменно абзацы 2 – 3 текста.**

**Вариант 4**

**I. Перепишите следующие предложения. Определите, является ли подчеркнутая форма инфинитивом, причастием или герундием. Переведите письменно предложения на русский язык.**

*Example: The falling water has kinetic energy. Falling – Причастие I. Падающая вода обладает кинетической энергией.*

- Though first developed for military purposes radar can be used in modern cars.
- By using this device, we are able to make new kinds of experiment.
- The elements possessing this property make the experiment impossible.
- The progress of electronics to have resulted in the invention of electronic computers was a breakthrough of the second part of the 20<sup>th</sup> century.

**II. Раскройте скобки, используя Participle I или Participle II. Переведите предложения на русский язык.**

*Example: (Heat) magnet loses some of its magnetism. – Heated magnet loses some of its magnetism.*

- The device (produce) in the laboratory was portable.
- Early computers (use) vacuum tubes could perform computations in milliseconds.

3. Now computers are arrays of integrated circuits (*build out*) of pieces of silicon.

4. The (*penetrate*) power and other characteristics of X-rays make them extremely useful in medicine.

**III. Перефразируйте данные сложные предложения, употребив независимый причастный оборот. Переведите письменно полученные предложения.**

*Example:* As the weather was fine, we went for a walk. – The weather being fine, we went for a walk. – Так как погода была хорошая, мы пошли гулять.

1. If the temperature increases, the resistivity of the semiconductor decreases.

2. When the research work was fulfilled, we decided to publish the results.

3. When the first communications satellite was launched, the satellite wireless industry exploded.

**IV. Прочитайте и перепишите следующие предложения. Определите, к какому типу условного предложения относится каждое из них. Переведите письменно предложение.**

*Example:* Ice will turn into water if you heat it. – Условное предложение I типа. – Лед превратится в воду, если его нагревать.

1. If an Integrated services Digital Network (ISDN) is developed in our country, the subscribers will have the complete spectrum of telecommunications services.

2. The machine wouldn't have been broken if all the safety measures had been taken.

3. The reaction wouldn't proceed if we didn't add some water.

### **Работа над текстом**

**I. Прочитайте текст. Постарайтесь понять его содержание. Выполните задания после текста.**

#### **Analogue and Digital Electronics**

1. The first electronic devices invented and mass produced were analogue. However, as time progressed digital circuits have become predominant in electronics. It is important to note that analogue and digital devices are the same, the only difference is the way they represent and process information. The same basic components can be used for analogue or digital circuits.

The main differences between analogue and digital electronics are listed below:

2. Noise: Because the way information is encoded in analogue circuits, they are much more susceptible to noise than digital circuits, since a small change in the signal can represent a significant change in the information present in the signal and can cause the information present to be lost, corrupted or otherwise made useless. In digital electronics, because the information is quantized, as long as the signal stays inside a range of values, it represents the same information. This is one of the main reasons that digital electronic circuits are predominant. In fact, digital circuits use this principle to regenerate the signal at each logic gate, lessening or removing noise.

3. Precision: A number of factors affect how precise a signal is, mainly the noise present in the original signal and the noise added by processing. See Signal to Noise Ratio. In digital electronics it is much easier to have high precision signals than in analogue electronics, because of the way information is represented and how noise affects digital and analogue signals.

Speed: This is where analogue electronics really outshines digital electronics. Analogue circuits are several times faster than their digital counterparts. Depending on the operation, analogue circuits can be several hundreds or hundreds of thousands of times faster than digital circuits. This is because information in digital circuits is represented by bits, while in analogue electronics it is represented by a property of the signal itself.

4. Bandwidth: Simply put, bandwidth is the amount of information a given circuit can cope with. Again, analogue circuits have much more bandwidth than digital, and can process/transmit more information in the same time.

Design Difficulty: Digital systems are much easier and smaller to design than comparable analogue circuits. This is one of the main reasons why digital systems are more common than analogue. An analogue circuit must be designed by hand, and the process is much less automated than for digital systems. Also, because the smaller the integrated circuit (chip) the cheaper it is, and digital systems are much smaller than analogue, digital is cheaper to manufacture.

**Notes:**

predominant	главенствующий
quantize	квантовать, разбивать на подгруппы
logic gate	логический элемент, схема
precise	точный
outshine	затмить, превзойти
bandwidth	ширина полосы частот

**II. Укажите, какие из данных утверждений соответствуют содержанию текста.**

1. The first electronic devices invented were digital.
2. The difference between analogue and digital electronics lies in the way they represent and process information.
3. Digital circuits are more susceptible to noise.
4. Analogue circuits are several times faster than their digital counterparts.
5. Digital systems are much easier but bigger to design.

