Министерство науки и высшего образования Российской Федерации

Томский государственный университет систем управления
и радиоэлектроники

# ENGLISH
# FOR ENGINEERING STUDENTS

**Учебное пособие**

для студентов естественно-научных и технических направлений
подготовки и специальностей высшего образования

Томск
Издательство ТУСУРа
2020

УДК 802.0(076.6)
ББК 81.432.1-922
Е 56

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Е 56 English for Engineering Students: учеб. пособие для студентов естественно-научных и технических направлений подготовки и специальностей высшего образования / Л.Б. Кадулина [и др.]. – Томск : Томск. гос. ун-т систем упр. и радиоэлектроники, 2020. – 296 с.

ISBN 978-5-86889-890-7

Настоящее учебное пособие составлено с учетом требований ФГОС ВО 3++.

Пособие состоит из трех разделов: Reading Course – адаптированные научно-популярные тексты с коммуникативными упражнениями; Oral Speech Course – вузовские темы бытового и страноведческого характера; Professional Reading – профессионально-ориентированные тексты, рекомендованные для индивидуального чтения.

Приложения (Appendices) содержат вводно-коррективный курс (Corrective Course), микротексты профессиональной направленности, а также практические рекомендации по подготовке презентации.

Предназначено для студентов естественно-научных и технических направлений подготовки и специальностей высшего образования.

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# Contents

# Введение

Настоящее учебное пособие составлено на основе требований ФГОС ВО 3++ для студентов естественно-научных и технических направлений подготовки и специальностей высшего образования. Основная цель – формирование у студентов общекультурных и профессиональных компетенций, необходимых для социального и про- фессионального взаимодействия.

При разработке учебного материала авторы учитывали необходимость повторения и активизации основных грамматических и лексических явлений, изученных в средней школе, а также необходимость углубленного изучения лингвистических понятий и представлений для межличностного общения и будущей профессиональной деятельности.

Тематика текстов определяется минимумом общетехнических знаний, которым обладают студенты первого курса следующих факультетов технического университета: радиотехнического, радио- конструкторского, электронной техники, вычислительных систем и подобных им. Тексты пособия отобраны с учетом их инфор- мативности и представлены по принципу постепенного усложнения языкового материала и тематики.

Пособие состоит из трех разделов:

**Reading Course (RC)** – адаптированные научно-популярные тексты с коммуникативными упражнениями);

**Oral Speech Course (OSC)** – вузовские темы бытового и страноведческого характера;

**Professional Reading (PR)** – профессионально-ориентиро- ванные тексты, рекомендованные для индивидуального чтения.

Предъявление учебного материала рекомендуется осуществлять следующим образом.

Unit 1 (OSC) Personal Life

Unit 1 (RC)

Communication Unit 2

(OSC) Education Unit 2

(RC) Radio

Unit 3 (OSC) The Russian Federation

Unit 3 (RC) Electronics
Unit 4 (RC) Television
Unit 5 (RC) Computers
Unit 4 (OSC) The United Kingdom
Unit 6 (RC) Optical Communication
Unit 5 (OSC) The United States of America

Тексты раздела **Professional Reading** изучаются в порядке, предусмотренном преподавателем.

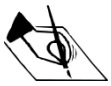
Приложения (**Appendices**) содержат вводно-коррективный курс (**Corrective Course)**, целью которого является компенсация недостатка или отсутствия грамматических умений и навыков в рамках базового уровня школьной программы; микротексты профессиональной направленности, а также практические рекомендации по подготовке презентации.

Условные обозначения:

 – тексты для чтения

 – устные упражнения

 – упражнения на аудирование

 – письменные упражнения

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# READING COURSE

# Unit 1 COMMUNICATION

| | |
|---|---|
| **Text A** | **Communication** |
| **Text B** | **Telephone** |
| **Grammar:** | **Functions of the Verbs *to be, to have*;** |
| | **Multifunctional Words *one (ones)* and *it*;** |
| | **Adjectives and Adverbs: Degrees of Comparison** |

## Text A

## COMMUNICATION

***Pretext exercises***

### 1.1 Read the words and try to guess their meaning.

Communication, activity, culture, industrial revolution, telegraph, telephone, radio, television, period, element, process, message, receiver, theory, radio, form, camera, decade, technology, regular, system, era, information, progress, popular.

### 1.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| **technique** | [tek'niːk] | **medium** | ['miːdɪəm] |
| **improve** | [ɪm'pruːv] | **interfere** | [ˌɪntə'fɪə] |
| **process** | ['prəuses] | **key** | [kiː] |
| **source** | [sɔːs] | **engine** | ['enʤɪn] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **communication** | связь, общение | **noise** | шум |
| **to be responsible** | быть ответственным | **static** | помехи |
| **evolution** | развитие | **to transmit** | передавать |
| **downfall** | падение, крах | **to connect** | связывать, соединять |
| **to determine** | определять | **to invent** | изобретать |

| | | | |
|---|---|---|---|
| **equipment** | оборудование | **wireless** | беспроводной |
| **to improve** | улучшать | **means** | средство, способ |
| **source** | источник | **engine** | двигатель |
| **to interfere** | вмешиваться | **society** | общество |
| **medium** | среда | **exchange** | обмен |
| **to receive** | получать, принимать | | |

## 1.3 Read the text.

### COMMUNICATION

Communication is an important human activity. It is responsible for the development of cultures and their evolution or downfall. During the industrial revolution new communication techniques began to evolve. Telegraph, telephone, radio, television were developed in a relatively short period of time. Communication equipment and techniques are still being developed and improved.

The main elements in any communication process are a message source, a message medium and a receiver. Noise is an important concept in communication theory. It is determined in communication theory as any signal that interferes with the message being transmitted. Radio static is a form of noise. Dirt on camera lens is noise also.

In 1875 Alexander Graham Bell invented the telephone. In the 20th century the number of telephones in use in the world grew at almost 100 percent per decade. A great contribution to long-distance communication came with the development of wireless technology. Before the First World War wireless telegraphy was established as a means of regular communication with ships at sea. In the next few years the telephone systems of all the countries were connected with each other by radio. The inventor of the radio was the Russian scientist A.S. Popov.

Nowadays we live in era, when information is the key and engine of progress. Our society needs the perfect means of information exchange. That is why today the Internet, cell phones, radio, television as the popular means of communication are under permanent development.

## 1.4 Match the English words with their Russian equivalents.

| | |
|---|---|
| 1. to determine | a) развитие |
| 2. medium | b) источник |
| 3. evolution | c) шум |
| 4. downfall | d) определять |
| 5. transmission | e) приемник |
| 6. equipment | f) среда |
| 7. source | g) средство |
| 8. means | h) оборудование |
| 9. receiver | i) падение |
| 10. noise | j) передача |

## 1.5 Match the words which have the opposite meaning.

| | |
|---|---|
| 1. to improve | a) to receive |
| 2. to transmit | b) wireless |
| 3. evolution | c) end |
| 4. wire | d) to worsen |
| 5. noisy | e) downfall |
| 6. beginning | f) noiseless |

## 1.6 Match the words which have the similar meaning.

| | |
|---|---|
| 1. evolution | a) apparatus |
| 2. to transmit | b)technique |
| 3. means | c) update |
| 4. downfall | d)idea |
| 5. equipment | e) data |
| 6. improvement | f) development |
| 7. to receive | g)mobile |
| 8. concept | h)to send |
| 9. information | i) crash |
| 10. cell phone | j) to get |

## 1.7 Choose the equivalents to the Russian words.

| | | | |
|---|---|---|---|
| 1. **информация** | to inform | information | informative |
| 2. **оборудовать** | equipment | equipped | to equip |
| 3. **средство** | mean | means | meaning |
| 4. **общество** | society | source | social |
| 5. **среда** | middle | medium | means |
| 6. **улучшать** | to prove | to improve | improvement |

## 1.8 Read the text.

The communication system may be symbolically presented in the following way. The information source selects a desired message out of a set of possible messages. The selected message may consist of written or spoken words, pictures, music, etc. The transmitter changes this message into the signal which is sent over the communication channel from the transmitter to the receiver.

In the fixed telephone the channel is a wire, the signal is the electric current on this wire. The transmitter is the device which changes the sound pressure of the voice into the electric current.

In the case of radio, the channel is simply space and the signal is the electromagnetic wave which is transmitted.
The receiver is the device which changes the transmitted signal back into the message.

In the process of transmission some things are added to the signal. These unwanted additions may be distortions (искажения) of sound or static in radio. All of these changes in the transmitted signal are called noise.

## 1.9 Find in the text the words which correspond to the following definitions.

1. something that provides what is wanted or needed
2. a piece of information that is sent to someone
3. a system used for transmitting information from one place or person to another
4. a thin flexible thread of metal

5. the process of joining something to something else
6. the change of natural, normal sound, picture in a way that is usually not attractive
7. unwanted electronic signals that harm the quality of something

## 1.10 Choose the correct word and fill in the blank with it.

1. New … techniques began to develop during the industrial revolution.
   a) information b) communication c) evolution
2. The information … selects a desired message out of a set of possible messages.
   a) medium b) transmission c) source
3. … is the electromagnetic wave that is transmitted.
   a) signal b) source c) data
4. All the changes (static, distortions) in the transmitted signal … noise.
   a) are produced b) are called c) are received
5. The technical problem is connected with the accuracy of … of information.
   a) connection b) transmission c) invention
6. The signal is sent from the transmitter to the … .
   a) source b) medium c) receiver
7. The … gets the message and transforms it into the signal.
   a) transmitter b) receiver c) connector
8. The receiver changes the signal back into a … .
   a) communication b) message c) noise

## 1.11 Answer the questions.

1. What is communication?
2. What means of communication do you know?
3. What are the main elements of communication process?
4. What is noise?
5. What is A. Bell famous for?
6. What did A.S. Popov invent?
7. What are the most popular means of communication today?

## 🎧 Effective Communication

### 1.12 Watch the video and answer the following questions.

1. What do people use to interact with each other?
2. How many parts does the effective communication contain? What are they?
3. Why do communication breakdowns sometimes happen?
4. What does incorrect response depend on?
5. What affects how we interpret what we hear?
6. What are the ways to respond to the boss's question “Is the report ready?”
7. How do you usually respond to the question about your duties?

### 1.13 Watch the video again and try to guess the words which correspond to the following definitions.

1. to say something in return, to answer
2. to grasp the meaning of something
3. trouble, problem, malfunction
4. explanation
5. wrong, not true, improper

### 1.14 Translate the following word groups.

1. to interact with people
2. broken communication
3. body language
4. to pay attention
5. to misinterpret
6. to respond incorrectly
7. to reduce communication errors

## 🎧 The Communication Model: How to Understand Communication Process

## 1.15 Watch the video and answer the following questions.

1. What are the basic components of communication?
2. What is the feedback?
3. What are the problems that sometimes happen in communication process?
4. What types of noise can breakdown communication?
5. Is it difficult to diagnose the problem?

## 1.16 Translate the following word groups.

1. a number of situations
2. feedback
3. misinterpretation
4. noise environment
5. to pronounce words properly
6. language barrier

## 1.17 Translate the following sentences from Russian into English.

1. Белл А. изобрел телефон в 1875 году.
2. Шум – это любой сигнал, который мешает передавать информацию.
3. Передатчик преобразует сообщение в сигнал, который передаётся к приёмнику.
4. В современном мире людям необходимы (need) разные средства связи.
5. Русский ученый А.С. Попов изобрел радио в 1895 году.
6. Сегодня мы можем передавать любую информацию на большие расстояния с большой скоростью.
7. Развитие беспроводной технологии помогло решить проблему связи на большие расстояния.

# Text B

# TELEPHONE

***Pretext exercises***

## 1.18 Read the following words and word combinations and try to guess their meaning.

Device, person, modernization, mobile, IP telephony, wi-fi, popular, compact, text messages, photos, e-mail, to communicate, smart phone, GPS receivers, digital camera, personal computer, mobile phone, immune system, signal.

## 1.19 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| **result** | [rɪ'zʌlt] | **allow** | [ə'lau] |
| **support** | [sə'pɔːt] | **control** | [kən'trəul] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **device** | *прибор, устройство* | **to receive** | *принимать* |
| **to develop** | *развивать, разрабатывать* | **digital** | *цифровой* |
| **to present** | *представлять* | **to replace** | *заменять* |
| **to support** | *поддерживать* | **fixed** | *стационарный* |
| **handy** | *удобный (для пользования)* | **to damage** | *наносить вред, разрушать* |
| **to carry about** | *носить, иметь при себе* | **harm** | *вред* |
| **to take place** | *происходить* | **to prevent** | *мешать* |
| **direct** | *прямой* | **to appear** | *появляться* |
| **to call** | *называть* | **useful** | *полезный* |

## 1.20 Read the text.

### TELEPHONE

People have invented many useful devices. One of the most interesting and widely used inventions is the telephone. The modern phone that we use today is the result of work of many people. The first person who patented the telephone in 1876 was Alexander Graham Bell. Other scientists who also worked on telephone invention were Elisha Gray, Antonio Meucci, Thomas Edison and some others.

The 20th century was the era of phone development and modernization. Modern phones are presented mostly by mobiles, which support IP telephony and wi-fi. These phones have become highly popular over the last years. They are rather compact, handy and easy to carry about. Mobile phones allow us to make instant calls, send text messages, listen to music, play games, take photos, check an e-mail, *etc*. All mobile phone communications take place through a central control base station. Mobile units do not communicate directly with other mobile units. They send messages to the control base station and it transmits the messages to the other mobile units. The modern form of mobile phone is called “smart phone”. It has become very popular. Most smart phones are also GPS receivers and digital cameras. Thus, they have replaced not only fixed phones but also personal computers.

However, there are many people in the world who are against mobiles phones. They say that this device has a bad effect on people’s health. It can damage our eyesight and immune system. The signals that are sent from mobiles can be harmful. Some people also believe that phones prevent live communication. With the appearance of mobile phones and computers people meet up with their friends not so often. Nevertheless, telephone is a very useful and important device. We simply can’t live without it in the modern world. Nowadays almost all the city areas, many country areas are covered by mobile phone networks.

**1.21 Match the following English words with their Russian equivalents.**

| | |
|---|---|
| 1. directly | a) удобный |
| 2. to prevent | b)вредный |
| 3. handy | c) стационарный |
| 4. to call | d)разрушать |
| 5. harmful | e) прямо |
| 6. replacement | f) называть |
| 7. useful | g)мешать |
| 8. fixed | h)замена |
| 9. digital | i) полезный |
| 10. to damage | j) цифровой |

**1.22 Match the words which have the similar meaning.**

| | |
|---|---|
| 1. to develop | a) stationary |
| 2. to replace | b) unit |
| 3. direct | c) crash |
| 4. device | d) straight |
| 5. fixed | e) to happen |
| 6. damage | f) to design |
| 7. to take place | g) to change |

**1.23 Match the words which have the opposite meaning.**

| | |
|---|---|
| 1. to receive | a) use |
| 2. useful | b) to disappear |
| 3. harm | c) mobile |
| 4. to prevent | d) to transmit |
| 5. fixed | e) useless |
| 6. to appear | f) to help |

## 1.24 Choose the appropriate equivalent to the Russian words.

| | | | |
|---|---|---|---|
| 1. **развитие** | develop | development | developer |
| 2. **происходить** | take place | take part | take off |
| 3. **прямой** | directly | director | direct |
| 4. **приём** | receive | reception | receiver |
| 5. **цифровой** | digital | digit | digitize |
| 6. **вредный** | harmful | harmless | harm |
| 7. **мешать** | preventive | prevention | prevent |
| 8. **бесполезный** | useful | useless | user |

## 1.25 Choose the appropriate word and fill in the blank with it.

1. The modern phones that we use today are … .
   a) useless b) handy c) analogue
2. All the mobile phone communications today … through a central control base station.
   a) take place b) carry about c) support
3. Mobile phones … messages to the control base station.
   a) receive b) present c) send
4. Smart phones replaced … phones and personal computers.
   a) mobile b) fixed c) wireless
5. Some people believe that mobile phones have a bad effect on people's health, so they are … .
   a) useful b) harmful c) handy
6. Mobile phones … people from communicating with each other directly.
   a) prevent b) help c) damage
7. Nowadays mobile phone … cover almost all the cities in the world.
   a) calls b) supports c) networks

## 1.26 Match the words with their definitions.

| | |
|---|---|
| 1. to patent | a) happening or done without delay, very quickly |
| 2. wi-fi | b) the time when smth. begins to exist or seen for the first time |
| 3. handy | c) to give a person or a company the right to be the only one to make or sell the product |
| 4. instant | d) broadcast while a performance, event is happening; not recorded earlier |
| 5. digital | e) capable of causing damage |
| 6. appearance | f) wireless fidelity |
| 7. harmful | g) a system of lines, wires that are connected to each other |
| 8. live | h) very useful and helpful |
| 9. network | i) relating to information that is stored in the form of numbers 0 and 1 |

## 1.27 Read the text and fill in the blanks with the following words.

| receiver | transmitted | vibrations | sound | hear | eardrum |
|---|---|---|---|---|---|

Sounds travel through the air in waves. When you play the violin, for example, the violin string vibrates. The (1) … from the violin string pass through the air in little waves. When these waves reach the ear, the eardrum vibrates, and you (2) … the violin.

It was found that a thin sheet of metal called "diaphragm" would vibrate in the same way as the (3) … when sounds reached it. In 1875 Alexander Bell made sound waves reach the diaphragms which vibrated.

At the other end of the wire Bell placed a similar instrument with a diaphragm and coils round a U-shaped piece of iron, which he called the (4) … . The impulses of electric current flowed through the coils of the receiver. It made the diaphragm vibrate and the vibrations made waves of sound in the air exactly like (5) … waves which originally reached the instrument at the other end of the wire. The sound waves were transformed into electricity, (6) … along a wire and transformed into sound again. Thus the telephone was invented.

## 1.28 Read the statements and decide whether they are true or false.

1. A. Bell invented the telephone in the 20th century.
2. We use mobile phones to make calls, send messages, etc.
3. Mobile units communicate directly with other mobile units.
4. Smart phones replaced GPS receivers and digital cameras.
5. Mobile phones are useful for people's health.
6. There are some cities and country areas that use mobile phone networks.

## 1.29 Answer the questions according to the text.

1. When was the telephone invented?
2. What do we use mobile phones for?
3. Can mobile units communicate directly with other mobile units?
4. What does the control base station do?
5. What is the difference between fixed and mobile phones?
6. What are the advantages and disadvantages of mobile phones?
7. How often do you use mobile phones and what for?

## How Does Your Mobile Phone Work?

## 1.30 Watch the video and match the beginnings and the endings of the following sentences.

| | |
|---|---|
| 1. the microphone | a) can not travel over long distances because of the different objects and the Earth's curved structure |
| 2. digital signal | b) receives 0 and 1 and transmits them in the form of electromagnetic waves |
| 3. antenna | c) provide international connecting |
| 4. electromagnetic waves | d) use a wired medium as well |
| 5. hexagonal cell | e) turns voice into a digital signal |
| 6. cell towers | f) processes your voice signal in the reverse process and your friend hears your voice |
| 7. optical fibre cables | g) are connected by optical fibre cables |

| | |
|---|---|
| 8. light pulses | h) contains the voice in the form of 0 and 1 |
| 9. base transceiver box | i) are carried to the base transceiver box |
| 10. mobile communications | j) has its own tower and frequency slot |

## 1.31 Watch the video again and answer the following questions.

1. What happens with your voice when you speak on your phone?
2. Can the electromagnetic waves travel over long distances? Why?
3. What is the antenna used for?
4. How are the cell towers connected?
5. What are the advantages and disadvantages of mobile phones?

## 1.32 Translate the following word groups.

1. different mobile communication generations
2. to turn voice into a digital signal
3. electromagnetic waves form
4. transmission at low and high frequencies
5. to be incapable of traveling long distances
6. the presence of some environmental factors
7. Earth's curved structure
8. connection of cell towers
9. to provide international connection
10. high frequency light pulses
11. a reverse processes
12. wireless and wired medium

## 1.33 Translate the following sentences from Russian into English.

1. Телефон был изобретен в 19 веке.
2. Телефон, телеграф, радио используются как средства связи.
3. Звуковые волны преобразуются в электричество.
4. Связь пользователей мобильными телефонами осуществляется через центральную контрольную базовую станцию.

5. Центральная базовая станция постоянно контролирует уровень сигнала телефона.
6. Мы используем мобильные телефоны, чтобы делать звонки, посылать сообщения, слушать музыку, т. д.
7. Мобильные телефоны заменили стационарные телефоны и персональные компьютеры.
8. Мобильные телефоны могут плохо влиять на здоровье человека и его иммунную систему.
9. Некоторые люди считают, что мобильные телефоны и компьютеры мешают общаться напрямую друг с другом.
10. И всё же телефон – это полезное и важное устройство; трудно жить без него в современном мире.

## GRAMMAR

*Table 1.1*

**Functions of the Verbs *to be* and *to have (got)***

| Function | to be | to have (got) |
|---|---|---|
| **Main verb** | The secretary **is** in the office.<br>The secretary **was** in the office one hour ago. | These laboratories **have** got modern equipment. |
| **Part of predicate** | She **is** writing a new article now.<br>The book **was** read by me up to the last page.<br>Three power stations **are being** built in this country now. | We **have** just finished the translation. |
| **Modal verb** | I **am** to meet him tomorrow. | He **has** to read this book quickly. I want it for my research. |

## 1.34 Point out the function of the verb *to be* in the following sentences and translate them.

1. Many scientific centers **are** in the East of our country.
2. He **was** to finish his work by April.
3. He **was** at the University yesterday.
4. The team **was** given satellite phones.
5. They **are** still waiting for him.
6. This question **is being** widely discussed at the seminar now.
7. He **is** to make a speech next Monday.
8. The device **is** in the lab.
9. The work **was** finished in time.
10. I **will be** at home tonight.
11. Lecture halls **are** on the second floor.
12. The train **is** to leave in 15 minutes.
13. The teacher **is** to come at five.
14. Jack **was** working at his project all night.
15. He **was** invited to the conference yesterday.

## 1.35 Point out the function of the verb *to have (got)* in the following sentences and translate them.

1. The students **have** got a large reading-hall in the hostel.
2. We **had** finished our work by 9 o'clock.
3. We **had** a meeting yesterday.
4. We didn't **have** to get up early last Saturday.
5. We **have** made an interesting report at the conference.
6. I **have** got some problems with my research.
7. In summer she **has** to take entrance exams.
8. I **haven't** got many friends at the University.
9. Somebody **has** left all the documents in the office.
10. I **had** much free time yesterday.
11. Computers **have** become a necessary part of modern life.
12. We didn't **have** time to visit the Eiffel Tower.
13. They didn't **have** much money last month.
14. This student **has** got a good memory.
15. He **has** just returned from a business trip to India.

## 1.36 Read the following sentences and translate them. Pay attention to the functions of the verbs *to be, to have.*

1. These components **are** now in production.
2. In all industrial countries the need for energy **is** increasing very fast.
3. What exams **are** we to take this year?
4. Bill **has** got questions to the lecturer.
5. The Internet **has** already entered our ordinary life.
6. At the examination the students **have** to write a dictation and a sort of an essay.
7. They **had** to do a good deal of work last month.
8. The number of computers in the world **is** constantly growing.
9. This method **has** got both advantages and disadvantages.
10. We **are** to meet near the Moscow University.
11. The part of a digital computer which stores information **is** called storage.
12. Now you **have** got a chance to improve your knowledge.
13. Our aim **is** to provide a better understanding of the current problems in this field.
14. At the university lectures and seminars **are** followed by examinations.
15. By September he **had** accepted their offer and joined the expedition.
16. PCs **are** now coming in different shapes, sizes and prices.
17. I could not come earlier as I **was** to prepare for the test.
18. He didn't **have** to set another experiment.
19. When you come back, you **are** to make a detailed report.
20. Energy **is** measured in the same units as work.
21. Those who cannot read or write **have** to remember things.
22. The surface of a disk **is** divided into concentric tracks.
23. Yesterday I didn't **have** any work to do.
24. Bluetooth **is** used to connect and exchange information between devices such as mobile phones, laptops, personal computers, printers, digital cameras, *etc*.
25. The conference **is** to be held next month.

*Table 1.2*

**Multifunctional Word *one (ones)***

| Function | Example |
|---|---|
| **Numeral (Number)** | We must write only **one** exercise now |
| **Empty subject** | **One** must study hard to become a specialist |
| **Empty object** | The advanced method allows **one** to get good results |

## 1.37 Point out the function of the word *one (ones)* in the following sentences and translate them.

1. He is one of my friends.
2. One must respect his parents.
3. One can solve a difficult problem using a computer.
4. This enables one to observe and record all the changes.
5. One must know that a high-frequency current radiates electromagnetic energy.
6. One example is enough.
7. One believes that this device is simple.
8. This method permits one to get good results.
9. One can easily imagine how wide can be the use of personal computers.
10. One of the problems has been solved with the help of the electronics in space communications.
11. One must work hard to get good results.
12. One cannot say that the concept of cloud computing is new.
13. One must believe in something.
14. If one wants some information to be sent rapidly, one sends it by computer.
15. The more one learns, the more one knows.

*Table 1.3*

**Pronoun *it***

| Function | Example |
|---|---|
| **Subject** (personal)<br>**Object (**personal) | Repeat this rule. **I**t is very important.<br>You have written a report. I've checked **it** |
| **Subject** (demonstrative) | What is this? **It** is new laboratory equipment |
| **Subject** (impersonal) | **It** is necessary to test these devices |

## 1.38 Point out the function of the pronoun *it* in the following sentences and translate them.

1. It is the most interesting article on this subject.
2. Repeat the experiment. It is very important.
3. I've read your report. I liked it.
4. It is hot in the laboratory.
5. We study strength of materials. It is a very difficult subject.
6. It is difficult to study law.
7. The discussion was very interesting, but some students failed to take part in it.
8. It is proposed to help computers "read" and use the Web in a more sophisticated way.
9. It's not very convenient to access all information when I'm in the office.
10. It is necessary to subtract one vector from another or to find their vector difference.
11. A material which allows electricity to flow through it is called a conductor.
12. It is surprising that such a simple measure gives such constant information.
13. It is difficult to explain how cosmic rays could have crossed such distance to the Earth.
14. It is possible that the problem will be solved.
15. It is expected that they will finish their work in time.

*Table 1.4*

**Adjectives and Adverbs: Degrees of Comparison**

| Adjective / Adverb | Comparative | Superlative |
|---|---|---|
| cheap | cheap**er** | **the** cheap**est** |
| large | large**r** | **the** large**st** |
| big | big**ger** | **the** big**gest** |
| easy | eas**ier** | the eas**iest** |
| funny | funn**ier** | the funn**iest** |
| intelligent | **more** intelligent | **the most** intelligent |
| difficult | **more** difficult | **the most** difficult |
| good / well | **better** | **the best** |
| bad / badly | **worse** | **the worst** |
| many / much | **more** | **the most** |
| little | **less** | **the least** |
| far | **further / farther** | **the furthest / farthest** |

## 1.39 Form comparative and superlative degrees of the following adjectives and adverbs.

Fast, talented, bad, quick, little, many, busy, good, sensitive, few, badly, much, progressive, early, well, far, interesting, high, difficult. big, poor, nice, clever, long, heavy, hard, little, good, comfortable, few, successful, well, difficult, rich.

## 1.40 Complete the following sentences with the correct variant.

1. Chinese is … than English.
   a) difficulter b) more difficult c) most difficult
2. At that moment he was … person in the world.
   a) more happier b) most happy c) the happiest
3. Is the word "newspaper" … than the word "book"?
   a) more long b) longest c) longer
4. Exercise 2 is … one.
   a) the simplest b) the most simple c) simplier
5. Today he feels … than yesterday.
   a) gooder b) better c) the best

6. Spanish is … than German.
   a) more easy  b) the easiest  c) easier
7. Gold is … than silver.
   a) more expensive  b) expensiver  c) the most expensive
8. Russia is a very … country.
   a) larger  b) the largest  c) large
9. My sister speaks English … than I do.
   a) worse  b) badder  c) more bad
10. I have … time for reading than my friend has.
    a) more  b) the most  c) much
11. She speaks Italian … than English.
    a) badlier  b) more badly  c) worse
12. He has … free time than I.
    a) more little  b) less  c) littler

## 1.41 Put the adjectives and adverbs into comparative or superlative degrees.

1. Which of these books is …? (*interesting*)
2. Emma is … than Angela, but Lilly is … in our group. (*old*)
3. Moscow is the … city in Russia. (*large*)
4. St. Petersburg is one of the … cities in the world. (*beautiful*)
5. Which building is the … in Moscow? (*high*)
6. Mary is a … student than Lucy. (*good*)
7. It is the … answer. (*good*)
8. This way is the … . (*short*)
9. Mark is … in our class. (*tall*)
10. Canada is … than Russia. (*small*)
11. Which is the … month of the year? (*hot*)
12. Who is the … student in your group? (*bad*)

## 1.42 Translate the following sentences.

1. Oil is lighter than water.
2. He is the most well-known scientist of our time.
3. Her explanation was much clearer than yours.

4. This classroom is larger and lighter than other classrooms. It is the largest and the lightest room here.
5. It's a very bad mistake. It was the worst mistake I've ever made.
6. Mathematics is much more important for technical students than many other subjects.
7. This subject is more difficult than that one.
8. Your handwriting is now better than it was last year; but still it is not so good as Nick's handwriting. Nick has a better handwriting than you. And of course Nellie has the best handwriting of all.
9. Our examinations are much more difficult than yours.
10. I hope to read this book faster than that one.
11. Money is one of the most important things in life.
12. My father speaks German better than English.
13. She is the most popular writer in our country.
14. When I passed my exams, I was the happiest person in the world.
15. This house isn't very modern. I prefer more modern houses.
16. He works harder at his English than they do.
17. Tom is a worse student than Ann. Peter is the worst student in our group.
18. I have less free time than you have.
19. This instrument is far more efficient than the other one.
20. Plane is the fastest means of transport.

## 1.43 Answer the questions.

1. Which is the most difficult subject for you?
2. Which is the easiest subject?
3. Which of the subjects is more difficult: physics or mathematics?
4. Who is the tallest in your group?
5. Which is the most interesting subject for you?
6. Is English more difficult than mathematics?

# Unit 2 RADIO

| | |
|---|---|
| **Text A** | **History of Radio** |
| **Text B** | **The First International Radioelectronic Conference** |
| **Grammar:** | **Tenses of the Active Voice** |

## Text A

## HISTORY OF RADIO

***Pretext exercises***

### 2.1 Read the words and expressions and try to guess their meaning.

Latin, radius, centre, station, American physicist, electrical, electromagnetic, theory, Russian, signal, detector, to demonstrate, apparatus, registration, the Russian Federation, Morse code, method, limit.

### 2.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| circle | ['sɜ:kl] | scientist | ['saɪəntɪst] |
| circumference | [sə'kʌmf(ə)r(ə)ns] | lightning | ['laɪtnɪŋ] |
| reception | [rɪ'sepʃ(ə)n] | thunderstorm | ['θʌndəstɔ:m] |
| oscillate | ['ɔsɪleɪt] | coherent | [kə(u)'hɪər(ə)nt] |
| equal | ['i:kwəl] | chemical | ['kemɪk(ə)l] |
| measure | ['meʒə] | wireless | ['waɪələs] |
| theory | ['θɪərɪ] | constantly | ['kɔn(t)stəntlɪ] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to transmit** | передавать | to detect | обнаруживать |
| **to propagate** | распространять | to measure | измерять |
| **to receive** | получать, принимать | to produce | производить |

| | | | |
|---|---|---|---|
| **to discover** | Открывать | to call | называть |
| **charge** | заряд | wire | провод |
| **discharge** | разряд | wireless | беспроводной |
| **to oscillate** | колебаться | to increase | увеличивать, повышать |
| **velocity** | скорость | | |

## 2.3 Read the text.

### HISTORY OF RADIO

The word “radio” comes from the Latin word “radius” – a straight line from the centre of a circle to a point on its circumference. The term “radio” now means the radiation of waves by transmitting stations, their propagation in space and reception by receiving stations.

Many scientists were involved in the invention of radio. Joseph Henry, an American physicist, discovered in 1842 that electrical discharges were oscillating. James Maxwell, a Scottish physicist, proved that the velocity of electric waves in air was equal to the velocity of light waves. Heinrich Hertz, the great German physicist, was the first to create, detect and measure electromagnetic waves and confirmed Maxwell's theory.

The world's first receiver was constructed in 1895 by the great Russian scientist Alexander Popov. There were no transmitters then, therefore his receiver could only pick up signals produced by lightning discharges during a thunderstorm. He constructed a coherent detector for the study of lightning discharges. A. Popov demonstrated the device that he called “the apparatus for the detection and registration of electric oscillations” at the meeting of the Russian Physico-Chemical Society in St. Petersburg on May 7, 1895. And this day is celebrated each year as “Radio Day” in the Russian Federation.

Soon Alexander Popov found a way of transmitting Morse code signals. In 1897 he sent the world's first wireless telegram over a distance of 600 m. and four years later the range of transmission was increased to 150 km. Ever since, thanks to the work of many scientists of the world the methods of transmission and reception have been constantly improved. Nowadays radio communication has no limits.

## 2.4 Match the words that have the similar meaning.

| | |
|---|---|
| 1. radiation | a) to show |
| 2. to transmit | b)apparatus |
| 3. velocity | c) to make better |
| 4. to demonstrate | d)to send |
| 5. device | e) emission |
| 6. to improve | f) speed |

## 2.5 Match the words to make an expression and translate them.

| | |
|---|---|
| 1. wireless | a) station |
| 2. to transmit | b) wave |
| 3. receiving | c) distance |
| 4. negative | d) speed |
| 5. to measure | e) communication |
| 6 .radio | f) message |
| 7. high | g) charge |
| 8. lightning | h) oscillations |
| 9. to detect | i) discharge |

## 2.6 Choose the equivalents to the Russian words.

| | | | |
|---|---|---|---|
| 1. **передача** | transmitter | transmission | transmitted |
| 2. **принимающий** | receiver | reception | receiving |
| 3. **наука** | scientist | science | scientific |
| 4. **производство** | production | produce | productivity |
| 5. **физик** | physics | physical | physicist |
| 6. **общаться** | communication | to communicate | communicative |

## 2.7 Choose the appropriate word and fill in the blank with it. Translate the sentences.

1. Radio waves are … from the transmitting station.
   a) received b) produced c) radiated

2. Maxwell proved that the velocity of … and light waves was equal.
   a) microwaves b) electric c) radio waves
3. Hertz H. was the first to … electromagnetic waves.
   a) measure b) invent c) charge
4. Signals were produced by … discharges.
   a) lightning b) oscillatory c) electrical
5. Popov A.S. found the means … Morse code signals.
   a) to discover b) to transmit c) to increase
6. Today there are … means of communication.
   a) different b) difficult c) differential

## 2.8a Read the text and fill in the blanks with the following words.

| **lightning sound positively another are route charges rapidly** |
|---|

To understand the forces of thunder and lightning one should know basic information about electricity. Things can become either (1) … or negatively charged with electricity and two things with opposite charges will attract each other. As the opposite (2) … become stronger, the attraction becomes greater. In fact the attraction becomes strong enough to result in a discharge that makes the two things electrically neutral again.

Lightning results when one cloud develops an opposite charge in relation to (3) … cloud. The pressure continues to build until there is enough pressure to break down the air separating the two clouds. A discharge occurs to neutralize the opposite charges in the two clouds, and this discharge is what we see as (4) … . As this discharge is happening, the lightning follows the “path of least resistance”. It doesn't follow a straight line but zigzags in order to find the easiest (5) … .

Thunder occurs during the discharge of electricity. As the discharge occurs, the air expands and contracts (6) … ; the air currents collide and cause the sound that we hear as thunder. Light travels much faster than (7) … , so we see the light first and then hear the sound. The farther away the thunder and lightning are, the greater the lapsed time between the

two. In fact the amount of lapsed time between the two can be used to determine how far away the thunder and lightning (8) … .

**2.8 b Answer the questions according to the text.**

1. What is lightning?
2. What is thunder?
3. Why does the lightning zigzag?
4. Why do we see the lightning first?
5. Can we determine how far away the lightning and thunder are? How?

**2.9 Answer the following questions.**

1. Where does the word “radio” come from?
2. What does the term “radio” mean?
3. What is James Maxwell famous for?
4. What did A.S. Popov invent?
5. How did he call his device?
6. What distance was the first wireless telegram sent?
7. What distance are the telegrams sent nowadays?

**2.10 Translate the following sentences from Russian into English.**

1. Скорость электрических волн равна скорости световых волн.
2. Ученый использовал прибор для передачи информации на большие расстояния.
3. Герц Г. смог обнаружить радиоволны на расстоянии 20 метров от передатчика в своей лаборатории.
4. Попов А.С. продемонстрировал первый радиоприемник в 1895 году.
5. Он назвал свой прибор аппаратом для обнаружения и регистрации электрических колебаний.
6. Существуют разные средства связи: телефон, радио, интернет и т. д.
7. Ученый изобрел прибор для изучения разрядов молнии.
8. Методы передачи и приема информации значительно улучшились.

## Who Invented Radio: Tesla vs Marconi

### 2.11 Watch the video and answer the following questions.

1. When did Tesla demonstrate the wireless transmission of energy?
2. What is Tesla famous for?
3. What was the function of the induction coil?
4. Did Tesla manage to demonstrate the signal transmission? Why?
5. What experiments did Marconi conduct?
6. What happened to Tesla in 1901?
7. When did US Patent Office declare Marconi the inventor of radio?
8. How did Tesla feel about that decision?
9. What was the decision of Supreme Court in 1943?
10. Was the question about the inventor of radio clarified? Why?
11. Who invented radio?

### 2.12 Watch the video again and fill in the blanks with the following words.

| **message** | **crushed** | **clarify** | **wireless** |
|---|---|---|---|
| **demonstrating** | **coil** | **famous** | **inventor** | **radio** |

1. Tesla studied the … transmission of energy.
2. Tesla got the patent for the induction … invention.
3. Induction coil was used to transmit and receive … signals.
4. Marconi was the first to transmit the transatlantic telegraph … in 1901.
5. Marconi's Telegraph Company attracted … investors.
6. Marconi was declared the … of radio in 1904.
7. Unexplained decision of US Patent Office left Tesla … .
8. The decision of Supreme Court to restore Tesla's patents didn't … the question about the inventor of radio.
9. The fire at Tesla's laboratory prevented him from … signal transmission.

## 2.13 Translate the following word groups.

1. wireless transmission
2. induction coil invention
3. to go up in flames
4. to be confident
5. wireless Telegraph Company
6. big-name investors
7. to pull a 180
8. to leave somebody crushed
9. fierce competition

# Text B

# THE FIRST INTERNATIONAL RADIOTELEGRAPH CONFERENCE

### *Pretext exercises*

## 2.14 Read the following words and expressions and try to guess their meaning.

Antenna, distance, radio station, standard, apparatus, operator, The International Conference on Radio, Berlin, to stop, to monopolize, monopoly, signal, private company, opposition, final protocol, telegram, system, elementary, principle, basis, regulation, radio communication.

## 2.15 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| nature | ['neɪʧə] | frequency | ['friːkwən(t)sɪ] |
| frontier | [frʌn'tɪə] | monopoly | [mə'nɔp(ə)lɪ] |
| throughout | [θru'aut] | stir | [stɜː] |
| choose | [ʧuːz] | coast | [kəust] |
| assign | [ə'saɪn] | destine | ['destɪn] |

### *Memorize the following words and expressions*

| | | | |
|---|---|---|---|
| **wave** | *волна* | **to take place** | *иметь место, происходить* |
| **man-made** | *искусственный* | **to call** | *(зд.) созывать* |

| | | | |
|---|---|---|---|
| **to emit** | *испускать, излучать* | **in order to** | *для того, чтобы* |
| **strength** | *сила* | **to exchange** | *обмениваться* |
| **frequency** | *частота* | **in spite of** | *несмотря на* |
| **to state** | *устанавливать, создавать* | **state** | *состояние* |
| **to operate** | *работать* | **communication** | *связь, коммуникация* |

## 2.16 Read the text.

### THE FIRST INTERNATIONAL RADIOTELEGRAPH CONFERENCE

The very nature of radio made it international right from its beginning. Unlike the cables of the telephone or the wires of the telegraph, electromagnetic waves know no man-made frontiers; once emitted from their antenna, only their strength decides to what distance they travel. Throughout the history of radio it has always been the aim to choose and assign appropriate frequencies by international agreement, to state the rules for the operation of radio stations and to approve standards for apparatus and their operators.

The International Conference on Radio took place in Berlin in 1903. Nine countries met to state the rules for the international regulation of radio. The main reason for calling this conference was to stop the attempt of Marconi to monopolize radio. In order to establish his monopoly he gave instructions to his operators only to exchange wireless signals with other stations also manned by Marconi operators. It was this action by a private company which stirred up most opposition.

In the Final Protocol of the Berlin Conference it was written that Coast stations should receive and transmit telegrams originating from or destined for ships at sea without distinction as to what radio system they used". In spite of the very elementary state of radio in 1903, this principle of the Final Protocol became the basis for the regulation of radio communication.

## 2.17 Match the words that have the similar meaning.

| | |
|---|---|
| 1. beginning | a) to select |
| 2. man-made | b) to happen |
| 3. to emit | c) artificial |
| 4. to choose | d) to establish |
| 5. operation | e) start |
| 6. to take place | f) to radiate |
| 7. to state | g) work |

## 2.18 Match the words to make an expression and translate them.

| | |
|---|---|
| 1. international | radio waves |
| 2. to emit | rules |
| 3. short | frequency |
| 4. to state | conference |
| 5. high | distance |
| 6. to give | signal |
| 7. wireless | instructions |

## 2.19 Choose the equivalents to the Russian words.

| | | | |
|---|---|---|---|
| 1. **излучение** | emitter | emission | emitted |
| 2. **частый** | frequency | frequently | frequent |
| 3. **работа** | operation | operative | operator |
| 4. **активный** | actor | action | active |
| 5. **полезный** | useless | useful | user |
| 6. **основной** | basic | basis | base |

## 2.20 Fill in the blanks with the following words

| | | |
|---|---|---|
| **receiver** | **communication** | **electromagnetic** |
| **oppose** | **transmitting** | **distance** | **took place** |

1. There are different kinds of … waves.
2. Radio waves are emitted from … station.
3. The main parts of communication are … and transmitter.
4. The participants stated the rules for regulation of radio … .
5. The first telegram was sent over short … .
6. The International Conference … in Berlin in 1903.
7. Many scientists tried to … the attempts of Marconi to monopolize radio.

## 2.21 a Read the text and decide whether the sentences (1-5) below are true or false.

In 1991 Trevor Baylis saw a television program about people in Africa with AIDS. A doctor in the program said that he wanted to give everyone in his country information about the illness but very few people had TV sets or radio receivers. The problem was that radios were very expensive because the batteries cost more than a week's food for a family.

Trevor Baylis had a clever idea: a clockwork (механический, заводной) radio that didn't need batteries. He designed and developed a mechanism where the energy stored in a wound up spring (пружина) could be used to drive a generator to power the radio. He also added a panel to convert solar energy into electrical energy. Trevor Baylis's environmentally-friendly radio has won lots of awards. The technology can be used in anything that needs batteries and it is perfect for countries where electrical power is unreliable or very expensive. The wind-up technology is now used in some electronic devices.

1. Trevor Baylis had his idea when he watched a TV program.
2. He wanted to give people information about AIDS.
3. His radio was powered in two different ways.
4. The idea hasn't been successful.
5. Only radios can have clockwork power.

## 2.21 b Complete the definitions with the underlined words in the text.

1. … means good for the health of people and the world.
2. … is power produced by a wound up spring.

3. Something that often doesn't work is … .
4. A … converts mechanical power into electrical energy
5. Power from the sun is … .