**III. Выберите правильные ответы на вопросы.**

1. What were first electronic devices invented?
  - a) digital;
  - b) analogue;
  - c) ICs.
2. What are the main differences between analogue and digital electronics?

- a) They concern noise.
  - b) They concern noise and bandwidth.
  - c) They concern noise, bandwidth, precision, speed and design.
3. What are perspectives of the range of analogue circuits applications?
- a) They will continue to reduce.
  - b) They will increase.
  - c) They will be replaced by digital ones.

**IV. Прочитайте предложения. Выберите правильный вариант перевода.**

1. Because of the way information is encoded in analogue circuits, they are much more susceptible to noise than digital circuits.

- a) Из-за способа шифрования информации в аналоговых схемах они более чувствительны к шуму, чем цифровые схемы.
- b) Потому что информация шифруется в аналоговых схемах, они более чувствительны к шуму, чем цифровые.
- c) Аналоговые схемы более чувствительны к шуму, чем цифровые из-за способа шифрования информации.

2. Analogue circuits are several times faster than their digital counterparts.

- a) Аналоговые схемы во много раз быстрее, чем их цифровые копии.
- b) Аналоговые схемы во много раз быстрее, чем их цифровые аналоги.
- c) Аналоговые схемы во много раз быстрее, чем их цифровые дубликаты.

3. Digital systems are much easier and smaller to design than comparable analogue circuits.

- a) Цифровые системы намного легче и меньше проектировать, чем соответствующие аналоговые схемы.
- b) Цифровые системы намного легче и меньше, чтобы их проектировать, чем соответствующие аналоговые схемы.
- c) Цифровые системы намного легче и меньше, чем сравнимые аналоговые схемы.

**V. Переведите письменно абзацы 3 – 4 текста.**

**Вариант 5**

**I. Перепишите следующие предложения. Определите, является ли подчеркнутая форма инфинитивом, причастием или герундием. Переведите письменно предложения на русский язык.**

*Example: The falling water has kinetic energy. Falling – Причастие I. Падающая вода обладает кинетической энергией.*

- 1. The cost of using fax is difficult to evaluate.
- 2. It has been recently reported that the results satisfying the experimentator were obtained.
- 3. Some materials with new useful properties may be produced in space.

4. We are glad to have obtained such valuable results.

**II. Раскройте скобки, используя Participle I или Participle II. Переведите предложения на русский язык.**

*Example:* (**Heat**) magnet loses some of its magnetism. – Heated magnet loses some of its magnetism.

1. The device (**invent**) showed good performance.
2. Second-generation computers (**use**) transistors began to appear in 1959.
3. The computer will then process (**income**) data according to internal procedures.
4. Larger networks of computers (**link**) together in local, national and international systems become now available.

**III. Перефразируйте данные сложные предложения, употребив независимый причастный оборот. Переведите письменно полученные предложения.**

*Example:* As the weather was fine, we went for a walk. – The weather being fine, we went for a walk. – Так как погода была хорошая, мы пошли гулять.

1. As the number of online users multiplies, the amount of space on the web decreases.
2. Since digital trend grows, copper wire is replaced by glass cables.
3. When the transformer was invented, the first electric lines and networks were set up.

**IV. Прочитайте и перепишите следующие предложения. Определите, к какому типу условного предложения относится каждое из них. Переведите письменно предложение.**

*Example:* Ice will turn into water if you heat it. – Условное предложение I типа. – Лед превратится в воду, если его нагревать.

1. If he had prepared the material beforehand, he might have done the work quite easily.
2. They would succeed to fulfill the work in time if they had necessary material.
3. If one transmitter fails, the other will take over its functions.

**Работа над текстом**

**I. Прочитайте текст. Постарайтесь понять его содержание. Выполните задания после текста.**

**The Development of Telecommunication**

1. On March 10<sup>th</sup>, 1876, in Boston USA, Alexander Graham Bell spoke the first recognizable words over what was certainly his most famous invention, the telephone. "Mr. Watson, come here. I want you," he called out to an astonished assistant.

It quickly became necessary to link up people using the new invention. This was done through the telephone exchange. In the first simple exchanges, all calls were handled

manually by the operator. Using the switchboard in front of her, she plugged the line of the subscriber calling her into the line of the subscriber being asked for.