## 2.22 Read the statements and decide whether they are true or false.

1. Electromagnetic waves are emitted from the antenna.
2. The scientists wanted to operate at appropriate frequencies.
3. The International Conference approved Marconi's attempts to monopolize radio.
4. Marconi's operators exchanged wireless signals with different stations.
5. The action of Marconi was met with satisfaction.
6. The Final Protocol of the Berlin Conference stated the rules for the regulation of radio communication.

## 2.23 Answer the following questions.

1. When did the International Conference take place?
2. What was the reason for calling the conference?
3. What did Marconi do to monopolize radio?
4. Did he manage to do it?
5. What did the Final Protocol of the Conference say?

## 2.24 Translate the sentences from Russian into English.

1. Участники конференции установили правила для операторов радиостанций.
2. Операторы Маркони обменивались сигналами с другими станциями, где работали тоже операторы Маркони.
3. Попытка монополизировать радио вызвала большое сопротивление.
4. Станции получали и передавали телеграммы от разных кораблей в море.
5. Берлинская Конференция заложила основы для международного регулирования радиосвязи.

## GRAMMAR

### Tenses of the Active Voice

*Table 2.1*

**Simple Tenses**
**S + V**

| Past | Present | Future |
|---|---|---|
| **S + $V_{ed/2}$** | **S + $V_{(s)}$** | **S + will V** |
| I **went** to the cinema *yesterday.* | I **go** to the cinema *every week.*<br>(He **go*es***…) | I **will go** to the cinema *tomorrow / if I have free time.* |

**2.25 Change the following sentences into the past simple or future simple tenses, as in the model.**

**Model:** They *always* **discuss** the results of the experiment.
They **discussed** the results of the experiment *yesterday*.
They **will discuss** the results of the experiment *tomorrow*.

1. Every day I read interesting books.
2. After lessons I work at my project.
3. They often take part in scientific conferences.
4. A lab assistant usually shows the equipment to the students.
5. We usually pass two or three exams at the end of each term.
6. We use such devices for amplification of radio signals.
7. They always answer the teachers' questions.
8. During the first course students learn a lot about new achievements of science.
9. He sometimes tells us about his plans.
10. The students of our group rarely do their homework in time.
11. We usually discuss the results of the experiments and plan our work for the next week.
12. As a rule, I have three pairs of lectures and two laboratory works every day.

*Table 2.2*

**Progressive Tenses**
**S + be + $V_{ing}$**

| Past | Present | Future |
|---|---|---|
| **S + was/were + $V_{ing}$** | **S + am/is /are + $V_{ing}$** | **S + will be + $V_{ing}$** |
| I **was doing** my homework *at 5 o'clock. / when he came.* | I **am doing** my homework *now.* | I **will be doing** my homework *at 5 o'clock. / when he comes.* |

## 2.26 Put the verbs in the correct progressive form.

1. At present specialists … a special system for drivers. (*to develop*)
2. I … for the test on Maths tomorrow morning. (*to prepare*)
3. When I … to the hostel, my room-mates … the homework. (to *come, to do*)
4. At this time tomorrow I … my examination. (*to pass*)
5. At noon yesterday the researchers … on their monthly report. (*to work*)
6. The students of our group … the results of the tests now. (*to discuss*)
7. The computer … while I … e-mail. *(to break down; to send)*
8. She … her mobile phone while she … home. (*to lose; to go*)
9. We … our tests at 10 o'clock tomorrow. (*to write*)
10. I don't think that they were interested. They … while I … the report. (*to go out; to do*)
11. Sorry, I can't go out. I … my homework. (*to do)*
12. At this time tomorrow they … . (*to meet*)

*Table 2.3*

**Perfect Tenses**
**S + have + $V_{ed/3}$**

| Past | Present | Future |
|---|---|---|
| **S + had + $V_{ed/3}$** | **S + has/have + $V_{ed/3}$** | **S + will have + $V_{ed/3}$** |
| I **had written** the letter *by 5 o'clock. / before he came.* | I **have** *just / already / recently / lately* **written** the letter. | I **will have written** the letter *by 5 o'clock. / before he comes.* |

## 2.27 Put the verbs in the correct perfect form.

1. Why are you doing nothing? – But I … everything. (*to do*)
2. I … English before I … my job. (*to teach; to change*)
3. Have you already written your test? – No, I … it by 2 o'clock. (*to write*)
4. She … her exams before she … on holiday with her friends. (*to pass; to go*)
5. Have you finished the translation yet? – No, I haven't. I … it by nine o'clock tomorrow morning. (*to finish*)
6. My sister … all her homework before I … home after the meeting (*to do; to get*)
7. I'm sorry, he's not here. He … to a meeting. (*to go*)
8. They … already… this important decision. (*to make*)
9. When I turned on the TV-set, the program … already … . (*to start*)
10. Wow! I … just … the visa! (*to receive*)
11. We … this problem with a lot of people by the end of the conference yesterday. (*to discuss*)
12. … she already … the whole book? – No, she hasn't. She … the whole book by the end of the month. (*to read*)

## Revising Tenses of the Active Voice

## 2.28 Make sentences according to the models.

**Model:** I **do** my hometask **every day**.

| | | | | | |
|---|---|---|---|---|---|
| 1. | __do__ | every day | 7. | _____ | tomorrow at 3 p.m. |
| 2. | _____ | yesterday | 8. | _____ | tomorrow by 6 p.m. |
| 3. | _____ | yesterday by 8 p.m. | 9. | _____ | before I listened to music |
| 4. | _____ | yesterday when my friend came | 10. | _____ | twice |
| 5. | _____ | yesterday at 7 p.m. | 11. | _____ | already / just |
| 6. | _____ | tomorrow | 12. | _____ | now |

## 2.29 Choose the correct variant.

1. Он **ходит** в библиотеку *каждый день*.
   a) go b) goes c) is going
2. Я не знаю человека, который **разговаривает** *сейчас* с директором.
   a) speaks b) is speaking c) speak
3. *Когда зазвонил телефон,* он **писал** письмо.
   a) was writing b) wrote c) will have written
4. *К экзамену* я **выучу** все темы.
   a) will learn b) will be learning c) will have learnt
5. *Завтра к восьми часам* я уже **закончу** свою работу на компьютере.
   a) will have finished b) will finish c) finish
6. *К его приходу* мы уже **ушли** в университет.
   a) went b) were going c) had gone
7. Она **окончит** университет *через год.*
   a) will graduate b) is graduating c) will have graduated
8. Я *уже* **написал** эссе. Мне его сдать?
   a) have written b) wrote c) had written
9. Они *уже* **обсудили** эту статью.
   a) discussed b) have discussed c) were discussing
10. *Перед тем как поступить в университет*, я работал на заводе.
    a) worked b) have worked c) had worked
11. Мы *только что* **получили** Ваше письмо.
    a) received b) have received c) had received
12. *На прошлом уроке* мы **готовились** к тесту.
    a) were preparing b) prepared c) had prepared
13. Что Вы **будете делать** *завтра в 10 утра*?
    a) will do b) will be doing c) will have done
14. Я *еще* **не говорил** с ним об этом.
    a) didn't speak b) don't speak c) haven't spoken
15. *Если они выйдут* в половине пятого, они **приедут** в шесть.
    a) will arrive b) arrive c) are arriving
16. Я **сдам** экзамен *к концу июня*.
    a) will pass b) will be passing c) will have passed

17. Не ходите в ту аудиторию. Там студенты **проводят** эксперимент.
    a) making b) are making c) make
18. Наш учитель **говорит** по-английски и по-французски.
    a) spoke b) speaks c) has spoken
19. Он **писал** письмо, *когда я пришел* к нему.
    a) was writing b) wrote c) writing
20. Я **сделал** свою работу *до того, как ко мне пришел мой друг.*
    a) did b) have done c) had done

## 2.30 Choose the correct variant.

1. They … in scientific conferences *when they were students*.
   a) take part b) are taking part c) took part
2. They … on their new project *next week.*
   a) was working b) will work c) are working
3. We … the new brochure *two weeks ago.*
   a) have bought b) bought c) were buying
4. He … for you *tomorrow at 10* in his office.
   a) will wait b) is waiting c) will be waiting
5. I … my homework *yesterday when you called me.*
   a) have done b) was doing c) was done
6. A programmer … instructions and data to the computer *before we came.*
   a) had given b) gave c) will have given
7. *Yesterday* I … an interesting book.
   a) read b) have read c) was reading
8. The teacher … our dictation *by the end of the next week.*
   a) will have corrected b) will correct c) will be correcting
9. I … already … my homework.
   a) have done b) was doing c) was done
10. Tom … here *2 hours ago.*
    a) will be b) was c) were
11. My friend … the university *last year*.
    a) has entered b) enters c) entered
12. I … this equation *if* you … me.
    a) solve; will help b) will solve; help c) will solve; will help

13. Don’t call me. I … at my project.
    a) work  b) was working  c) am working
14. I … a letter *yesterday at 9 o’clock*.
    a) was writing  b) wrote  c) will be writing

## 2.31 Translate the following sentences.

1. The development of any country depends on good specialists in different spheres of science and technology.
2. His project for further research was met with enthusiastic support from everyone.
3. If he concentrates his attention on his studies, he will pass his exams successfully.
4. We are now looking for an optimal solution, since there is a choice.
5. We have recently studied the feedback mechanism.
6. The qualification of specialists determines the scientific and technological progress of the country.
7. Radio employs electrical energy to transmit sounds, images and signals.
8. New data will support the results of our research.
9. Different fields of science and technology use the new methods of radio engineering.
10. Our scientists will further develop various kinds of radio communication.
11. Radio waves are the longest members of the family of electromagnetic waves.
12. Radio technique has become closely associated with many branches of science and engineering.
13. Radio devices have given the possibility to get the information about the mysterious phenomena that are taking place in far-away Galaxies.
14. Today scientists are using the energy of atom in various spheres of life.
15. The engineers have already discussed the advantages of this new system at the scientific conference.

16. The results of the experiment showed that he had made a mistake in his calculations.
17. A portable generator provides electricity no matter how far you are from the mains (сеть).
18. The practical use of electricity has become possible after the development of generators and transformers.
19. The solar panels provide power during the day and charge batteries which accumulate enough power to light the tunnel at night.
20. The scientists are developing devices which will transform solar power into mechanical or electric forms of power.
21. For two years the scientists were working to build a machine that people could use to talk with each other over long distances.
22. When white light passes through air and glass, all the colors do not focus at the same point because each color has a unique refractive index (коэффициент преломления).
23. Researchers have long thought about using light rather than electrons to move data between microprocessors.

## 2.32. Complete the following sentences on your own.

1. I … every week.
2. Don't come to my place tomorrow morning. I … .
3. When I was ten, I … .
4. If I have more money, I … .
5. I … now.
6. Yesterday at 5 p.m. I …
7. Wow! I … just … .
8. I … before you came.
9. I … by the end of this month.
10. We … yesterday.

# Unit 3 ELECTRONICS

**Text A** **Development of Electronics**
**Text B** **Vacuum-Channel Transistors**
**Grammar: Tenses of the Passive Voice; Attribute Group, Complex Sentences**

## Text A

## DEVELOPMENT OF ELECTRONICS

***Pretext exercises***

### 3.1 Read the words and expressions and try to guess their meaning.

Electronics, engineering, physics, electron, generation, transmission, information, transistor, electrode, function, million, microwave communication systems, technology, industrial, trajectory, automation of production processes, organism.

### 3.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| engineering | [ˌendʒɪ'nɪərɪŋ] | consumption | [kən'sʌm(p)ʃ(ə)n] |
| apply | [ə'plaɪ] | reliability | [rɪˌlaɪə'bɪlətɪ] |
| design | [dɪ'zaɪn] | essential | [ɪ'sen(t)ʃ(ə)l] |
| circuit | ['sɜ:kɪt] | enough | [ɪ'nʌf] |
| electron | [ɪ'lektrɔn] | microwave | ['maɪkrə(u)weɪv] |
| development | [dɪ'veləpmənt] | manufacture | [ˌmænjə'fækʧəˌ] |
| through | [θru:] | industrial | [ɪn'dʌstrɪəl] |
| technology | [tek'nɔlədʒɪ] | control | [kən'trəul] |
| electrode | [ɪ'lektrəud] | trajectory | [trə'dʒekt(ə)rɪ] |
| weight | [weɪt] | | |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **field** | *поле, область* | **disadvantage** | *недостаток* |
| **to apply** | *прикладывать, применять* | **to perform** | *выполнять* |
| **circuit** | *цепь, схема, контур* | **to reduce** | *уменьшать, понижать* |
| **to depend on** | *зависеть от* | **to consume** | *потреблять* |
| **flow** | *поток* | **reliability** | *надежность* |
| **storage** | *хранение* | **to carry out** | *выполнять, проводить* |
| **vacuum tube** | *электронная лампа* | **solid** | *твердый* |
| **rapid** | *быстрый* | **rate** | *скорость* |
| **to develop** | *развивать, разрабатывать* | **to increase** | *повышать, увеличивать* |
| **to replace** | *заменять, замещать* | **to design** | *конструировать, разрабатывать* |
| **semiconductor** | *полупроводник* | **due to** | *из-за, вследствие* |
| **advantage** | *преимущество* | **to amplify** | *усиливать* |

## 3.3 Read the text.

### DEVELOPMENT OF ELECTRONICS

Electronics is a field of engineering and applied physics dealing with the design and application of electronic circuits. The operation of the circuits depends on the flow of electrons for generation, transmission, reception and storage of information.

The invention of the vacuum tubes at the beginning of the 20$^{th}$ century was the starting point of the rapid growth of modern electronics. The development of vacuum tubes where the electrons flow through the vacuum made possible the progress in radio communication technology before the World War II and in the creation of early computers during and shortly after the war.

The transistor invented by American scientists W. Shockly, J. Bardeen and W. Brattain in 1948 completely replaced the vacuum tube. The

transistor, a semiconductor device with three electrodes, had great advantages over the best vacuum tubes. It performed the same functions as the vacuum tube but at reduced weight, size, power consumption and with high reliability. With the invention of the transistor all the essential circuit functions could be carried out inside solid bodies. Early transistors could respond at a rate of a few million times a second. This was fast enough to serve in radio circuits, but far below the speed needed for high-speed computers or microwave communication systems.

The progress in semiconductor technology led to the development of the integrated circuit. There appeared a new field of science – integrated electronics. It greatly reduced the size of devices, lowered manufacturing cost and at the same time provided high speed and increased reliability.

Today it is difficult to imagine our life without electronics. Electronic devices are widely used in scientific research and industrial designing; they control the work of plants and power stations, calculate the trajectories of space ships and help the people discover new phenomena of nature. Automation of production processes and studies on living organisms became possible due to electronics.

## 3.4 Match the English words with their Russian equivalents.

| | |
|---|---|
| 1. field | a) схема |
| 2. application | b) надежность |
| 3. circuit | c) поле |
| 4. to replace | d) скорость |
| 5. semiconductor | e) применение |
| 6. advantage | f) конструировать |
| 7. to perform | g) полупроводник |
| 8. reliability | h) заменять |
| 9. rate | i) выполнять |
| 10. to design | j) преимущество |

## 3.5 Match the words that have the similar meaning.

| | |
|---|---|
| 1. rate | a) to use |
| 2. to apply | b) to carry out |
| 3. rapidly | c) because of |
| 4. to perform | d) speed |
| 5. development | e) stream |
| 6. due to | f) quickly |
| 7. flow | g) design |

## 3.6 Find in the text the words which correspond to the following definitions.

1. the process of forming or developing something (para 2)
2. exactly like someone or something else (para 3)
3. ability to be relied upon, to be trusted (para 3)
4. extremely important and necessary (para 3)
5. to do something as a reaction to something (para 3)
6. to begin to exist (para 4)
7. the process of making something for sale or use (para 5)

## 3.7 Choose the appropriate word and fill in the blank with it.

1. In vacuum tubes electrons … through the vacuum.
   a) perform b) flow c) use
2. American scientists … transistor in 1948.
   a) applied b) consumed c) invented
3. One of the advantages of semiconductor devices is … .
   a) small size b) big weight c) low speed
4. Vacuum tubes consumed … power than semiconductors.
   a) little b) more c) less
5. Vacuum tubes and transistors perform … functions.
   a) the same b) some c) different
6. Integrated circuits reduced the … of the semiconductor devices.
   a) reliability b) speed c) cost
7. Transistors … vacuum tubes after their invention.
   a) replaced b) developed c) increased

## 3.8 Read the following text.

Vacuum tubes that amplified (усиливать) signals in many radio and television sets during the first half of the 20th century might seem different from the field-effect transistors (FET) that dazzle (поражать) us with their capabilities in today's digital electronics. But in many ways they are quite similar. They both are three-terminal devices. The voltage applied to one terminal – the grid (сетка) in a triode vacuum tube and the gate (затвор) in a FET – controls the amount of current flowing between the other two: from cathode to anode in a vacuum tube and from source (исток) to drain (сток) in a FET. This ability allows each of these devices to function as an amplifier.

How electric current flows in a vacuum tube is very different from how it flows in a transistor. Vacuum tubes are based on the process called thermionic emission: heating the cathode causes it to emit electrons into the vacuum. The current in transistors, on the other hand, comes from the movement and diffusion of electrons between the source and the drain through the solid semiconducting material that separates them.

## 3.8a Translate the following word groups.

1. signal amplification
2. field-effect transistors
3. applied voltage
4. vacuum tube application
5. transistor gate
6. current flow
7. electron emission
8. vacuum tube cathode
9. transistor function

## 3.8b Read the following statements and decide whether they are true or false.

1. The functions of the vacuum tube and transistor are different.
2. The triode consists of the gate, source and drain.
3. The main elements of the transistor are cathode, anode and grid..
4. In the triode the voltage is applied to the grid.
5. Amplifiers can function as a switch.

6. Cathode is heated to emit electrons into vacuum.
7. Electric current in the vacuum tube and transistor flows in the same way.

### 3.9 Answer the following questions.

1. What is electronics?
2. What does the operation of circuits depend on?
3. Where do the electrons flow in vacuum tubes?
4. What is a transistor?
5. What are the advantages of transistors over vacuum tubes?
6. Do the transistors and vacuum tubes perform the same functions?
7. Where do the electrons flow in transistors?
8. What is the importance of integrated electronics?
9. Where are the electron devices used?

## How Transistors Work

### 3.10 Watch the video and decide whether the sentences are true or false.

1. Transistor is the greatest invention of the $20^{th}$ century.
2. Semiconductor's conductivity is similar to that of dielectrics.
3. The most popular semiconductors are germanium and plastic.
4. Semiconductors conduct only at high temperatures.
5. Doping is the addition of impurities to semiconductors.
6. Semiconductors are doped with impurities to improve performance.
7. Holes have a negative charge.
8. Semiconductors are electrically neutral.
9. Both donors and acceptors are negative.

### 3.11 Watch the video again and try to give definitions to the following words.

1. dielectric
2. conductor
3. doping
4. to improve
5. performance
6. acceptor

### 3.12 Translate the following word groups.

1. vacuum tube computers
2. semiconductor conductivity
3. performance improvement
4. positively charged holes
5. n-type semiconductor properties
6. accepted electrons

### 3.13 Translate the following sentences from Russian into English.

1. Электронные лампы были изобретены в начале 20 века.
2. В электронных лампах ток проходит в вакууме.
3. Американские ученые изобрели транзистор в 1948 году.
4. Транзистор выполняет такие же функции, как и электронная лампа.
5. В транзисторе ток протекает через переход (junction).
6. Транзисторы меньше и легче, чем электронные лампы и потребляют меньше мощности.
7. Транзисторы являются более надежными, чем электронные лампы.
8. Интегральные схемы позволили уменьшить размер приборов и увеличить их скорость и надежность.

## Text B

## VACUUM-CHANNEL TRANSISTORS

***Pretext exercises***

### 3.14 Read the following words and try to guess their meaning.

Surprise, prototype, combination, traditional, hybrid, to combine, aspect, cathode, energy, industry, microprocessor, commercial products.

## 3.15 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| specialize | ['speʃ(ə)laɪz] | sufficiently | [sə'fɪʃ(ə)ntlɪ] |
| extinct | [ɪk'stɪŋkt ] | source | [sɔːs] |
| technique | [tek'niːk] | efficient | [ɪ'fɪʃ(ə)nt] |
| breathe | [briːð] | although | [ɔːl'ðəu] |
| prototype | ['prəutətaɪp] | huge | [hjuːʤ] |
| extraordinary | [ɪk'strɔːd(ə)n(ə)rɪ] | influence | ['ɪnfluən(t)s] |
| eventually | [ɪ'venʧuəlɪ] | industry | ['ɪndəstrɪ] |
| considerably | [kən'sɪd(ə)rəblɪ] | particularly | [pə'tɪkjələlɪ] |
| curious | ['kjuərɪəs] | importance | [ɪm'pɔːt(ə)n(t)s] |
| hybrid | ['haɪbrɪd] | microprocessor | [ˌmaɪkrə(u) 'prəusesə] |
| drawback | ['drɔːbæk] | emerging | [ɪ'mɜːʤɪŋ] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to equip** | *оборудовать* | **to heat** | нагревать |
| **extinct** | *устаревший* | **sufficiently** | достаточно |
| **change** | *изменение* | **to warm up** | нагреваться |
| **to develop** | *развивать, разрабатывать* | **to consume** | потреблять |
| **eventually** | *фактически* | **source** | источник |
| **to operate** | *работать* | **field emission** | автоэлектронная эмиссия |
| **fabrication** | *изготовление производство* | **to improve** | улучшать |
| **solid-state** | *твердотельный полупроводниковый* | **influence** | влияние |
| **drawback** | *недостаток* | **particular** | особый |
| **filament** | *катод* | **to apply** | применять прикладывать |

## 3.16 Read the text.

### VACUUM-CHANNEL TRANSISTORS

In 1947 William Shockley, John Bardeen and Walter Brattain invented the first transistor at Bell Laboratory. By the mid-1970s, the only vacuum tubes you could find in Western electronics were used in certain kinds of specialized equipment. Today even those are gone, and vacuum tubes are an extinct technology. So it might come as a surprise to learn that some changes to the fabrication techniques could breathe vacuum electronics back to life.

At the NASA Research Center the scientists are working to develop vacuum-channel transistors. Their research is still at an early stage, but the prototypes show that this new device holds extraordinary promise. Vacuum-channel transistors work 10 times as fast as ordinary silicon transistors and may eventually be able to operate at high frequencies. And they are considerably more tolerant of heat and radiation.

The vacuum-channel transistor is the combination of traditional vacuum-tube technology and modern semiconductor fabrication techniques. This curious hybrid combines the best aspects of vacuum tubes and transistors and can be made as small and as cheap as any solid-state device. Indeed, making them small is what eliminates the well-known drawbacks of vacuum tubes. In a vacuum tube an electric filament is heated sufficiently for it to emit electrons. That is why vacuum tubes need time to warm up and so they consume too much power. But vacuum-channel transistors do not need a filament or hot cathode. If the device is made small enough, the electric field across it is sufficient to draw electrons from the source by the process known as field emission. It makes this new kind of a transistor energy efficient.

Although the scientists are still at an early stage with their research, they believe that the improvements they've made to vacuum-channel transistor could have a huge influence on the electronics industry, particularly for applications where speed is of special importance. These transistors might also find their way into future microprocessors. But a great deal of work remains to be done before we can see commercial products emerging.

## 3.17 Match the words with the similar meaning.

| | |
|---|---|
| 1. emission | a) old-fashioned |
| 2. extinct | b) to design |
| 3. to fabricate | c) in fact |
| 4. to develop | d) semiconductor |
| 5. work | e) enough |
| 6. eventually | f) to require |
| 7. solid-state | g) radiation |
| 8. drawback | h) to manufacture |
| 9. sufficiently | i) disadvantage |
| 10. to consume | j) operation |

## 3.18 Translate the following word groups.

1. semiconductor fabrication technique change
2. integrated circuit capability
3. traditional vacuum-tube technology
4. high power consumption
5. energy efficient equipment
6. vacuum tube drawback
7. low operating voltage
8. conventional fabrication method
9. commercial product applications

## 3.19 Choose the synonyms to the underlined words. Translate them.

1. Today vacuum tubes are an <u>extinct</u> technology.
   a) out of date b) modern c) new
2. Scientists all over the world are working to <u>develop</u> vacuum-channel transistors.
   a) to use b) to increase c) to design
3. Dimension reduction of the new transistor eliminates the <u>drawback</u> of the vacuum tubes.
   a) advantage b) disadvantage c) property
4. Vacuum transistors will be able to <u>operate</u> at high frequencies.
   a) to communicate b) to work c) to control

5. Filament is the electrode of the vacuum tube that emits electrons.
   a) radiates b) transmits c) produces
6. New kind of transistor requires little energy.
   a) generates b) operates c) consumes
7. Vacuum-channel transistors will have a big influence on electronics industry.
   a) little b) great c) sufficient
8. This device is of great value particularly for high-speed applications.
   a) partly b) mainly c) especially
9. The scientists will be able to complete their research next decade.
   a) to finish b) to compete c) to continue

## 3.20 Read the text and fill in the blanks with the following words.

| air | electrons | colliding | less | large | means |
|---|---|---|---|---|---|

The long-standing problems of vacuum electronics aren't unavoidable. What if the distance between filament and plate were (1) … than the average distance an electron travels before hitting a gas molecule, a distance known as the mean free path? Then you wouldn't have to worry about collisions between electrons and gas molecules. For example, the mean free path of (2) … in air under normal atmospheric pressure is about 200 nanometers, which on the scale of today's transistors is rather (3) … . Use helium instead of (4) … and the mean free path goes up to about 1 micrometer. It (5) … that an electron travelling across a 100nm gap filled with helium would have only about a 10 percent probability of (6) … with the gas. Make the gap smaller still and the chance of collision diminishes further.

## 3.21 Try to give the definitions to the following words.

1. filament
2. transistor
3. frequency
4. improve
5. conductor
6. semiconductor
7. research

## 3.22 Translate the sentences from Russian into English.

1. Ученые центра НАСА разрабатывают новый вид транзистора, который сможет работать на высоких частотах.
2. Вакуумные транзисторы сочетают в себе лучшие свойства электронных ламп и транзисторов.
3. Недостатком электронных ламп является их размер, вес и большое потребление энергии.
4. Катод в электронной лампе используется для излучения электронов.
5. Контролирующая сетка в триоде расположена между катодом и анодом.
6. Напряжение в триоде контролирует величину тока, проходящего от катода к аноду.
7. Основная функция электронных ламп и транзисторов – усиление.
8. Ламповое оборудование работает лучше с высоким напряжением и на высоких частотах, чем полупроводниковые приборы.

## 3.23 Answer the following questions.

1. What is the vacuum-channel transistor?
2. What does a vacuum tube consist of?
3. What does a transistor consist of?
4. What are the advantages of vacuum tubes?
5. What are the advantages of transistors?
6. What is the function of the transistors?
7. Where are the transistors used?

## GRAMMAR

### Tenses of the Passive Voice

*Table 3.1*

**Simple Passive Tenses**
**be + $V_{ed/3}$**

| Tense | Model | Example |
|---|---|---|
| **Present** | am / is / are + $V_{ed/3}$ | The work **is done** every *day*. |
| **Past** | was / were + $V_{ed/3}$ | The work **was done** *yesterday*. |
| **Future** | will be + $V_{ed/3}$ | The work **will be done** *tomorrow*. |

**3.24 Rewrite the following sentences in simple passive, as in the model.**

**Model:** The professor **examines** the students.
The students **are examined** by the professor.

1. You always **make** the same mistake.
   The same mistake … always … by you.
2. Radio devices **perform** various communication tasks.
   Various communication tasks … by radio devices.
3. The manager **offered** us several jobs.
   We … several jobs by the manager.
4. Popov A.S. **invented** the first radio receiver.
   The first radio receiver … by A.S. Popov.
5. Solar batteries **generate** electricity.
   Electricity … by solar batteries.
6. The manager **will sign** the contract tomorrow.
   The contract … by the manager tomorrow.

*Table 3.2*

**Progressive Passive Tenses**
**be + being + $V_{ed/3}$**

| Tense | Model | Example |
|---|---|---|
| **Present** | am / is / are + being + $V_{ed/3}$ | The work **is being done** *now*. |
| **Past** | was / were + being + $V_{ed/3}$ | The work **was being done** *at 5 o'clock / when he came*. |
| **Future** | **Future Simple form** is used. | |

## 3.25 Rewrite the following sentences in progressive passive, as in the model.

**Model:** The professor **is examining** the students at the moment.
The students **are being examined** by the professor at the moment.

1. The secretary **was sending** the fax.
   The fax … by the secretary.
2. The interpreter **is translating** their conversation rather well.
   Their conversation … by the interpreter rather well.
3. They **are making** a lot of noise at this moment.
   A lot of noise … by them at this moment.
4. We **were writing** a test.
   A test … by us.
5. The teacher is **explaining** the rule to the students now.
   The rule … to the students by the teacher now.
6. We **are doing** our course project at the moment.
   Our course project … by us at the moment.

*Table 3.3*

**Perfect Passive Tenses**

**have + been + $V_{ed/3}$**

| Tense | Model | Example |
|---|---|---|
| **Present** | have / has + been + $V_{ed/3}$ | The work **has** *just* **been done**. |
| **Past** | had + been + + $V_{ed/3}$ | The work **had been done** *by 5 o'clock / before he came*. |
| **Future** | will have + + been + $V_{ed/3}$ | The work **will have been done** *by 5 o'clock / before he comes*. |

## 3.26 Rewrite the following sentences in perfect passive, as in the model.

**Model:** The professor **has examined** the students.
The students **have been examined** by the professor.

1. He **has** just **completed** the project.
   The project … just … by him.
2. They **will have republished** this book by the end of September.
   This book … by the end of September.
3. Russian scientists **have achieved** great success in space research.
   Great success … in space research by Russian scientists.
4. The specialist **had tested** the device by the time we came.
   The device … by the specialist by the time we came.
5. We **have given** the new computers to our colleagues.
   The new computers … to our colleagues by us.
6. I **had written** the article by 3 o'clock.
   The article … by me by 3 o'clock.

## 3.27 Choose the English equivalents to the words in bold.

1. Собрание **состоялось** в зале.
   a) was held b) will be held c) is held
2. *К их приходу* все оборудование **будет** уже **доставлено**.
   a) is delivered b) is being delivered c) will have been delivered

3. Мы еще не знали своих оценок, потому что наши контрольные **проверялись**, *когда мы уходили из института*.
   a) were corrected  b) were being corrected  c) was being corrected
4. *Иногда* ее **приглашают** на конференции.
   a) is invited  b) invites  c) is being invited
5. Ему **сообщили** эти новости *перед тем, как он уехал*.
   a) has been told  b) was told  c) had been told
6. Планеты **притягиваются** Солнцем.
   a) are attracted  b) were attracted  c) have been attracted
7. Радио **было изобретено** Поповым в *1895 году*.
   a) was invented  b) is invented  c) has been invented
8. Статья **будет опубликована** *к январю*.
   a) will be published  b) will have published  c) will have been published
9. Здесь **построят** много новых зданий *в следующем году*.
   a) are built  b) will have built  c) will be built
10. Вас **просят** вернуть книги в библиотеку.
    a) asked  b) are asked  c) ask
11. План нашей поездки *еще* **не обсужден**.
    a) wasn't discussed  b) hadn't been discussed  c) hasn't been discussed
12. *Я уверен*, что его **будут слушать** с большим вниманием.
    a) will be listened tob) will listened to  c) will have listened to
13. *Как правило*, на уроке **говорят** по-английски.
    a) speak  b) is spoken  c) spoke
14. Вам **сообщат** об этом *завтра*.
    a) will be informed  b) are informed  c) will have been informed
15. Студентов **экзаменуют** *два раза в год*.
    a) are being examined  b) is examined  c) are examined

## 3.28 Choose the correct variant.

1. He … a telegram by somebody from homeland.
   a) sent b) was sent c) has sent
2. This digital camera … *occasionally*.
   a) is used b) is being used c) had been used
3. They … a new task *tomorrow*.
   a) will be given b) will have given c) are given
4. *By the end of the week* my flat … .
   a) will be sold b) will have sold c) will have been sold
5. A test … by our teacher *now*.
   a) is being prepared b) was being prepared c) has been prepared
6. My new film … to my friends *at 5 yesterday*.
   a) was shown b) has been shown c) was being shown
7. Mobile phones … by many young people.
   a) are used b) is used c) was used
8. At present computers … more widely … in the sphere of education.
   a) is being used b) are being used c) are used
9. *By the year 2030* human labour in industry … by robots.
   a) will be replaced b) will have replaced c) will have been replaced
10. The training at Cambridge and Oxford … by tutorial system.
    a) carries out b) is carried out c) are carried out
11. Large sums of money … by the state to train highly-qualified engineers.
    a) are spent b) is spent c) was spent
12. New Metro lines … *now* in Moscow.
    a) are built b) are being built c) will be built
13. Some institutes of technology … into universities.
    a) is reorganized b) reorganized c) are reorganized
14. Much attention … *at present* to the development of international scientific contacts.
    a) is paid b) is being paid c) will be paid

15. The translation has not been finished yet. It …*by the end of the month*.
    a) will be finished  b) will have finished  c) will have been finished

## 3.29 Translate the following sentences.

1. The study of theory is accompanied by practical training.
2. Who told you that the agreement had been signed?
3. The methods of radio engineering are now being used in various fields of science and technology.
4. New subjects will be studied next term.
5. Unfortunately, these questions were not touched upon at the conference.
6. Nothing has been told about this to me.
7. The service area of this transmitter was limited to a radius of 25 to 50 miles.
8. Only English is spoken here.
9. Vacuum tubes are classified according to the number of electrodes.
10. This article is often referred to.
11. The signal received by the antenna will be transmitted to the radio receiver.
12. The experiment will be followed by testing the end product.
13. The equations were solved by the machine.
14. A technical text is being translated now.
15. Many new methods were used last year
16. The data will not be lost during the inevitable server crashes.
17. The distortions (искажения) are called nonlinear because they don't double if the intensity of the light is doubled.
18. The repeater was used to convert light pulses into electronic signals.
19. The speed with which arithmetic operations are performed is affected by a number of factors.
20. All the requirements were met in the experiment.
21. Some steps have been taken to increase the speed of sending messages.

22. Great attention was given to the study of electricity.
23. We are informed that many scientists are working at the problem of space communication.
24. The work is being done now and soon it will be finished.
25. The very first apparatus for radio communication was called wireless telegraph.

*Table 3.4*

**Attribute Group**

| | |
|---|---|
| **noun + noun** | identification problem<br>**(but**: identification of problem) |
| **noun + noun + noun** | Internet access devices |
| **adjective + noun + noun** | a new control system |
| **adjective + noun + noun + noun** | different search approaches |

## 3.30 Translate the following word-groups.

*noun + noun*

Cost reduction, power consumption, source material, a user's location, equipment manufacturer, control function, sound quality, search methods.

*noun + noun + noun*

Data network providers, power consumption change, size reduction need, network management application, optics cameras manufacturer, the system reaction identification, parameter identification methods, control system design.

*adjective + noun + noun*

Local exploration office, complex search methods, an interesting system model, a simple identification technique, an elementary game theory, important measurement parameters, the main growth parameter, a complex simulation model, digital data design, an important control system, straight line motion,

*adjective + noun + noun + noun*

A new control system design, different parameter identification methods, new generation information society, our problem determination task.

## 3.31 Choose the correct translation.

1. **automatic frequency correction**
   a) коррекция автоматической частоты
   b) автоматическая частота коррекции
   c) автоматическая коррекция частоты
2. **automatic data processing system**
   a) автоматическая обработка данных системы
   b) система автоматической обработки данных
   c) автоматическая система обработки данных
3. **automatic gain control**
   a) усиление с автоматической регулировкой
   b) автоматическая регулировка усиления
   c) регулировка автоматического усиления
4. **first satellite television signal**
   a) сигнал первого спутникового телевидения
   b) спутниковый сигнал первого телевидения
   c) первый сигнал спутникового телевидения
5. **radioactivity phenomenon discovery importance**
   a) важность открытия явления радиоактивности
   b) феномен открытия важности радиоактивности
   c) феноменальная важность открытия радиоактивности
6. **matter structure theory development**
   a) структура теории развития вещества
   b) теория развития структуры вещества
   c) развитие теории структуры вещества
7. **digital television broadcasting technology**
   a) цифровое вещание технологии телевидения
   b) цифровая технология телевизионного вещания
   c) технология цифрового телевизионного вещания
8. **transistor equivalent circuit**
   a) транзистор эквивалентной схемы
   b) эквивалентная схема транзистора
   c) транзистор с эквивалентной схемой

## 3.32 Translate the sentences paying attention to the attribute groups.

1. They used the temperature control system.
2. The paper aims at the development of a search approach.
3. A cell growth increase is a factor in the test.
4. We shall organize discussion of the important measurement parameters.
5. You may use any control system design method.
6. We use different system models.
7. They solved the parameter identification problem.
8. The problem identification task is of great importance.
9. That parameter determination method is of great help.
10. That control system design is of interest.
11. They were to study the performance of single sideband radio receivers.
12. The State Research Coordination Committee was offered to improve their methods of scientific work.
13. A nuclear reactor is a device in which chain reaction takes place.
14. The important radiation characteristic is that it can take place in vacuum.
15. To use free-space laser communication you need to understand how light propagates from the source to the receiver.

*Table 3.5*

**Complex Sentences: Object and Attribute Clauses**

| | |
|---|---|
| **Object Clause** | We know **(that)** the warm air rises and the cooler air takes its place. |
| **Attribute Clause** | The local station is broadcasting the news **(which)** I have already heard today. |

## 3.33 Read and translate the following sentences paying attention to the object and attribute clauses.

1. We know our scientists have achieved great success in the development of electrical engineering.
2. Radio waves our students will study propagate at a great speed.

3. The facts you have been given above are an attempt to illustrate this phenomenon.
4. From this article we learned the hydrogen atom is the simplest.
5. The antenna we are speaking about is mounted on the airplane.
6. The laboratory he works in carried out an important research.
7. The problem this article deals with is connected with subject we study.
8. The new methods of research the engineers had used at the plant greatly improved their work.
9. Materials new computers depend on must be of the best quality.
10. The number of components supercomputers consist of is great.
11. The text the student is reading is about the latest achievements in the computer science.
12. There are now lots of applications you could download.
13. Many computer operating systems allow the user to install or create any user interface they desire.
14. The few calls he made and the emails he sent were digitally recorded and archived for three years.
15. The Pentium processor is currently the most powerful processor the Intel offers for the personal computer.
16. The data the computer holds will disappear if the computer loses power.
17. The report he made at the conference helped us in our research.
18. The problem they were speaking about was of great value for our experiment.
19. For a long time A.Bell couldn't get the results he was looking for.
20. The discovery of Newton's mistake we were reading about was made by a young physicist.
21. The problem of this article is connected with the subject we study.
22. It is difficult to imagine the world we live in without computers.
23. We will speak about the progress the computers have made in their development.
24. You have been given all the information you need.
25. The news we have heard this week is of great importance.

*Table 3.6*

**Complex Sentences: Conditionals I and II**

| | |
|---|---|
| **Conditional I** | If I **know** English well, I**'ll** (**will) translate** this article. |
| **Conditional II** | If I **knew** English well, I**'d** (**would / could) translate** this article. |

## 3.34 Complete the following sentences with the correct form of the verb.

1. I could finish my work this evening if you … me. (*help*)
2. If she gives me this book, I … the report. (*write*)
3. If she … , we'll demonstrate our experiment. (*come*)
4. If we …books in original, we'd have a good language practice. (*read*)
5. If he receives a letter from his collegue, he … immediately. (*answer*)
6. He could complete the test if he … time. (*have*)
7. If she thinks it over carefully, she … a clear opinion. (*form*)
8. If he answered all the questions, he … the prize. (*win*)
9. I'll finish the job tomorrow if I … (*can*).
10. They will all be surprised if I … such a mistake. (*make*)
11. He … the answers if he looks at the back of the book. (*find*)
12. If I … English well, I'd take this job. (*know*)
13. If the machine stops, you … this button. (*press*)
14. If the temperature … low, the reaction will proceed slow. (*be*)
15. Your computer … perfectly if you called out a technician to repair it. *(work)*

# Unit 4 TELEVISION

| | |
|---|---|
| **Text A** | **History of Television** |
| **Text B** | **Internet vs Television** |
| **Grammar:** | **Participle I (active forms)** |
| | **Participle II** |

## Text A

## HISTORY OF TELEVISION

***Pretext exercises***

### 4.1 Read the words and expressions and try to guess their meaning.

History, television, individual, corporation, technology, combination, electrical, mechanical, fax machine, patent, system, centre, rotation, practical, cathode, experiment, person, signal, Pennsylvania, cable, revolution, show, musical, documentary.

### 4.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| pulse | [pʌls] | equal | ['iːkwəl] |
| silhouette | [ˌsɪlu'et] | significant | [sɪg'nɪfɪkənt] |
| convergence | [kən'vɜːʤ(ə)n(t)s] | bandwidth | ['bæ̲ndwɪdθ] |
| supersede | [ˌs(j)uːpə'siːd] | capture | ['kæpʧə] |
| compete | [kəm'piːt] | advent | ['ædvənt] |
| spiral | ['spaɪər(ə)l] | towards | [tə'wɔːdz] |
| exhibit | [ɪg'zɪbɪt] | | |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to compete** | *соперничать* | **band** | *диапазон* |
| **to deliver** | *доставлять, выпускать, снабжать* | **advent** | *появление, внедрение* |
| **convergence** | *взаимодействие, совмещение* | **to rotate** | *вращать, поворачивать* |

| | | | |
|---|---|---|---|
| **to employ** | *применять, использовать* | **cathode ray tube** | *катодно-лучевая трубка* |
| **to capture** | *улавливать* | **to record** | *записывать,* |
| **hole** | *дыра, отверстие* | **to represent** | *представлять, отображать* |
| **towards** | *к, по направлению* | **to process** | *обрабатывать* |
| **to spiral** | *закручивать(ся) в спираль, двигаться по спирали* | **to support** | *поддерживать, обеспечивать* |
| **equal** | *равный, одинаковый, подобный* | **bandwidth** | *диапазон частот* |
| **channel** | *канал* | **to refer to** | *ссылаться на, относиться к* |

## 4.3 Read the text.

### HISTORY OF TELEVISION

Television, TV for short, is a telecommunication medium that is used to transmit and receive moving images, either monochromic or color, usually accompanied by sound. The word television has been derived from Latin and Greek words which mean “far sight”. The invention of television was the work of many individuals in the late 19th century and early 20th century. Individuals and corporations competed in various parts of the world to deliver a device that superseded previous technology.

The early stages of television development saw inventors employing a combination of optical, mechanical and electronic technologies to capture, transmit and display a visual image. In the late 1800s the first images were transmitted electrically via early mechanical fax machines. In 1884 a 20-year old German student Paul Gottlieb Nipkow patented the first electromechanical television system that used a scanning disk with series of holes spiraling towards the centre. These holes were located at equal intervals in such a way that the disk would allow light to pass through each hole in a single rotation and onto a light sensitive selenium sensor which produced electrical pulses.

With time came up designs that used a mirror-drum scanner to capture the image and cathode ray tube (CRT) as a display device. In 1907 a Russian scientist Boris Rosing used a CRT in the receiver of an experimental television system. In 1925 a Scottish inventor John Logie Baird exhibited the transmission of moving silhouette images in London. In 1927 Baird became the first person to invent a video recording system called "Phonovision". A few of his "Phonovision" recordings were decoded and renewed in 1990s using modern digital signal-processing technology.

The mountains of Pennsylvania gave birth to the cable television in 1940. The second major development of television in the 1960s was the introduction of color in 1964, a revolution that transformed the world. For the first time, audiences could see shows, musicals, documentaries, and news broadcasts as if they were right there. On July 20, 1969 as many as 600 million people watched the first transmission from the Moon. By 1972 around 50% of the televisions used in homes were colored.