2. The idea of an automatic exchange was soon suggested. In 1892, three years after patenting his ideas, Almon B. Strowger saw his system installed at La Porte, Indiana. Strowger, an undertaker from Kansas City, found his business was becoming less and less profitable because the operator always connected calls intended for him to other undertakers.

3. Strowger's automatic exchange underwent several modifications over the next fifty years, but the principle has remained the same ever since. It is known as the 'step-by-step' system and there are still thousands of Strowger exchanges in service throughout the world today.

The next generation of exchanges was first developed in Sweden. Crossbar exchanges, as they are called, consist of a series of vertically and horizontally crossed bars. For the first time a common control system was used. This made crossbar exchanges cheaper than Strowger, for each selector could now carry up to ten calls. They were not as noisy as Strowger, either. These exchanges are electro-mechanically operated, using electromagnets.

4. In 1948, the invention of the transistor at Bell Telephone Laboratories led to a revolution in electronics and to the creation of semielectronic telephone exchanges. The old mechanical and electromechanical exchanges have now begun to disappear, and since the 1970s they have started to be replaced by exchanges built around electronic components. The latest digital switching centers have several advantages over other types of exchange, for they provide: a substantial reduction in equipment cost; a large reduction in equipment size; shorter procurement times; shorter installation and commissioning times; greater reliability and reduced running costs; new services for the customer; and new facilities for the administration.

### Notes:

recognizable	узнаваемый, четкий
telephone exchange	коммутатор
handle	обрабатывать
subscriber	абонент
undergo	претерпевать
reduction	сокращение, уменьшение
reliability	надежность

### *II. Укажите, какие из данных утверждений соответствуют содержанию текста.*

1. It was Marconi who sent the first recognizable message to his assistant.
2. First telephone calls were handled manually.
3. Automatic exchanges were suggested in 1892 by Strowger.
4. Automatic exchanges developed in Sweden were costly and noisier.
5. Today electromechanical exchanges have been replaced by electronic ones.

### *III. Выберите правильные ответы на вопросы.*

1. Who transmitted the first recognizable message over the telephone?
  - a) A.G. Bell;
  - b) G. Marconi;
  - c) A. Popov.
2. In which way were the first telephone calls handled?
  - a) manually;
  - b) electronically;
  - c) mechanically.
3. What form have new exchanges acquired?
  - a) mechanical;
  - b) electromechanical;
  - c) digital.

**IV. Прочитайте предложения. Выберите правильный вариант перевода.**

1. Linking up people was done through telephone exchange.
  - a) Связь между абонентами осуществлялась через коммутаторы.
  - b) Абоненты соединялись на коммутаторах.
  - c) Соединение абонентов осуществлялось через коммутатор.
2. Strowger's automatic exchange underwent several modifications over the next fifty years.
  - a) Автоматический коммутатор Строугера претерпел несколько модификаций на протяжении следующих 50-ти лет.
  - b) Автоматический коммутатор Строугера несколько раз усовершенствовался на протяжении следующих 50 лет.
  - c) Автоматический коммутатор Строугера несколько раз изменялся на протяжении следующих 50 лет.
3. Since the 1970s they have started to be replaced by exchanges built around electronic components.
  - a) С 1970-х годов их начали заменять коммутаторами на электронных компонентах.
  - b) С 1970-х годов их заменили на электронные коммутаторы.
  - c) С 1970-х годов их начали заменять на электронные коммутаторы.

**V. Переведите письменно абзацы 3 – 4 текста.**

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Учебное издание

**МЕТОДИЧЕСКИЕ УКАЗАНИЯ И КОНТРОЛЬНЫЕ ЗАДАНИЯ №2–4  
ПО АНГЛИЙСКОМУ ЯЗЫКУ ДЛЯ СТУДЕНТОВ ФЗВиДО**

**METHODICAL DIRECTIONS AND TESTS №2–4  
IN ENGLISH FOR THE STUDENTS  
OF THE FACULTY OF EXTRAMURAL, EVENING  
AND DISTANCE EDUCATION**

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Подписано в печать 12.06.2009.  
Гарнитура «Таймс».  
Уч.-изд. л. 3,5.

Формат 60×84 1/16.  
Печать ризографическая.  
Тираж 100 экз.

Бумага офсетная.  
Усл. печ. л. 3,95.  
Заказ 83.

---

Издатель и полиграфическое исполнение: Учреждение образования  
«Белорусский государственный университет информатики и радиоэлектроники»  
ПИ №02330/0494371 от 16.03.2009. ЛП №02330/0494175 от 03.04.2009.  
220013, Минск, П. Бровки, 6