Digital television started in the late 2000s. It was an innovative service that represented the first significant evolution in television technology since color television in the 1960s. Initially the adoption rate was low. But soon, more and more households were converting to digital televisions.

Digital television (DTV) is the transmission of audio and video by digitally processed and multiplexed signal, in contrast to analog signals used by analog television. Digital TV can support more than one program in the same channel bandwidth.

Advent of digital television allowed innovations like smart TVs. A smart television, sometimes referred to as *connected TV* or *hybrid television*, is a television set with integrated Internet and Web features, and is an example of technological convergence between computers and television sets.

The future of TV will be very different from the first years of the history of television.

## 4.4 Match the English words with their Russian equivalents.

| | |
|---|---|
| 1. visual | a) человек, частное лицо |
| 2. audience | b) происходить |
| 3. digital | c) позволять, давать возможность |
| 4. feature | d) видимый |
| 5. amplifier | e) зрители |
| 6. convergence | f) усилитель |
| 7. individual | g) цифровой |
| 8. to derive | h) передача |
| 9. transmission | i) совмещение |
| 10. to allow | j) свойство |

## 4.5 Match the words with similar meaning.

| | |
|---|---|
| 1. significant | a) to detect |
| 2. to renew | b) to demonstrate |
| 3. device | c) old |
| 4. to exhibit | d) introduction |
| 5. previous | e) important |
| 6. image | f) set |
| 7. visual | g) to update |
| 8. advent | h) through |
| 9. via | i) picture |
| 10. to capture | j) optical |

## 4.6 Match the words with opposite meaning.

| | |
|---|---|
| 1. to record | a) the same |
| 2. significant | b) traditional |
| 3. digital | c) to decode |
| 4. different | d) past |
| 5. transmitter | e) secondary |
| 6. to code | f) to reproduce |
| 7. innovative | g) to separate |
| 8. major | h) analog |
| 9. future | i) unimportant |
| 10. to integrate | j) receiver |

## 4.7 Choose the equivalents to the Russian words.

| | | | |
|---|---|---|---|
| 1. **запись** | to record | recording | recorded |
| 2. **изменчивый** | changeable | changeless | to change |
| 3. **связь** | communication | communicator | communicative |
| 4. **соперничать** | competitive | competition | to compete |
| 5. **разработанный** | development | developer | developed |
| 6. **экспериментальный** | experiment | experimental | experimenter |
| 7. **разница** | to differ | different | difference |
| 8. **многообразие** | variety | various | to vary |
| 9. **передатчик** | transmission | transmitter | transmitted |
| 10. **метод** | technique | technical | technology |

## 4.8 Translate the following word groups.

1. a mirror-drum scanner
2. video recording system
3. digital signal-processing technology
4. adoption rate
5. analog signal
6. digitally processed and multiplexed signal
7. cathode ray tube
8. a display device
9. integrated Internet and Web features
10. connected television

## 4.9 Match the following English words with their Russian equivalents.

| | |
|---|---|
| 1. to exhibit | a) далеко (от) |
| 2. in action | b) содержать |
| 3. quality | c) средство |
| 4. production | d) демонстрировать |
| 5. to provide (with) | e) взаимодействие |
| 6. means | f) яркость |
| 7. far (from) | g) качество |
| 8. to contain | h) в действии |
| 9. brightness | i) обеспечивать |
| 10. convergence | j) производство |

## 4.10 Answer the questions.

1. What does the word “television” mean?
2. When did the invention of television start?
3. How were the first black-and-white images transmitted?
4. How did Nipkow disk work?
5. What was exhibited in London in 1939?
6. What is John Baird known for?
7. Why was the introduction of color so important?
8. When did digital television appear?
9. What is smart television like?
10. What are other names of smart television?

## 🎧 TV in Our Life

## 4.11 Watch the video and answer the following questions.

1. In the video TV is considered from two points of view. What are they?
2. What does TV content consist of?
3. In what way are the channels different?
4. What is TV advertisement?
5. What are pros and cons of commercials?
6. What is TV role in people's free time?
7. People turn on the TV sets for different reasons. What are they?

## 4.12 Watch the video again. Choose the appropriate words and fill in the blanks with them.

1. There are channels that … content according to their specialization.
   a) provide b) protect c) prevent
2. Professionally done commercials on TV … different kinds of goods and services.
   a) develop b) promote c) improve
3. Due to … people don't have to pay for watching TV.
   a) quality b) high resolution c) commercials

4. Watching TV is one of the … to relax and spend time with family.
   a) ways b) reasons c) duties
5. You have to plan your time if you want … something that you are interested in.
   a) to spend b) to find c) like
6. The absence of the TV set at home makes people … more useful activities.
   a) look at b) look after c) look for
7. How people spend free time is … own choice.
   a) they b) their c) them
8. Some TV channels try to entertain … with talk shows, music, *etc*.
   a) viewers b) listeners c) readers
9. Companies pay much money to TV channels … their ads.
   a) to search b) to show c) to abandon
10. There are … commercial channels where you can watch chosen content without any ads.
    a) various b) powerful c) no

## 4.13 Translate the following word groups.

1. TV advertisement technology
2. professionally done commercials
3. commercial channels content
4. new information source
5. background noise problems
6. entertainment TV channel content
7. to involve a person into watching the program
8. to avoid turning on the TV
9. useful information search
10. TV pros and cons
11. free time activities

## 4.14 Translate the following sentences from Russian into English.

1. Первый телевизор был продемонстрирован в 1939 году в Нью Йорке.
2. Сотни людей впервые видели телевизор в действии.
3. Черно-белые картинки были плохого качества и передавались на короткое расстояние.
4. Производство телевизоров прекратилось во время Первой мировой войны.
5. Сегодня телевизионная связь обеспечивается с помощью системы искусственных спутников земли.
6. Кабельное телевидение появилось в 1949 как средство передачи телевизионных сигналов в районы, далекие от больших городов.
7. Кабельное телевидение – это система, использующая провода для передачи TV программ.
8. Цифровой телевизор – это миникомпьютер с дисплеем.
9. В цифровой системе аналоговый сигнал заменяется цифровым кодом, содержащим информацию о яркости, цвете и т.д.
10. «Умное» телевидение – это пример технологической комбинации компьютера и телевизора.

# Text B

# INTERNET VS TELEVISION

## 4.15 Read the words and try to guess their meaning.

Global, online, basis, minute, business, personal, cable, traditional, program, site, practically, film, laptop, provider, emails, information, scan, social, media.

## 4.16 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| gradually | ['grædjuəlɪ ], [-ʤu-] | viewer | ['vjuːə] |
| average | ['æv(ə)rɪʤ] | character | ['kærəktə] |
| surpass | [sə'pɑːs] | flexibility | [ˌfleksɪ'bɪlətɪ] |
| satellite | ['sæt(ə)laɪt] | entertainment | [ˌentə'teɪnmənt] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **average** | *средний, в среднем* | **flexibility** | мобильность, вариативность |
| **per (month)** | *в месяц, помесячно* | **to interact** | взаимодействовать |
| **to surf the Web** | *использовать ресурсы сети* | **to share** | делить, иметь общее |
| **content** | *содержание* | **character** | (зд.) действующее лицо |
| **to surpass** | *превосходить* | **to consume** | потреблять |
| **to provide (with)** | *обеспечивать* | **to deny** | отрицать |
| **to compare** | *сравнивать* | **recent** | недавний |
| **to film** | *снимать (кино)* | **to prove** | доказывать, подтверждать |
| **to appeal** | *зд. вызывать интерес* | | |

## 4.17 Read the text.

### INTERNET VS TELEVISION

Do you spend more time in front of the TV or in front of the computer screen? Just a few years ago, the answer probably would have been the television. But with a growing global online population, the Internet is gradually replacing television in the lives of the modern individuals.

Recent studies show that about 30% of the worlds' population is online, and the average Internet user spends 32 hours per month surfing the Web. While many individuals still watch television on a regular basis, more and more people choose to view content online.

According to a study, Russians spend about 98 minutes a day watching television. But time spent online is starting to surpass time spent watching television. Unlike TV, the Internet can be used for business, personal use, and entertainment.

Cable and satellite TV services may provide thousands of channels, but traditional television programming can't be compared to the variety of the Internet. There are hundreds of TV shows and movies available from

a number of online sites. With huge databases like YouTube, you can find practically any program ever filmed.

Another advantage of the Internet is flexibility. Viewers can watch TV anywhere they want on a variety of portable devices, from laptops to tablets and smartphones. With such Internet connections from providers like Google Fiber and Verizon Internet, viewers can multi-task while they watch TV. They can send emails. Look up information. Scan social media accounts. Shop online.

Social media makes watching TV online even more appealing – viewers can tweet or post about the programs they watch, interact with other viewers and share opinions about characters. In modern world where users can keep up with the weather, their family and friends, consumers have less and less of a reason to turn on the TV.

There is no denying that television is still a major player, but the Internet is quickly becoming the dominant force in entertainment. The recent domination of the Internet over TV also proves that viewers want to create and continue conversations online.

## 4.18 Match the words with similar meaning.

| | |
|---|---|
| 1. screen | a) main |
| 2. a few | b) to cooperate |
| 3. to grow | c) to switch on |
| 4. advantage | d) by stages |
| 5. gradually | e) display |
| 6. viewers | f) some |
| 7. to interact | g) diversity |
| 8. to turn on | h) to increase |
| 9. major | i) benefit |
| 10. variety | j) audience |

## 4.19 Match the words with opposite meaning.

| | |
|---|---|
| 1. to connect | a) fixed |
| 2. advantage | b) to agree |
| 3. to increase | c) to pause |
| 4. to turn on | d) old |
| 5. to continue | e) disadvantage |

| | |
|---|---|
| 6. portable | f) to reduce |
| 7. to deny | g) stability |
| 8. recent | h) to separate |
| 9. flexibility | i) fast |
| 10. gradually | j) to switch off |

## 4.20 Match the following English verbs with their Russian equivalents.

| | |
|---|---|
| 1. to surpass | a) отрицать |
| 2. to deny | b) обеспечивать |
| 3. to prove | c) заниматься несколькими делами |
| 4. to share | d) доказывать |
| 5. to provide | e) сравнивать |
| 6. to consume | f) заменять |
| 7. to multi-task | g) делить |
| 8. to post | h) превосходить |
| 9. to compare | i) размещать информацию |
| 10. to replace | j) потреблять |

## 4.21 Choose the appropriate equivalent to the Russian words.

| | | | |
|---|---|---|---|
| 1. **интерактивный** | interaction | interactive | interacting |
| 2. **потребление** | consumable | consumption | consumer |
| 3. **заменяемый** | replacement | replacer | replaceable |
| 4. **по сравнению** | comparison | comparable | compared to |
| 5. **программирование** | program | programming | programmer |
| 6. **возрастающий** | increase | increasing | increased |
| 7. **видимый** | viewer | viewing | viewable |
| 8. **практически** | practice | practical | practically |
| 9. **поставщик** | provide | provided | provider |
| 10. **доказуемый** | prove | proved | provable |

## 4.22 Fill in the blanks with the following words and translate the sentences.

**increasing provides replace posted proved compares share entertainment consume practice**

1. The Web … information about the local activities.
2. These clubs provide nightly … .
3. They need to rethink the way they … energy.
4. Tests have … that the television system works.
5. She was named to … him as the company's vice president.
6. … makes perfect.
7. The Internet plays an … role in the political sphere.
8. I … your opinion.
9. He … an old computer design to a box.
10. I … several videos on YouTube yesterday.

## 4.23 Answer the following questions.

1. What media is more popular today?
2. How much time does an average Internet user spend in the Web?
3. What do NV services provide?
4. What can the Internet be used for?
5. Why is the Internet becoming the dominant force?
6. What are the advantages of the Internet?
7. What do you prefer: to watch NV or use the Internet? Why?

## 4.24 Read the text.

Liquid-crystal display televisions (LCD TV) are television sets that use LCD technology to produce images. LCD televisions are thinner and lighter than CRTs of similar display size, and are available in much larger sizes. This combination of features made LCDs more practical than CRTs for many reasons, and as manufacturing costs fell, their eventual dominant of the television market was guaranteed.

In 2007 LCD televisions surpassed sales of CRT-based televisions worldwide for the first time, and their sales figures relatively to other technologies increased. LCD TVs quickly displaced the only major competitors in the large-screen TV market, the plasma display panel and rear-projection television. LCDs are the most widely produced and sold television technology today.

In spite of the LCD's many advantages over the CRT technology LCDs also have a variety of disadvantages. A number of other technologies are

competing to enter the large-screen television market using as many advantages as possible.

## 4.25 Translate the following words and word-groups.

1. liquid-crystal display television
2. to produce images
3. the combination of features
4. manufacturing cost
5. to guarantee
6. large-screen television market
7. CRT-based televisions
8. plasma display panel
9. rear-projection TV
10. as many as

## 4.26 Read the sentences and decide whether they are true or false.

1. LCDs are the most widely produced and sold television technology today.
2. In 2010 LCD TVs first surpassed sales of CRT-based televisions worldwide.
3. As manufacturing costs raised their eventual dominant was guaranteed.
4. LCD TVs are thinner and lighter than CRTs.
5. LCD TVs are video sets that use LCD technology.

## GRAMMAR

*Table 4.1*

### Participle I (active forms), Participle II

| Simple Participle I | Participle II | Perfect Participle I |
|---|---|---|
| **$V_{ing}$** (recording, sending) | **$V_{ed}$, $V_3$** (recorded, sent) | **having + $V_{ed}$, $V_3$** (having recorded, having sent) |

### 4.27 Make participles from the following verbs and translate them.

| | Simple Participle I | Participle II | Perfect Participle I |
|---|---|---|---|
| to support | | | |
| to employ | | | |
| to provide | | | |
| to study | | | |
| to make | | | |
| to see | | | |
| to do | | | |

### 4.28 Choose the correct participle.

1. When *translating/ translated* the article he used no dictionary.
2. A robot is a mechanical device *controlling/ controlled* by a computer.
3. The man *replacing / replaced* these devices is our lab assistant.
4. The subjects *studying / studied* in the last two years are very important for your future job.
5. The TV sets *producing / produced* at this plant are very reliable.
6. The article on history of television was very *interesting / interested*.
7. The results of the test *receiving / received* by the student were satisfactory.

8. At present TV communication is *providing / provided* with the help of a system of artificial earth satellites.
9. A digital television set can automatically video-record a program when you are absent or *occupying / occupied*.
10. *Watching / Watched* a TV program we heard the news which was *worrying / worried*.

## 4.29 Translate the following pairs of sentences. Pay attentions to the forms of the verbs.

1. The students **studying** at universities pass exams twice a year.
   The subjects **studied** in the first two years are very important for future engineers.
2. The lecture **delivered** by our dean was on new methods of technology.
   The man **delivering** this lecture is our professor on mathematics.
3. An article **discussing** the new system of school education appeared in all newspapers.
   The results of the experiments **discussed** yesterday will be published.
4. The energy **possessed** by the body due to its position is called the potential energy.
   The new material **possessed** good properties.
5. The equipment **required** to carry out laboratory experiments was very complex.
   The equipment **required** further improvement.
6. The attention **paid** to the study of fundamental subjects is great.
   Much attention is **paid** to the study of fundamental subjects.

## 4.30 Combine the following pairs of the sentences by using participle l.

**Model:** The engineers designed a new device. They have to solve a few problems.
The engineers have to solve a few problems **(while/when) designing** a new device.

1. The student was writing his course project. He made a few bad mistakes.
2. The researchers were carrying out an experiment. They got good results.
3. The teacher delivers lectures at the university. She tells very interesting facts.
4. These engineers are working at new computers. They have some problems to solve.
5. The scientists often discuss the results of the experiments. They argue a lot.
6. We produce electric energy at atomic power plants. We use the energy of atom.
7. The company Motorola created a walkie-talkie (radiophone) in 1940. They used radio frequencies to transmit sound.
8. A digital TV set hangs on the wall. It looks like a picture.
9. These facts illustrate his theory. They sound convincing.
10. We attended at the conference in October. We didn't meet our partners from Germany.

## 4.31 Combine the following pairs of the sentences by using perfect participle.

**Model:** The English teacher gave the students a brief test. She had explained a new rule.
***Having explained*** a new rule the English teacher gave the students a brief test.

1. The engineers started complex tests. They had designed the car radar.
2. The atoms became positively charged ions. They had lost a negative charge.
3. The students wrote down the equation. They had solved the problem.
4. We should analyze all the necessary data. We had collected them.
5. I found a lot of interesting expressions. I had read a text in English.
6. I called him up at once. I had heard the news.

7. The committee rejected the proposal. They had considered it to be unconstitutional.
8. The participant of the conference asked if he could leave. He had given his report.
9. The teacher gave the students a few tasks to solve. He had explained the theorem.
10. I sent the article to the scientific magazine. I had translated it into English.

## 4.32 Complete the following sentences with the correct form of the participle.

**Model:** The engineer … that experiment took a lot of measurements. (*делающий, проводящий;* ***to make*** *– делать, проводить*)
The engineer ***making*** this experiment took a lot of measurements.

1. … a few questions the students solved the equation. (*задав;* ***to ask*** *– спрашивать, задавать вопросы*)
2. … the device in action he decided to modify it. (*когда он увидел, увидев;* ***to see*** *– видеть*)
3. A plastic card … a processor and a memory chip is called a smart card. (*которая содержит, содержащая;* ***to contain*** *– содержать, включать в себя*)
4. … this method he made a mistake.(*используя, при использовании;* ***to use*** *– использовать, пользоваться*)
5. … the experiment we found an error. (*после повторения, повторив;* ***to repeat*** *– повторять*)
6. All the components … for a computer are included on single chip. (н*еобходимые;* ***to need*** *– нужно, нуждаться*)
7. … the article he had to use a lot of foreign materials. (*при написании, когда он писал;* ***to write*** *– писать*)
8. … a lot of experiments with different devices the research group chose the best one for practical work. (*проведя, после того, как провели;* ***to make*** *– проводить, делать*)

9. A laptop is a portable computer … 2-4 kg. (*который весит;* ***to weigh*** *– весить*)
10. Databases are programs … you to store, look through, and change a large quantity of information quickly and easily. (*которые позволяют, позволяющие;* ***to allow*** *– позволять, давать возможность*)

## 4.33 Translate the sentences.

1. Television is an electronic system of sending images and sound over a wire or through space by devices converting light and sound into electrical signals and then reconverting them into visible light rays and audible sound.
2. In 1926 in London John Logie Baird and Charles Jenkins broadcasted a series of small moving black and white images using mechanical means.
3. The cathode ray tube, one of the most enabling technologies for TV was invented in 1876.
4. At the end of the 19th century the first electromagnetic television system was invented by Paul Nipkow, a student from Germany.
5. In 1923 Charles Jenkins invented a mechanical television transmitting one of the first moving images.
6. An American farmer named Philo Earnsworth created over 165 devices including a dissector tube which became the groundwork for the televisions we use today.
7. In 1929 at the Radio Exhibition the Baird's model mechanical television sets were introduced to the public.
8. Initially only wealthy people could afford televisions sold for about 55 dollars.
9. In 1923 an American engineer and inventor Vladimir Zvorykin patented a cathode-ray tube device for electrically capturing images in a camera called iconoscope.
10. A year later he created a kinescope, having become the inventor of the main transmitting and receiving elements of electronic television.
11. Iconoscope and kinescope have become the basic elements of the working electronic television system.

12. The first electronic television set for practical use was developed in an American research laboratory RCA headed by Zvorykin at the end of 1936.
13. The first mechanical TV set produced in the Soviet Union was called B-2.
14. The first Soviet electronic TV set was introduced in 1949. It was a legendary KVN-49. The TV set was equipped with a special enlarging lens filled with water in front of the screen.
15. At the beginning radio tubes were replaced by semiconductors – the first semiconductor TV set was developed in 1960 by Sony Company.

# Unit 5 COMPUTERS

| | |
|---|---|
| **Text** A | **Historical Development of Computers** |
| **Text B** | **The Volatile Future of Storage** |
| **Grammar:** | **Gerund and Complex Sentence;** |
| | **Gerund and Participle I** |

## Text A

## HISTORICAL DEVELOPMENT OF COMPUTERS

***Pretext exercises***

### 5.1 Read the words and expressions and try to guess their meaning.

Computer, technology, calculations, machine, basic elements, automatic, system, logical, American mathematician, programme concept, electronics, construction, electronic computer, minute, conditioning device, data, transistor, operation, integrated circuits, miniaturized.

### 5.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| influence | ['ɪnfluən(t)s] | considerable | [kən'sɪd(ə)rəbl] |
| complicated | ['kɔmplɪkeɪtɪd] | capacity | [kə'pæsətɪ] |
| automatic | [ˌɔ:tə'mætɪk] | further | ['fɜ:ðə] |
| sequence | ['si:kwən(t)s] | miniaturized | ['mɪnətʃ(ə)raɪz] |
| development | [dɪ'veləpmənt] | technique | [tek'ni:k] |
| symbolically | [sɪm'bɔlɪk(ə)lɪ] | processing | ['prəusesɪŋ] |
| mathematician | [ˌmæθ(ə)mə'tɪʃ(ə)n] | threshold | ['θreʃ(h)əuld] |
| purpose | ['pɜ:pəs] | artificial | [ˌɑ:tɪ'fɪʃ(ə)l] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to influence** | *влиять* | **to enter** | *вводить* |
| **to improve** | *улучшать* | **integrated circuit** | *интегральная схема* |
| **to perform** | *выполнять* | **input** | *вход* |
| **complicated** | *сложный* | **output** | *выход* |
| **sequence** | *последовательность* | **bus** | *шина* |
| **to store** | *хранить* | **to link** | *связывать, соединять* |
| **storage unit** | *запоминающее устройство* | **artificial** | *искусственный* |
| **heat** | *тепло* | **hardware** | *аппаратное обеспечение* |
| **to process** | *обрабатывать* | **software** | *программное обеспечение* |
| **capacity** | *емкость, мощность, объем* | | |

## 5.3 Read the text.

### HISTORICAL DEVELOPMENT OF COMPUTERS

We are living in the computer age. Most of our jobs are being influenced by the use of computers. In the areas of science and technology no improvements can be achieved without the use of computers. Computer is an electronic device that performs complicated calculations at high speed. The first computing machine was developed by Charles Babbage in the 19$^{th}$ century. It contained the basic elements of an automatic computer and performed computations according to the sequence of instructions. Another important contribution to the development of the computer was made in the mid-1800s by George Boole who devised a system of formulating logical statements symbolically. During the 1940s the American mathematician John Von Neumann was the first to use stored programme concept in computers.

The rapidly developing field of electronics led to the construction of the first general-purpose electronic computer in 1946. The device contained 18,000 vacuum tubes and had a speed of several hundred multiplications per minute. The computers were extremely large in size with vacuum tubes which generated considerable heat. Hence, special air conditioning devices were required to dissipate this heat. They were extremely slow and their storage capacity was about 2000 words. In these computers punched cards were used to enter data into the computer.

Later transistors appeared. The use of transistors in computers reduced the heat generated during the operation. It also decreased the size and increased storage capacity. Computers required less power to operate and were much faster than the first generation computers. They used high level languages for writing computer programs.

The third generation computers started in 1966 with the invention of integrated circuits (IC). They had small size and were cost effective. Storage capacity and speed of these computers were increased many folds compared to the second generation computers.

The fourth generation computers were introduced after 1976 and in these computers electronic components were further miniaturized through Large Scale Integration (LSI) techniques.

A digital computer is a system composed of five elements: input devices, memory storage devices, a central processing unit, output devices and a communication network called a “bus” that links all the elements of the system and connects the system itself to the external world.

Today we are at the threshold of the new computer era when artificial intelligence could be invented. There are no questions with “if”, the only question is “when”. And time will show whether computers will become our best friends or our evil enemies.

## 5.4 Match the words that have the similar meaning.

| | |
|---|---|
| 1. to improve | a) difficult |
| 2. to perform | b) memory |
| 3. complicated | c) unit |
| 4. to store | d) to make better |

| | |
|---|---|
| 5. storage unit | e) connection |
| 6. link | f) to carry out |
| 7. device | g) to keep |

## 5.5 Match the words that have the opposite meaning.

| | |
|---|---|
| 1. high | a) quick |
| 2. slow | b) output |
| 3. air | c) low |
| 4. input | d) simple |
| 5. complicated | e) vacuum |
| 6. improvement | f) degradation |

## 5.6 Match the words to make an expression. Translate the expressions.

| | |
|---|---|
| 1. complicated | a) purpose |
| 2. storage | b) speed |
| 3. general | c) data |
| 4. vacuum | d) program |
| 5. high | e) calculations |
| 6. punched | f) effective |
| 7. to enter | g) capacity |
| 8. computer | h) card |
| 9. cost | i) tubes |

## 5.7 Choose the appropriate word to fill in the blank with it. Translate the sentences.

1. No improvements can be … without computers.
   a) achieved b) increased c) stored
2. This device performs … calculations at high speed.
   a) simple b) extreme c) complicated
3. First-generation computers had vacuum tubes which generated …
   a) energy b) heat c) power

4. The devices had slow speed and their storage … was 2000 words.
   a) speed b) capacity c) programs
5. The fourth generation computers were based on … circuits.
   a) integrated b) artificial c) electronic
6. Communication network … all the elements of the system.
   a) increases b) disconnects c) connects
7. They used … level languages for writing computer programs.
   a) low b) high c) assembler

## 5.8 Read the text.

The desktop is the screen that appears when you turn on your computer. It shows a number of icons on a background picture or colour. When you buy a new computer and turn it on for the first time, the desktop will only show a small number of icons. In the Windows operating system, these usually include My Computer and Recycle Bin.

Double-clicking on an icon with a mouse opens a computer program, a folder or a file. Folders usually contain other files. You can move icons around the desktop, add new ones and remove them by deleting them. Deleted files go to the Recycle Bin. People usually put the programs they use most often on the desktop to find them quickly.

When you double-click on My Computer another screen appears. This screen shows the A: drive icon, for floppy disks; the C: drive icon, which usually contains all the main programs and folders on your computer; the D: drive icon, which is usually the CDROM drive, and the Control Panel folder.

When you double-click on Control Panel, another screen appears that shows many other icons such as the Display icon and the Date/Time icon. Double-clicking on Display opens a box that lets you personalize your desktop by changing the screen saver or background picture.

## 5.8a Find the words in the text that mean:

1. comes into view so you can see it (para 1)
2. the picture or colour on your screen (para 1)
3. clicking the mouse two times quickly (para 2)

4. something that holds documents or files (para 2)
5. most important (para 3)
6. make something the way you want it (para 4)

## 5.8 b Fill in the blanks with the following words.

| **display** | **screen saver** | **folders** | **Recycle Bin** |
|---|---|---|---|
| **files** | **deleted** | **desktop** | |

1. The … icon lets you change the way your desktop looks.
2. If you remove the file by mistake, you can find it in the … .
3. The … appears when you don't use the mouse or keyboard.
4. I didn't use that program very much so I … it from my desktop.
5. I have a great program on my … that I use for playing music.
6. Windows Explore lets you move … from one folder to another.
7. … contain documents or files.

## 5.9 Translate the following word groups into Russian.

1. stored program concept
2. general-purpose computer
3. vacuum tube application
4. air conditioning device
5. heat dissipation
6. heat reduction
7. increased storage capacity
8. integrated circuit development
9. large scale integration techniques

## 5.10 Try to give the definitions to the following words and expressions.

1. computer
2. input device
3. CPU
4. output device
5. storage unit
6. bus

## 5.11 Answer the following questions.

1. What is a computer?
2. When was the first computing machine developed?
3. What is John Von Neumann famous for?
4. What were the first generation computers?
5. Is there any difference between the first and the second generation computers?
6. What is the difference?
7. What were the third generation computers based on?
8. What are the main parts of any computer?
9. How often do you use computers? What for?
10. What are the advantages and disadvantages of computers?
11. Do modern computers understand human speech?

## 🎧 Life Before and After Computers

## 5.12 Watch the video and answer the following questions.

1. How did people communicate before the computer invention?
2. How do they communicate today?
3. What was the main source of information before the computer appearance?
4. How did people use to buy things they needed?
5. In what way do they do shopping, booking, etc. nowadays?
6. What are the words that have got new meaning after the invention of computer?
7. What benefits has the computer brought the mankind?

## 5.13 Watch the video again and try to guess the words that correspond to the following definitions.

1. computer's capacity to store information
2. input device that is used to enter the data
3. a computer program that performs a particular task (such as word processing)
4. to press a button on a mouse

5. a collection of computer data that forms a single unit and that is given a particular name
6. the part of the Internet that you can look at with a special program and that is made up of many documents which are linked together
7. program that infects a computer system
8. a device that is used for storing computer data and that contains one or more hard disks
9. to store data in a computer or on CD so that it can be used later
10. the process of looking for information in a database, network, Website, etc.

## 5.14 Translate the following word groups.

1. social networks appearance
2. important data saving
3. limitless storage capacity
4. computer keyboard application
5. input device function
6. computer virus property
7. software application
8. computer invention benefits

## 5.15 Translate the following sentences from Russian into English.

1. Компьютер – это электронный прибор, который выполняет сложные вычисления и обрабатывает данные с большой скоростью.
2. Компьютеры можно использовать как обучающие машины.
3. Оператор вводит инструкции и данные через устройство ввода.
4. Запоминающее устройство получает информацию и хранит её.
5. Все данные в цифровых компьютерах представлены цифрами.
6. Обработанные данные отображаются на экране.
7. Компьютеры широко используются в нашей жизни.
8. Клавиатура – самое простое и распространенное устройство ввода.

9. В 60-е годы транзисторные компьютеры заменили ламповые устройства.
10. Компьютеры второго поколения потребляли меньше мощности и были намного быстрее, чем компьютеры первого поколения.
11. Быстрое развитие электроники привело к созданию первого компьютера в 1946 году.
12. Время покажет, смогут ли компьютеры стать нашими настоящими друзьями.

# Text B

# THE VOLATILE FUTURE OF STORAGE

### *Pretext exercises*

### 5.16 Read the following words and try to guess their meaning.

Magnetic disk, commercial, disk technology, typical, information, compact, mobile device, flash, alternative, dynamic, Facebook, system, center, user, server.

### 5.17 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| storage | ['stɔ:rɪʤ] | alternative | [ɔ:l'tɜ:nətɪv] |
| capacity | [kə'pæsətɪ] | access | ['ækses] |
| primary | ['praɪm(ə)rɪ] | jeopardy | ['ʤepədɪ] |
| medium | ['mi:dɪəm] | ridiculous | [rɪ'dɪkjələs] |
| reign | [reɪn] | temporarily | ['temp(ə)r(ə)r(ə)lɪ] |
| obvious | ['ɔbvɪəs] | advantage | [əd'vɑ:ntɪʤ] |
| virtually | ['vɜ:ʧuəlɪ ], [-tju-] | inevitable | [ɪ'nevɪtəbl] |

### *Memorize the following words and expressions*

| | | | |
|---|---|---|---|
| **volatile** | *изменяемый; не сохраняющий информацию при отключении питания* | **application** | *прибор, устройство* |
| **to improve** | *улучшать* | **to intend** | *предназначать* |

| | | | |
|---|---|---|---|
| **to replace** | *заменять* | **temporary** | *временный* |
| **drive** | *накопитель, диск* | **to run** | *прогонять программу, работать* |
| **challenger** | *соперник, конкурент* | **to back up** | *создать резервную копию* |
| **random-access** | *произвольный доступ* | **inevitable** | *неизбежный* |
| **to crash** | *давать сбой; выходить из строя* | | |

## 5.18 Read the text.

### THE VOLATILE FUTURE OF STORAGE

As for the computer storage, the magnetic disk has been top dog for almost half a century. The first commercial disks appeared in 1956 and by the early 1970s their cost and capacity had improved to the point where they began to replace magnetic tape as the primary storage medium for computers. Since then the disk technology has greatly improved. Nowadays, a typical drive holds 20,000 times as much data as it did in 1985. Until recently any information kept on a computer for more than a few seconds was stored on disk.

But the hard disk's reign is coming to an end. The most obvious challenger is flash memory, which is faster, more compact and more resistant to shock. Virtually all mobile devices use flash instead of disk.
Today there is another alternative to disk: using dynamic random-access memory (DRAM) as the primary storage for long-lived data. More and more applications are keeping most or all of their data in DRAM. For example, Facebook keeps most of its social-network data in DRAM. And IBM's Watson artificial-intelligence system kept all of its data in DRAM when it won the "jeopardy!" challenge a few years ago.

On the surface, this seems ridiculous. After all, DRAM was intended to hold information temporarily during active computations. Although it is about 1,000 times as fast as flash, it is also 100 times as expensive as disk, and it is volatile, which means that the data it holds will disappear if

the computer loses power. Nevertheless, DRAM could soon become the primary storage medium for large-scale applications running in data centers. If DRAM is backed up on disk or flash, users can enjoy the medium's high speed advantage without worrying that data will be lost during the inevitable server crashes.

## 5.19 Match the words that have the similar meaning.

| | |
|---|---|
| 1. volatile | a) to design |
| 2. application | b) information |
| 3. to intend | c) memory |
| 4. to run | d) benefit |
| 5. storage | e) changeable |
| 6. advantage | f) to operate |
| 7. data | g) device |

## 5.20 Match the words to make an expression. Translate these expressions.

| | |
|---|---|
| 1. storage | a) memory |
| 2. magnetic | b) disk |
| 3. hard | c) power |
| 4. flash | d) crash |
| 5. artificial | e) unit |
| 6. to keep | f) tape |
| 7. to lose | g) data |
| 8. inevitable | h) intelligence |

## 5.21 Translate the following word groups.

1. capacity increase
2. primary storage medium
3. disk technology improvement
4. random-access memory
5. social-network data
6. data centers

7. high speed advantages
8. inevitable server crash
9. flash memory alternative
10. long-lived data

**5.22 Find in the text the words that correspond to the following definitions.**

1. most important, basic (para 1)
2. a device in a computer which can read and copy information onto disk or tape (para 1)
3. some thing or action that is against something (para 2)
4. very nearly, almost entirely (para 2)
5. chosen without a particular plan (para 3)
6. unit, device (para 3)
7. extremely silly or unreasonable (para 4)
8. something that is sure to happen (para 4)

**5.23 Choose the appropriate words and fill in the blanks with them.**

1. By the early 1970s disks became the … storage medium for computers.
   a) temporary b) primary c) secondary
2. The … to disk is flash memory.
   a) challenge b) medium c) drive
3. Flash memory is … , more compact and more resistant to shock than hard disk.
   a) slower b) faster c) lighter
4. Many applications today keep their … in DRAM.
   a) storage b) power c) data
5. The data will disappear if the computer … power.
   a) increases b) loses c) uses
6. If DRAM is backed up on disk or flash, the data … be lost during the server crash.
   a) will not b) will c) can

## 5.24 Read the text and fill in the blanks with the following words.

| backups | center | storage | disk | flash | data |
|---|---|---|---|---|---|

The researchers at Stanford University have constructed a general-purpose … (1) system we call RAMCloud, which keeps all of its … (2) in DRAM at all times. RAMCloud aggregates the DRAM memories of a collection of servers – potentially hundreds or thousands in a typical data … (3). To work around DRAM's volatility, RAMCloud stores copies of data on disk or in … (4) memory, and it automatically recovers data from those … (5) after a server crashes. The scientists believe that the RAMCloud project will make it as easy for the developers to use DRAM-based storage as it is for them to use … (6) .

## 5.25 Answer the questions on the text.

1. When did the first commercial disk appear?
2. Why did it replace magnetic tape?
3. What is the advantage of flash memory over hard disk?
4. What is DRAM?
5. Is there any difference between hard disk and DRAM?
6. What is the difference?
7. What are the advantages and disadvantages of DRAM?
8. What is the most popular storage medium today?

## 5.26 Translate the following sentences from Russian into English.

1. В начале 1970-х годов стоимость жестких дисков уменьшилась.
2. Сегодня обычный диск хранит больше данных, чем в 1980 году.
3. Преимуществом флэш-памяти является скорость, стоимость, большой объём.
4. DRAM – это динамическая память с произвольным доступом.

5. DRAM изготавливается на основе конденсаторов небольшой емкости.
6. Такие конденсаторы быстро теряют заряд.
7. Чтобы сохранить данные, конденсаторы необходимо подзаряжать через определенные интервалы.
8. DRAM широко используется в качестве оперативной памяти современных компьютеров.
9. DRAM – это память, где хранятся активные программы и данные во время работы.
10. Оперативная память – это временное хранилище данных.

## GRAMMAR

*Table 5.1*

**Gerund and Complex Sentence**

| Complex sentence | Gerund |
|---|---|
| **Before I did** this experiment, I read a lot of articles. | **Before doing** this experiment I read a lot of articles. |
| **When he explained** his project, he forgot one point. | **In explaining** his project he forgot one point. |
| **When he made** an experiment, he went home. | **After making** an experiment, he went home. |

### 5.27 Замените придаточные времени герундием с предлогом *after, in, before.*

1. When we measure the voltage, we use a voltmeter.
2. When we do nothing we don't reach the solution.
3. Before I translated the text, I underlined all the unknown words.
4. They thought of setting up a special commission after they considered this question.
5. When we solve problems, it is necessary to distinguish between facts and hypothesis.

6. When he proved that his theory was correct, he started studying ways and means of improving the conditions of work
7. When he made a thorough study of the subject, he found that it was a great deal more important than he had thought at first.

*Table 5.2*

**Gerund and Participle I**

| Function | Gerund | Participle I |
|---|---|---|
| **Subject** | **Making** a list of all computer devices took me five minutes. | – |
| **Part of predicate** | Our aim is **making** experiments. | They are **making** a great mistake! |
| **Object** | He avoided **making** the same mistake again.<br>They succeeded ***in*** **making** the experiment. | – |
| **Attribute** | The new method ***of*** **making** such engines was good. | Physical parts **making** up a computer system are hardware. |
| **Adverbial modifier** | *Before* **making** the experiment you should read this article. | **Making** the experiment you should be careful. |

## 5.28 Translate the following sentences. Point out what parts of speech the words in bold are: gerund or participle I.

1. **Explaining** theories you don't know well is almost impossible task.
   The teacher is **explaining** a new material now.
2. **Readin**g English is necessary for every specialist.
   **Reading** such books you will improve your knowledge on this speciality.
3. My friend succeeded in **translating** this difficult text.
   **Translating** an article I used a dictionary.
4. Stage two involves **planning** the experiment.
   They are **planning** their future work.

5. On **receiving** successful results he carried out various experiments of this kind.
   **When receiving** successful results he carried out various experiments of this kind.
6. These scientists continue **working** in this promising field of knowledge.
   Let me tell you some things I learned **working** here.
7. **Describing** the experiment he gives every detail of the process.
   **Describing** the phenomenon is the aim of her research.
8. Our aim is **solving** this complex problem.
   **Solving** this complex problem I had a lot of difficulties.
9. Perhaps the most important component of a standard computer system is the central **processing** unit.
   We keep data and programs in memory systems where they are available for **processing**.
10. The importance of scientific researches is **growing** with every year.
    The **growing** importance of automatic equipment in industry is evident.
11. **Discussing** his research with his colleagues he saw some of its weak points.
    In **discussing** this problem they touched upon new methods of research.
12. **Applying** new technologies allow us to do the work with high quality and in short terms.
    **Applying** a new method he get good results.
    There were other ways of **applying** high voltages.
13. **Testing** the engine the engineer applied new methods.
    My work involves **testing** the final product.
    In **testing** the devices they found some serious faults.
14. After **studying** the theory we can make experiments.
    His main occupation was **studying** properties of some conductors.
    The students **studying** well receive grants.

15. Thousands of scientists **using** the most modern equipment are studying the atmosphere.
    We have no experience in **using** Linux OS.
    **Using** this device we can make many experiments.
    **Using** a beam of electrons solved the problem of studying microorganisms.

## 5.29 Translate the sentences paying attention to the functions of the gerund and participle I.

1. **Measuring** the current resistance is necessary in many experiments.
   a) Измерение b) Измеряющий c) Измеряя
2. The software on this PC needs **updating**.
   a) обновляется b) обновляя c) обновление
3. **Using** the energy of the atom we produce electric energy at atomic power plants.
   a) Использование b) Используя c) Использовав
4. The purpose of the method is **determining** system stability.
   a) определение b) определяющий c) определяет
5. **Making** a decision is a complex process.
   a) Принятие b) Принимая c) Принимающий
6. **Considering** these problems took us much time.
   a) Рассматривая b) Рассмотрение c) Рассмотрев
7. They succeeded in **obtaining** good results working with this metal.
   a) получении b) полученный c) получая
8. (When) **choosing** a monitor, you have to take into account a few basics.
   a) Выбор b) Выбирая c) Выбрав
9. (While) **operating** on the basis of analogy analog computers simulate physical systems.
   a) Работать b) Работающие c) Работая
10. The main function of a transformer is **changing** voltage in the circuit.
    a) изменяет b) изменение c) изменяя

## 5.30 Translate the following sentences paying attention to the gerund and the participle I functions.

1. Following their method we could obtain reliable data.
2. Programming is breaking a task down into small steps.
3. Electronic computers perform both arithmetic and logical operations, making it possible to control the process under rather complicated conditions.
4. Measuring the current resistance is necessary in many experiments.
5. Being not visible software makes possible the effective operation of computer system.
6. A number of materials including some gases and semiconductors possess this property.
7. We changed the plan making it possible to take into consideration the new data concerning the problem under investigation.
8. Making these calculations may be a very difficult procedure.
9. Absence of necessary materials prevented us from completing the experiment in time.
10. We presented all the determining factors, thus changing the resulting effect.
11. Developing the transistor was a key to computer miniaturization and reliability.
12. Large-scale application of electronic technique is a trend of technical progress capable of revolutionizing many branches of industry.
13. Relying upon inadequate information you will make a mistake.
14. Penetrating into space was very important for mankind.
15. For many centuries people were interested in obtaining new sources of energy.
16. I had difficulty in searching grants for my research.
17. While considering one problem we found a solution of another problem.
18. There can be no progress in science without experimenting.
19. Upon switching off the current the pressure dropped.
20. While differing in detail these programs involve similar problems.

# Unit 6 OPTICAL COMMUNICATION

| | |
|---|---|
| **Text A** | **Optical Communication** |
| **Text B** | **Lasers and Masers** |
| **Grammar:** | **Infinitive and Gerund Functions, Revising Verbals, Infinitive Constructions** |

## Text A

## OPTICAL COMMUNICATION

***Pretext exercises***

### 6.1 Read the words and expressions and try to guess their meaning.

Optical communication, problem, atmosphere, interest, laser, device, problem, system, optical components, information transfer, basic concept, type of communication system, electron, metal, photon, electric, cable, electromagnetic, signal.

### 6.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| investigation | [ɪnˌvestɪ'geɪʃ(ə)n] | similar | ['sɪmɪlə] |
| due | [dju:] | conventional | [kən'ven(t)ʃ(ə)n(ə)l] |
| suitable | ['s(j)u:təbl] | substitute | ['sʌbstɪtju:t] |
| source | [sɔ:s] | immune | [ɪ'mju:n] |
| disturbance | [dɪ'stɜ:b(ə)n(t)s] | interference | [ˌɪntə'fɪər(ə)n(t)s] |
| turbulence | ['tɜ:bjulən(t)s] | requirement | [rɪ'kwaɪəmənt] |
| renew | [rɪ'nju:] | intermediate | [ˌɪntə'mi:dɪət] |
| coherent | [kə(u)'hɪər(ə)nt] | strength | [streŋθ] |
| nevertheless | [ˌnevəðə'les] | medium | ['mi:dɪəm] |
| component | [kəm'pəunənt] | society | [sə'saɪətɪ] |
| reliable | [rɪ'laɪəbl] | | |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **optical fiber** | *оптоволокно* | **reliable** | *надежный* |
| **beam** | *луч, пучок* | **to affect** | *влиять* |
| **to investigate** | *исследовать, изучать* | **conventional** | *обычный, традиционный* |
| **due to** | *из-за, вследствие* | **to substitute** | *заменять* |
| **lack** | *отсутствие, недостаток* | **immune** | *невосприимчивый* |
| **suitable** | *подходящий, пригодный* | **property** | *свойство* |
| **source** | *источник* | **to reduce** | *уменьшать, понижать* |
| **to provide** | *обеспечивать* | **requirement** | *требование, потребление* |
| **to achieve** | *достигать* | **medium** | *среда* |

## 6.3 Read the text.

### OPTICAL COMMUNICATION

The use of visible waves or light for communication has been common for many years. As early as 1880 Alexander Graham Bell could transmit the human voice using a light beam. The photophone invented by Bell four years after the invention of telephone was used to transmit speech over a distance of 200m. However, although the investigation of optical communication continued in the beginning of the 20$^{th}$ century its use was limited. This was due to both the lack of suitable light source and the problem that light wave transmission in the atmosphere was affected by disturbances such as rain, snow, fog, dust and atmospheric turbulence.

A renewed interest in optical communication was stimulated in the early 1960s with the invention of the laser. This device provided a powerful coherent light source and made free space optical transmission possible. But because of the problems with light transmission in the atmosphere these systems were limited to short distance applications.

Nevertheless, the invention of the laser led to the research of optical components to achieve reliable information transfer. The proposals for

optical communication via optical fibers fabricated from glass to avoid degradation of the optical signal by the atmosphere were made in 1966 by Kao, Hockham and Werts.

An optical fiber communication system is similar in basic concept to any type of communication system. Conventional communication transmission is based on the conduction of electrons through metal. But optical communication systems substitute photons for electrons and glass fibers for copper.

There are a lot of advantages of optical fibers over electric conductors. Optical fibers are far smaller and much lighter than corresponding copper cables. They are immune to electromagnetic and radio frequency interference. Optical fibers have very low transmission loss in comparison with the best copper conductors. This low-loss property reduces the requirement for intermediate repeaters or amplifiers to boost the transmitted signal strength. Today optical fiber has become the dominant transmission medium in the major industrialized societies.

## 6.4 Match the words that have the similar meaning.

| | |
|---|---|
| 1. beam | a) to influence |
| 2. to investigate | b) usual |
| 3. due to | c) decrease |
| 4. conventional | d) ray |
| 5. to substitute | e) demand |
| 6. reduction | f) to study |
| 7. requirement | g) to replace |
| 8. to affect | h) because of |

## 6.5 Match the words to make an expression. Translate these expressions.

| | |
|---|---|
| 1. optical | a) conduction |
| 2. light | b) property |
| 3. copper | c) fiber |
| 4. electron | d) strength |

| | |
|---|---|
| 5. communication | e) beam |
| 6. electromagnetic | f) cable |
| 7. low-loss | g) system |
| 8. signal | h) interference |

## 6.6 Translate the following word groups.

1. human voice transmission
2. suitable light source
3. free space optical communication
4. short distance applications
5. reliable information transfer
6. optical signal degradation
7. low transmission loss
8. transmitted signal strength

## 6.7 Fill in the blanks with the following words.

| | | | | |
|---|---|---|---|---|
| **require** | **digital** | **amplifier** | **laser** | **fibre** |
| | **optical** | **electronically** | | |

In optical communication systems … (1) information is transmitted as a train of light pulses through the fibre. To support the 2,4GBit/s transmission rate these light pulses need to be very short. As the optical pulses travel through the … (2) they weaken in signal strength and become stretched, making the information they carry indecipherable. The signals in existing submarine systems operating at 140Mbit/s need to be … (3) regenerated every 40 miles. A 2,4Gbit/s transmission rate would be impractical with conventional systems as it would … (4) too many repeaters on the sea bed.

To overcome this, researchers have developed an optical … (5) which can regenerate the optical signal without the need for electro-optic conversion on the ocean floor. The optical amplifiers developed by BT boost the … (6) signal as it travels through a short length of fibre which contains traces of the element erbium. The signal gains its optical energy from the highly reliable semiconductor … (7) that "pumps" the amplifier.

## 6.7 a Match the words with their definitions.

| | |
|---|---|
| 1. weaken | a) usual, traditional |
| 2. indecipherable | b) smth. Which shows that someone or something was in a particular place |
| 3. conventional | c) to make something less forceful, less effective |
| 4. conversion | d) to get something wanted or valued |
| 5. trace | e) impossible to read or understand |
| 6. gain | f) process of changing from one form, state, etc. to another |

## 6.8 Read the statements and decide whether they are true or false.

1. Now optical communication use is limited because of the lack of suitable light source.
2. Light wave transmission affects the atmospheric turbulence.
3. In the early 1960s laser systems were limited to short distance applications
4. Optical fibers were fabricated from glass.
5. Optical communication systems are based on the same principle as the conventional communication systems.
6. In optical communication system the electrons flow through a metal conductor.
7. Optical fibers are immune to electromagnetic interference.
8. Optical communication systems don't need repeaters to amplify the transmitted signal strength.

## 6.9 Answer the questions on the text.

1. What was the photophone used for?
2. Why wasn't optical communication widely used at the beginning of the $20^{th}$ century?
3. What is the difference between optical communication system and conventional communication system?
4. What are the advantages of optical fibers over electric conductors?

5. Do optical fibers need any intermediate repeaters?
6. What is the best means of communication today?

## Physics of Fiber Optics

### 6.10 Watch the video and answer the following questions.

1. What is the data transmission of optical fiber based on?
2. What are the properties of light waves?
3. What does the light wave speed depend on?
4. What is the difference between medium A and medium B?
5. Is the refraction index of air and water the same?
6. What is the refraction?
7. What does Snell's law determine?
8. What is the difference between the angle of incidence and the angle of refraction?

### 6.11 Watch the video again. Match the beginnings and the endings of the sentences and translate them.

| | |
|---|---|
| 1. The light wave properties | a) as it passes from one medium to another |
| 2. As a light wave propagates through two different mediums | b) should be considered to determine the degree of reflection and refraction |
| 3. Water has a higher refraction index | c) reflection takes place |
| 4. Where the refraction and reflection occur | d) affect the total internal reflection |
| 5. Refraction is the bending of the light wave | e) than air |
| 6. If the second medium prevents light from passing through the interface | f) is called the angle of refraction |
| 7. The angle at which the light wave strikes the interface | g) the change in light speed will result in the beam direction change |
| 8. Snell's law is used to determine | h) its speed changes |

9. As the light hits the interface at the angle
10. The angle at which the light propagates through the new medium

i) is the interface between two mediums
j) the amount of refraction between two mediums

## 6.12 Translate the following word groups.

1. light reflection phenomena
2. refractive index change
3. light wave propagation
4. slower moving light wave
5. two mediums interface
6. light wave bending
7. reflection degree determination
8. Snell's law application
9. light direction change

## 6.13 Translate the following sentences from Russian into English.

1. Оптические системы являются эффективными и универсальными.
2. Они передают большое количество информации на большие расстояния за несколько секунд.
3. В 1880 году А.Бэлл смог передать человеческий голос, используя световой луч.
4. Интерес к оптической связи возрос в 1960 годы с изобретением лазера.
5. Обычные системы связи основаны на прохождении электронов в металле.
6. Преимуществами стекловолокна являются их размер и вес.
7. Оптическое волокно не подвержено интерференции.
8. Свет встречает маленькое сопротивление, когда проходит по стекловолокну.
9. Сегодня оптическое волокно является самым распространенным средством передачи информации.

# Text B

## LASERS AND MASERS

***Pretext exercises***

### 6.14 Read the words and expressions and try to guess their meaning.

Laser, machine, intensity, atom, neutron, electron, proton, energy, material, gas, medical, industrial, metal, operation, emission, principle, molecules, atomic electrons, production, electronic components, medicine, computer technologies.

### 6.15 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| machine | [mə'ʃi:n] | diamond | ['daıəmənd] |
| intense | [ın'ten(t)s] | delicate | ['delıkət] |
| amplification | [ˌæmplıfı'keıʃ(ə)n] | surgery | ['sɜ:ʤ(ə)rı] |
| length | [leŋ(k)θ] | microwave | ['maıkrə(u)weıv] |
| neutron | ['nju:trən] | wavelength | ['weıvleŋθ] |
| electron | [ı'lektrən] | molecule | ['məlıkju:l] |
| excited | [ık'saıtıd] | coherent | [kə(u)'hıər(ə)nt] |
| industrial | [ın'dʌstrıəl] | component | [kəm'pəunənt] |
| purpose | ['pɜ:pəs] | control | [kən'trəul] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **intense** | *интенсивный* | **liquid** | *жидкость* |
| **to amplify** | *усиливать* | **solid** | *твердый* |
| **to emit** | *излучать, испускать* | **beam** | *луч, пучок* |
| **ordinary** | *обычный* | **to join** | *соединять* |
| **wavelength** | *длина волны* | **to operate** | *работать* |
| **to excite** | *возбуждать* | **to generate** | *генерировать* |

| | | | |
|---|---|---|---|
| **level** | *уровень* | **body** | *тело* |
| **state** | *состояние* | **coherent** | *когерентный* |
| **property** | *свойство* | **application** | *применение* |

## 6.16 Read the text.

### LASERS AND MASERS

A laser is a machine for making and concentrating light waves into a very intense beam. The letters LASER stand for Light Amplification by Stimulated Emission of Radiation. The light made by a laser is much more intense than ordinary light. With ordinary light, all the light waves are of different length. With lasers, all the light waves have the same length and this increases the intensity.

Atoms are made of neutrons, electrons and protons. In a laser the electrons are excited to a high energy level. As the electrons fall back from their excited state, they give off energy. This energy is given off as light which can be seen. A number of materials have this property including some gases, liquids, solids and semiconductors. Thus a number of different types of lasers have been developed.

Lasers are now used for many scientific, medical and industrial purposes. The thin beam of light gives a lot of heat and it is used to join metals when a very small joint is needed. The beam can also be used as a drill to make holes in steel or even in diamonds. Since the beam is so small it is very important in delicate surgery and is used in eye operations.

The word MASER is also an acronym – for Microwave Amplification by Stimulated Emission of Radiation. The maser operates on the same principle as the laser except that the wavelengths generated are much longer and therefore the energy jumps are smaller. The excited bodies in a maser are molecules rather than atomic electrons and the beam generated is a coherent beam of microwaves which is not visible to the eye.

The field of laser application is expanding very rapidly. Today they are widely used in the production of electronic components, in medicine, in solving the quality control problems, in space research, in communication and computer technologies.

## 6.17 Match the words that have similar meaning.

| | |
|---|---|
| 1. make | a) since |
| 2. ordinary | b) many |
| 3. different | c) usage |
| 4. as | d) produce |
| 5. a number of | e) work |
| 6. beam | f) various |
| 7. operate | g) fast |
| 8. application | h) common |
| 9. rapidly | i) ray |

## 6.18 Choose the appropriate word to fill in the blank.

1. The light made by a laser is very … .
   a) bright b) intense c) dark
2. In lasers all the light waves have … wavelength.
   a) the same b) different c) some
3. The thin beam of light … a lot of heat and it is used to join metals.
   a) increases b) decreases c) gives
4. The beam … by a maser is not visible to the eye.
   a) generated b) used c) needed
5. When the electrons return from the high energy level, they give off … light.
   a) invisible b) white c) visible
6. The maser … on the same principle as the laser.
   a) depends b) operates c) concentrates
7. The development of laser systems for communication is going ahead … .
   a) slowly b) properly c) fast

## 6.19 Translate the following word groups.

1. light waves concentration
2. laser beam intensity
3. high energy level
4. laser system development
5. laser property importance

6. maser operation principle
7. small energy jumps
8. maser excited bodies
9. laser application research
10. electronic components production

## 6.20 Match the following words with their definitions.

| | |
|---|---|
| 1. amplify | a) a process in which a doctor cuts into someone's body to repair or remove a damaged part |
| 2. join | b) the use of an idea, method in a particular situation or for a particular purpose |
| 3. delicate | c) to increase the strength, to make bigger |
| 4. operation | d) requiring special care or skill |
| 5. emission | e) to connect two or more things |
| 6. application | f) the act of producing or giving off smth. (energy or gas) from the source |

## 6.21 Choose the equivalents to the Russian words.

| | | | | |
|---|---|---|---|---|
| 1. | **интенсивность** | intensity | intensive | intensively |
| 2. | **обычный** | coherent | ordinary | wide |
| 3. | **излучать** | emission | emitter | emit |
| 4. | **полезный** | use | useful | useless |
| 5. | **значение** | importance | important | import |
| 6. | **ученый** | scientific | scientist | science |
| 7. | **применение** | applied | applicant | application |
| 8. | **соединять** | join | joint | joined |
| 9. | **длина** | longitude | length | long |

## 6.22 Read the text and fill in the blanks with the following words.

| | | | | |
|---|---|---|---|---|
| **the same** | **emits** | **differs** | **communication** | **losses** |
| **visible** | **thinner** | **dimensions** | **efficiency** | |

Scientists of the Philips Research Laboratories succeeded in creating a semiconductor laser for practical use which … (1) radiation with the same light-red colour as the widely used helium/neon gas laser.

At present applications for semiconductor lasers include glass-fiber … (2) and optical recording and playback, such as reading the CDs. The new laser is the first semiconductor laser to emit light which is … (3) to the human eye. The wavelength is exactly … (4) as that of the gas laser, which is widely used in laser printers and barcode readers. Previously, this wavelength could not be achieved with semiconductor lasers for practical use, since it resulted in excessive … (5) in the material. Now Philips succeeded in reducing these losses.

Replacing the helium/neon laser with the new semiconductor laser is an attractive prospect due to very small … (6), the high operational safety and high … (7) (which means that a low-voltage source is sufficient to power the laser).

The new laser … (8) from dark-red-emitting semiconductor lasers in the thickness of extremely thin layers of gallium indium phosphide. Each layer is ten thousand times … (9) than a human hair. Philips claims to be the first to succeed in using such thin layers and in understanding their behaviour, which is of vital importance in achieving good results.

## 6.23 Read the following sentences and decide whether they are true or false.

1. Light made by a laser is more intense than ordinary light.
2. With ordinary light, all the light waves have the same wavelength.
3. Laser beam intensity depends on the wavelength.
4. The energy is given off when electrons are excited to a high energy level.
5. In a laser the energy is emitted as an invisible light.
6. Lasers are now used only for scientific purposes.
7. The excited bodies in a laser and maser are molecules.
8. The light generated by a maser is not visible to the eye.
9. The laser and maser operate on the same principle.

## 6.24 Answer the following questions.

1. What do the letters LASER stand for?
2. What is the difference between light made by laser and ordinary light?
3. What does the laser beam intensity depend on?
4. What is the difference between laser and maser?
5. Where are lasers used?

## 🎧 Lasers are the Future of Optical Communication

## 6.25 Watch the video and answer the following questions.

1. What are avionics boxes used for?
2. Where are optical telescopes placed?
3. What is the function of the optical telescope?
4. When did NASA launch the satellite to the Moon?
5. What are the benefits of laser?

## 6.26 Translate the following word groups.

1. laser communication demonstration
2. high-rate data system
3. radio frequency device
4. deep space mission
5. manned flight

## GRAMMAR

*Table 6.1*

**Infinitive and Gerund functions**

| Function | Example |
|---|---|
| **Subject** | **To translate / Translating** articles is difficult. |
| **Part of predicate** | His task was **to translate** / **translating** the article in time. |
| **Object** | He likes **to translate** / **translating** technical articles.<br>Knowing English allows articles **to be translated** well. |
| **Attribute** | He was the first **to translate** the article.<br>Here is the article **to be translated**. |
| | There are some ways *of* **translating** technical articles. |
| **Adverbial modifier** | He went home **to translate** / *for* **translating** the article.<br>**To translate** articles you must know English well. |

### 6.27 Translate the sentences and choose the right variant. Pay attention to the infinitive and the gerund functions.

1. **To conduct** / **Conducting** an experiment of this kind seems nearly impossible.
   a) Для того чтобы провести
   b) Провести
   c) Чтобы провести
2. **To perform** this work one must have all necessary equipment.
   a) Для того чтобы выполнить
   b) Выполнить
   c) Чтобы выполнять
3. The quality of speech signals **to be transmitted** may degrade.
   a) которые передают
   b) которые нужно передать
   c) которые были переданы

4. Data are processed **to become** useful information.
   a) чтобы стать
   b) стать
   c) становятся
5. Input devices are used **to enter** data into primary storage.
   a) вводить
   b) для ввода
   c) ввести
6. **To make** / **Making** this method effective requires some more efforts.
   a) Делать
   b) Для того чтобы сделать
   c) Сделать
7. The *cloud* and *cloud computing* are new terms **to be explained**.
   a) которые объяснили
   b) которые следует объяснить
   c) которые объясняют
8. The computer was too old **to work** quickly.
   a) чтобы работать
   b) работать
   c) для работы
9. We conducted the experiment for **solving** this problem.
   a) решающий
   b) решение
   c) решать
10. **To use** integrated circuit technology new computers were built.
    a) Использовать
    b) Для того чтобы использовать
    c) Чтобы использовать

## 6.28 Rewrite each of these sentences, as in the model.

**Model:** Their task is **to maintain** the temperature at 100 degrees.
**Maintaining** the temperature at 100 degrees is their task.

1. One of the objects of Thomson's work was to measure the velocity of cathode rays.
2. The main task of a computer is to give the automatic solution of the set of problems.
3. The role of the operating system is to communicate directly with the hardware.
4. One of the most important functions of a computer is to process large amounts of data quickly.
5. The main reason for installing more memory is to allow the computer to process data faster.

## 6.29 Change the following complex sentences according to the models and translate them.

**Model 1:** Einstein was the first **who showed** that mass could be converted to energy.
Einstein was the first ***to show*** that mass could be converted to energy.

**Model 2:** The equipment **that *is to be / will be* installed** is very effective.
The equipment **to be installed** is very effective.

1. These devices were the first **that were tested** in our laboratory.
2. The engineer was the last **who made** the report at the conference.
3. The problem **that must be solved** is very difficult.
4. The method **which will be used** is reliable.
5. The famous scientist was the first **who proved** this theory.
6. The data **that are to be obtained** will be of great interest.
7. The quality of speech signals **that will be transmitted** may degrade.
8. The results **which will be received** will be published next month.

## 6.30 Translate the following sentences paying attention to the infinitive and the gerund functions.

*Subject*

**To complete** this experiment will not take much time.

**Replacing** the helium/neon laser with the new semiconductor laser is an attractive prospect because of the very small dimensions and high efficiency.

*Object*

A material which allows electricity **to flow** through it is called a conductor.

The scientists succeeded in **creating** the semiconductor laser for practical use.

*Attribute*

He was among **the first** researchers to test the new software.

The work **to be done** is of great importance.

There are projects of **using** lasers for long distance communication.

*Adverbial modifier*

**To make** computers more reliable transistors were used.

Analytical engine was invented for **storing** data.

1. Many instruments were invented to measure pressure, length, time and so on.
2. To connect two plates with copper wire means to form a path for electron flow.
3. Computers were designed for performing thousands of computations per second.
4. Breaking a magnet does not separate the north and south poles, for each part is now a complete magnet.
5. The problem to be solved is of great importance for this branch of science.
6. We conducted the experiment to solve this problem.
7. Liquid mirrors don't require polishing or diamond-machining like solid surfaces do.
8. Some devices were developed for detecting cosmic rays.
9. To integrate large numbers of circuit elements into a small chip, transistors should be reduced in size.
10. The information to be used is taken from the journal.
11. Disk drives are used for reading and writing data on disks.
12. To perform this work one must have all the necessary equipment.

13. The researchers showed that it was possible to amplify light directly inside an optical fiber instead of using external electronics.
14. Processing is operations on data to convert them into useful information.

## Revising Verbals

### 6.31 Choose the English equivalents of the words in bold.

1. ***to use***

- **Using** various methods of computation students made progress
- in their work .
- **Having used** a new method of computation the students did the task in time.
- The method **used** showed good results.
- **Using** new methods in computation is necessary.
- The task of the students was **to use** the new methods in computation.

2. ***to obtain***

- Obtaining this information is hardly possible.
- Their task was **to obtain** information.
- The mass media enlarged on the event **obtaining** new information every day.
- The information **obtained** by us was very urgent.

3. ***to design***

- **Designing** websites made knowing world affairs possible.
- **Having designed** the Internet scientists created a huge network of computers spanning our planet.
- New computers **designed** nowadays are considerably improved in technology.
- You can improve your computer skills **designing** the programmes for yourself.
- Internet allows advertisers **to design** personal messages for individual customers.

4. ***to assemble***

- While **assembling** this device they found some broken parts.
- **Assembling** new information for the report was not an easy matter for him.
- **Having assembled** the device the scientists began to use it in their experiment.
- After **assembling** all the parts of the mosaic the child found two extra details.
- The devices **assembled** in this manner are usually reliable.

## Infinitive Constructions

*Table 6.2*

**Complex Object**

| |
|---|
| We know **him to be** a good scientist. = We know **(that) he is** a good scientist.<br>I hope **them to come in time**. = I hope **(that) they will come** in time.<br><br>**Particle 'to' is not used after the verbs**<br>a) ***to see, to hear, to feel, to watch, to observe,*** *etc.*<br>b) ***to cause, to make, to permit, to allow, to enable*** |

### 6.32 Change the following complex sentences given below according to the model and translate them.

**Model 1:** We know (that) radio electronics surrounds us everywhere.
We know radio electronics to surround us everywhere.

**Model 2:** I hate when you forget your duties.
I hate you to forget your duties.

**Model 3:** We want (that) this device will be tested.
We want this device to be tested.

1. We know the cybernetics is an important branch of modern technology.
2. I hate when you use my laptop.

3. He wants (that) this device will be tested.
4. We know Pascal is the first inventor of the mechanical computer.
5. The professor wants (that) we will use these data.
6. The scientists consider (that) the sun emits radio signals.
7. They want (that) this device will be tested.
8. We expect (that) the message will be transmitted by radio.
9. I expect (that) the teacher will give me a good mark.
10. We see (that) this scientific centre grows day by day.
11. I want that you will have your own opinion.
12. She does not like when I argue with her.

## 6.33 Choose the best translation.

1. We know Mr. Stanton to be a good PR specialist.
   a) Мы знаем, что мистер Стентон – хороший специалист по связям с общественностью.
   b) Мы знаем мистера Стентона по его хорошей работе в качестве специалиста по связям с общественностью.
2. The teacher wanted the student to explain this new phenomenon.
   a) Преподаватель хотел объяснить студенту это новое явление.
   b) Преподаватель хотел, чтобы студент объяснил это новое явление.
3. He ordered the e-mail to be transmitted instantaneously.
   a) Он приказал отправить электронное письмо незамедлительно.
   b) Он сразу же отправил все письма по электронной почте.
4. We knew nothing of the research work to be carried out next month.
   a) Мы ничего не знали о том, что исследование будет проведено в следующем месяце.
   b) Мы ничего не знали о том, как проводить исследование в следующем месяце.
5. The engineer expected the work to be done in time.
   a) Инженер надеялся, что работа будет сделана вовремя.
   b) Ожидали, что инженер сделает работу вовремя.

## 6.34 Translate the following sentences paying attention to the complex object.

1. Even schoolchildren know any electronic equipment to be very complex.
2. The use of this technique permits more accurate calculations to be performed.
3. These arguments made the explorers change their plan of actions.
4. Many times we heard our lecturer refer to the data obtained by physicists.
5. New techniques allowed the properties of this substance to be changed.
6. The firm made business increase its profitability by introducing electronic data processing.
7. We watched the robot perform different operations.
8. The professor wanted the post-graduate to find the articles on the latest discoveries in nuclear physics.
9. He ordered these devices to be repaired as soon as possible.
10. I have never heard anyone give so much interesting information in one report.
11. We proved this suggestion to be wrong.
12. Variable current makes the diaphragm vibrate.
13. This force causes the electrons to be attracted to the cathode.
14. High temperatures allowed the reaction to be carried out in two hours.
15. The engineer wants the new device to be tested as soon as possible.
16. We know the semiconductor laser to emit light that is visible to the human eye.
17. They know the weakly interacting photon to be perfect for carrying signals over long distances.
18. He wanted the fiber-optic messages to be encoded by simply switching the laser source on and off.
19. We know the physical changes to be caused by heat.
20. We know different transmitters to be used in a television system – one for the sound channel and the other for the picture channel.

**6.35 Translate the following sentences from Russian into English using complex object.**

1. Я хочу, чтобы вы поняли свою ошибку.
2. Он терпеть не может, когда я опаздываю.
3. Я знаю, что она – лучшая студентка.
4. Я рассчитываю, что письмо придет вовремя.
5. Они надеялись, что работа будет сделана вовремя.
6. Я люблю, когда моя сестра разговаривает по-английски со своими друзьями.

*Table 6.3*

**Complex Subject**

| |
|---|
| **He** *is known* **to be** a good scientist. = *It is known* **that he is** a good scientist. |
| **to think, to consider, to know, to expect, to believe, to suppose, to report, to say** |

**6.36 Change the following complex sentences given below according to the model and translate them.**

**Model 1:** *We know* that life on the Earth is impossible without ozone.
Life on the Earth *is known* to be impossible without ozone.

**Model 2:** *It is supposed* that you will graduate from the University in four years.
You *are supposed* to graduate from the University in four years.

1. We know that they obtain the information from the English press.
   They … known … the information from the English press.
2. They expect that he will take a postgraduate course.
   He … expected … a postgraduate course.
3. My colleagues believe that these phenomena are interdependent.
   These phenomena ... believed … interdependent.

4. It is reported that the conference begins at 10 a.m.
   The conference … reported … at 10 a.m.
5. Scientists say that this new method will find a lot of applications.
   This new method … said … a lot of applications.
6. It is expected that a computer centre will be installed in our town next year.
   A computer centre … expected … in our town next year.

*Table 6.4*

**Special cases of using Complex Subject**

| | |
|---|---|
| **to be (un)likely** | **She** *is (un)likely* **to change** her opinion. |
| **to seem** | **He** *seems* **to know** English.<br>**They** *seem* **to know** about it. |
| **to appear** | **He** *appears* **to know** his subject well. |
| **to happen** | **He** *happened* **to be** there. |
| **to prove** | **The new theory** *proved* **to be** valid. |

## 6.37 Change the following complex sentences given below according to the model and translate them.

**Model:** *It is likely* **that they apply** the new method.
**They** *are likely* **to apply** the new method.

1. It seems that this substance possesses useful properties.
   This substance … … … useful properties.
2. It appears that he is quite skillful.
   He … … … quite skillful.
3. It so happened that I made a mistake.
   I … … … a mistake.
4. It is likely that the software industry will see big changes.
   The software industry .....big changes.
5. It is unlikely that he will take part in the discussion.
   He ..... in the discussion.

## 6.38 Choose the best variant of the similar sentence with the infinitive construction.

1. His article is likely to appear in the next issue.
   a) Perhaps his article will appear in the next issue.
   b) His article will appear in the next issue by all means.
2. The delegation was reported to come in 2 days.
   a) The delegation reported that they would come in 2 days.
   b) It was reported that the delegation would come in 2 days.
3. They seemed to be satisfied with the results of the experiment.
   a) It seemed that they were satisfied with the results of the experiment.
   b) It seemed to me that they were satisfied with the results of the experiment.
4. The scientists are supposed to work at the problem for half a year.
   a) The problem supposes half a year period of work by the scientists.
   b) It is supposed that the scientists have been working at the problem for half a year.
5. The experiment is expected to be dangerous.
   a) The experiment will be made despite it is dangerous.
   b) It is expected that the experiment will be dangerous.
6. He was said to be one of the most promising nuclear physicists.
   a) It was said that he was one of the most promising nuclear physicists.
   b) According to the information he was one of the most promising in nuclear physics.

## 6.39 Translate the following sentences paying attention to the complex subject.

1. These programming languages are considered to be quite complex.
2. They are unlikely to change their plans.
3. A lot of companies are likely to go out of business.
4. The apparatus seems to be in excellent condition.
5. The experiment proved to be a failure.

6. The temperature is expected to play an important role in this reaction.
7. Light pulses are considered to travel along the fiber at the speed of about 200,000 kilometers per second.
8. Science is known to have greatly changed the living conditions of a modern man.
9. This material is unlikely to help you in your work.
10. The problem happens to get worse as the data rate increases and the interval between successive pulses gets shorter.
11. Recent scientific developments prove to be of great importance and interest.
12. Weakening signals at a receiver are known to be due to their irregular reflection from the layer of the ionized gases in the upper atmosphere.
13. The software is considered to be the most important component of the computer system because it is made by people.
14. The pulse of laser light appears to stretch out as it travels through the fiber.
15. Confidential Internet communications proved to be not secure.
16. The problem with the copper pairs in the ground may seem to be rather difficult.
17. Traditionally, telecom companies happened to make most of their profit from voice calls.
18. A television system is considered to possess means for transmitting sounds synchronously with visual images.
19. The radio receiver assembled of micromodules proved to weigh not more than 60 grammes.

## 6.40 Translate the following sentences from Russian into English using complex subject, as in the model.

**Model:** Кажется, они работают здесь. (*to seem*)
They **seem to work** here.

1. Говорят, что она хорошо знает английский язык. (*to say*)
2. Ожидается, что компания получит прибыль в этом году. (*to expect*)

3. Предполагается, что студенты приходят вовремя на занятия. (*to suppose*)
4. Думали, что он учится здесь. (*to think*)
5. Он, кажется, не знает, как перевести это английское предложение (*to seem*)
6. Кажется, исследование показывает хороший результат (*to appear*)

*Table 6.5*

**Infinitive Construction with *for***

| | |
|---|---|
| **Subject** | **For me to translate** this text is difficult.<br>**=** It is difficult for me to translate this text. |
| **Object** | We waited **for him to translate** this text.<br>= We waited when he translates this text. |
| **Adverbial modifier** | I'll give this text **for you to translate**.<br>**For this text to be understood** you should translate it. |

## 6.41 Choose the best variant of the similar sentence with the infinitive construction.

1. If you like gadgets and electronic entertainment, a personal computer is for you to relax with computer games.
   a) A personal computer helps you to relax if you like gadgets and electronic entertainment.
   b) You can relax playing computer games if you like gadgets and electronic entertainment using a personal computer.
2. For me to study the technology related to the transfer of information is not difficult.
   a) It is quite easy for me to study the technology related to the transfer of information.
   b) I always wanted to study the relation of technology and information, which seemed not difficult for me.
3. It is a matter of a few seconds for an e-mail message to get to the addressee.
   a) An e-mail message reaches its addressee within a few seconds.
   b) It will take you only a few seconds to send an e-mail message.

4. For the experiment to be finished in time we must begin to work immediately.
   a) It is necessary to begin to work immediately if we want to finish the experiment in time.
   b) We must start our work at once if we wish to finish the experiment in time.
5. For the people to become dependent on computers is very easy.
   a) People become dependent on computers very easily.
   b) It is very easy for the people to become dependent on computers.
6. Input devices are meant for the data to go into the computer's memory.
   a) Input devices enable the data to enter the computer's memory.
   b) The entered information in the computer's memory is processed by the input devices.
7. Before doing the research it is necessary for you to make observations.
   a) Doing the research requires making observations.
   b) Making observations should precede your doing the research.

## 6.42 Translate the following sentences paying attention to the infinitive construction with *for*.

1. It is necessary for you to hear his report on the results of his experiment.
2. We have made a new device for them to use in the experiment.
3. It is impossible for them to complete the work so quickly without using this device.
4. A new way of mathematical analysis is the task for the group to solve.
5. It is for you to choose which of the two methods to use.
6. Much experimental work is needed for these phenomena to be explained.
7. It is advisable for post-graduates to know at least one foreign language.
8. The Internet is a system meant for computer users around the world to send messages and information to each other.

9. A more reliable equipment is necessary for us to supply them with better devices.
10. The question was too unexpected for me to answer it at once.
11. The first thing for you to do is to check the work of the monitor.
12. The students were waiting for the assistant to adjust the device for work.

## Revising verbal constructions

### 6.43 Read and translate the following sentences. Pay attention to the infinitive constructions.

1. We know the computers to be equipped with microprocessors that can handle the data.
2. This change is known to increase transmission efficiency up to 30 percent.
3. This mechanism is provided with a special device for the whole system to function automatically.
4. We know the value of resistance to depend on the amount of plate current that passes through the rectifier.
5. This discovery proved to be of special value for the development of electronics.
6. Computing with encrypted data is considered to be of primary strategies for protecting confidential information stored in the cloud.
7. Everybody expected the international exhibition 'Oil and Gas' to attract many visitors.
8. For a computer to "understand" a program some instructions have to be written in a code which is especially designed for the given computer.
9. In optical communication systems digital information is known to be carried as a train of light pulses through the fiber.
10. It is necessary for him to make a great number of calculations to solve the problem.

# ORAL SPEECH COURSE

# Unit 1 PERSONAL LIFE

| | |
|---|---|
| **Text A** | **My Family** |
| **Text B** | **Personal Traits of Character** |
| **Grammar:** | **Articles, Plurals, Possessive Case, the Verb *to be*, the Verb *to have (got)*** |

## Text A

## MY FAMILY

### *Pretext exercises*

### 1.1 Read the words and word combinations and try to guess their meaning.

Student, university, radioelectronics, guitar, programmer, secretary, faculty, Russia, computer company, character, cousin, creative, tolerant, Siberian, system, group, top manager, Internet, special, rock music, sport, volleyball, football, weekend.

### 1.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| introduce | [ˌintrə'dju:s] | situated | ['sɪtjueɪtɪd] |
| quiet | ['kwaɪət] | quite | [kwaɪt] |
| educational | [ˌedʒu'keɪʃ(ə)n(ə)l] | scientific | [ˌsaɪən'tɪfɪk] |
| establishment | [ɪs'tæblɪʃmənt] | curly | ['kɜ:lɪ] |
| lawyer | ['lɔɪə ] | polite | [pə'laɪt] |
| intelligent | [ɪn'telɪdʒ(ə)nt] | young | [jʌŋ] |
| special | ['speʃ(ə)l] | especially | [ɪs'peʃ(ə)lɪ] |
| poor | [puə ] | cousin | ['kʌz(ə)n] |
| competent | ['kɔmpɪt(ə)nt] | creative | [krɪ'eɪtɪv] |

### *Memorize the following words and expressions*

| | | | |
|---|---|---|---|
| **to be born** | *родиться* | **creative** | *творческий* |
| **to get on (with smb.)** | *ладить, иметь хорошие отношения с кем-либо* | **to work for a company** | *работать в компании* |

| | | | |
|---|---|---|---|
| **to work as (an economist)** | *работать в качестве кого-либо (н-р, экономиста)* | **to be married to smb.** | *быть женатым на ком-либо, замужем за кем-либо* |
| **quiet** | *спокойный, покладистый* | **to be good (bad) at smth.** | *преуспевать (не преуспевать) в чем-либо* |
| **competent** | *квалифицированный* | **to be single** | *быть неженатым, не замужем* |
| **intelligent** | *способный, смышленый, умный* | **to have much in common** | *иметь много общего* |
| **to have a good (perfect) command of smth.** | *уметь что-либо делать (очень) хорошо* | **to agree with smb., to smth.** | *соглашаться с кем-либо или с чем-либо* |
| **attractive** | *привлекательный* | **to be retired** | *быть на пенсии* |
| **for short** | *для краткости, сокращенно* | **to be in bad health** | *болеть* |
| **computer freak** | *компьютерный фанат* | **relative** | *родственник* |

## 1.3 Complete the sentences with the words and expressions given above.

1. We are a happy family and we … … … … .
2. My uncle … … in 1955.
3. His daughter is very … .
4. My brother is a … … so he works … a programmer … a very big company.
5. He is … … programming.
6. Sofia Brown has a … … of English and speaks a little French.
7. Anna is extremely … and … . Besides, she is very … by character and everybody likes her.
8. Ivan's job is very skilled and … but unfortunately badly-paid.
9. My parents are 53 and they aren't … yet.
10. His grandmother is very old and she is … … … .

## 1.4 Word building.

a) Try to guess the meaning of the words in the table below.
b) Read the words aloud.

| | |
|---|---|
| to attract – привлекать | attraction, attractive |
| to create – создавать, творить | creation, creative, creator, creativity |
| to program – программировать | program, programmer, programmable, programming |
| to educate – обучать, давать образование | education, educational, educative |
| intellect – интеллект | intelligence, intelligent, intellectual, intellectually |
| extreme – предельный, крайний | extreme, extremely |
| quiet – спокойный | quietness, quietly |

## 1.5 Read the text.

### MY FAMILY

Before I start telling about my family let me introduce myself. I am Andrey Zhilin. I am 18. I was born on the 18th of February in an old Siberian town Tomsk, which is situated on the bank of the river Tom. It is one of the oldest educational and scientific centers in Russia. There are more than 9 higher educational establishments in our town. I am a first-year student of Tomsk State University of Control Systems and Radioelectronics. In our group at the university there are students from many cities and towns of Russia and other countries. I have a lot of friends and we get on well together. Our family is neither large nor small. I have got a father, a mother and an elder brother. We live in a four rooms' flat in Kashtak.

My father Igor Ivanovich is 55 years old. He is not very tall but well-built with brown eyes and curly dark hair. He works as a lawyer at a plant. By character my father is very quiet, polite and everybody likes him. He is extremely competent and intelligent.

My mother's name is Alla Nikolaevna. She is 55 too but she looks younger. My mother is a top manager; she speaks English and a little French and has a perfect command of Microsoft Word and Excel. She always dresses well and she's very attractive with fair hair and grey eyes. She is shorter than my father.

My elder brother Alexander (Alex for short) is a computer freak. He spends all his life in the Internet. Alex is very friendly, creative and helpful but he's a bit absent-minded too. He works as a programmer for a computer company. Alex is already 30 but he isn't married yet. His girlfriend Anzhela has no special education but she loves working with people. She works as a secretary but finds this work boring and unskilled so she wants to enter the university next year. Anzhela is pretty, slim and quite fair.

As for me, I have always loved music, especially rock and I can play the guitar. We have Leisure Center at the University where the students can play and write music. The students can do any sports they like: play volleyball, football, go skiing in winter and swim. I play chess and I'm good at it. Now let me describe my appearance. I am tall, brown-haired and handsome. I am single but I have got a girlfriend. Her name is Dasha. She is a student too.

Our family is very friendly. In the evenings we watch TV, read books and newspapers, listen to music or just talk about the events of the day. We have much in common. Though our parents do not always agree to what we say, they are quite tolerant and listen to our opinion. We like spending weekends out of town where our grandparents live. They are retired. My great-grandmother is still alive but she is in poor health now. I have also got a lot of relatives: uncles, aunts and cousins. We are happy when we are together.

## 1.6 Match the following words and expressions with their Russian equivalents.

| | |
|---|---|
| 1. a first-year student | a) стать инженером |
| 2. attractive | b) быть на пенсии |
| 3. an elder brother | c) неквалифицированная работа |
| 4. well-built | d) играть на гитаре |

| | |
|---|---|
| 5. a great-grandmother | e) центр досуга |
| 6. to become an engineer | f) молодо выглядеть |
| 7. a quiet man | g) иметь много родственников |
| 8. to play the guitar | h) не иметь специального образования |
| 9. in five years' time | i) через 5 лет |
| 10. curly hair | j) студент-первокурсник |
| 11. to be retired | k) старший брат |
| 12. to have a lot of relatives | l) соглашаться с кем-либо |
| 13. unskilled work | m) привлекательный |
| 14. to agree with smb. | n) прекрасно говорить по-английски |
| 15. Leisure center | o) хорошо сложенный, крепкий |
| 16. to have a perfect command of English | p) хорошо одеваться |
| 17. to dress well | q) прабабушка |
| 18. to have no special education | r) кудрявые волосы |
| 19. to be a computer freak | s) быть «волшебником» в компьютерной компании |
| 20. to look young | t) спокойный человек |

## 1.7 Answer the following questions according to the text.

1. What is Andrey's surname?
2. How old is he? How old are his parents?
3. When and where was he born?
4. What's his job?
5. Is he a second-year student?
6. What university does he study at? What's his faculty?
7. How many people are there in his family?
8. What's his elder brother like?
9. Is Alex married or single?
10. What are Andrey's hobbies?

## Window on Britain: Homes

## 1.8 Watch the video and decide if the statements are true or false.

1. Homes in Britain are of different shapes and sizes.
2. A detached house is a house for two or more families.
3. Most British people live in flats.
4. They prefer to have a bath, not to take a shower.
5. A “living room” and a “sitting room” mean the same.
6. A dining room is a family place to relax.
7. The children’s rooms are usually downstairs
8. An average British drinks 8 cups of tea per week.
9. British people are not very interested in gardening.
10. Buckingham Palace is the home where the Queen lives.

## 1.9 Match the words and word combinations with their definitions.

| | |
|---|---|
| 1. a castle | a) a two-apartment house |
| 2. a caravan | b) a large separately built private house with adjacent land plot |
| 3. a bungalow | c) a country house |
| 4. a cottage | d) a low rise residential or public building with several multilevel apartments usually with a separate entrance |
| 5. a semi-detached house | e) a palace |
| 6. a detached house | f) a trailer |
| 7. a terraced house | g) one-story house |

# Text B

# PERSONAL TRAITS OF CHARACTER

***Pretext exercises***

## 1.10 Read the following words and word combinations and try to guess their meaning.

Profession, management, position, to organize parties and excursions, semester, captain, publications on Management and Marketing, ambitious, creative, hobby, history, architecture, system user, project, colleague, to specialize, moment, special, charismatic, problem, recommendations, career.

## 1.11 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| author | ['ɔːθə] | unfortunately | [ʌn'fɔːʧ(ə)nətlɪ] |
| excursion | [ɪks'kɜːʃ(ə)n] | career | [kə'rɪə] |
| impatient | [ɪm'peɪʃ(ə)nt] | architecture | ['ɑːkɪtekʧə] |
| require | [rɪ'kwaɪə] | responsibility | [rɪˌspɔn(t)sə'bɪlətɪ] |
| to estimate | ['estɪmeɪt] | ambitious | [æm'bɪʃəs] |
| charismatic | [ˌkærɪz'mætɪk] | specialize | ['speʃ(ə)laɪz] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to estimate** | *оценивать* | **to be responsible for** | *отвечать за* |
| **to take a position** | *занимать должность* | **within** | *внутри, в пределах* |
| **undergrad (сокр. от undergraduate)** | *студент последнего курса* | **complete** | *(зд.) полный* |
| | | **disaster** | *провал* |
| **impatient** | *нетерпеливый* | **to sack** | *увольнять* |
| **boastful** | *хвастливый* | **shy** | *скромный, застенчивый* |
| **absent-minded** | *рассеянный* | **to make the ends meet** | *сводить концы с концами* |
| **taste** | *вкус* | **competitive** | *склонный к соперничеству* |
| **boring** | *скучный* | **ambitious** | *честолюбивый* |

## 1.12 Read the text.

### PERSONAL TRAITS OF CHARACTER

Meeting people for the first time we always make a judgement based on their appearances though the proverb tells us not to make this mistake. Still we look at the face, try to guess age or profession, listen to the way a person speaks. The same way other people might estimate us.

***Jane Webster*** is 22 and she has just graduated. She studied Management at the University and wants to find a job now. In the University everybody knew Jane. She always took the most important positions and played a big part in the University life. She organized parties, excursions and represented the undergrads in the Students' Council for two semesters. She was also the captain of the University volleyball team. She is an author of several publications on Management and Marketing. Her works were published in 2015 and 2016. She is very ambitious and creative. Unfortunately she is also domineering, impatient and boastful. She only speaks English but is ready to study another language if her new position requires it. She has to work experience but she will only have a well-paid and skilled job. Jane's hobby is history and architecture.

***Alex Warren*** is a computer freak. He spends all his life in the Internet. He tried to work for a small company and was responsible for support of all system users within the company, but too much responsibility made the job really stressful and even dangerous for him. In fact his last project was a complete disaster so the company sacked him.
Alex is very friendly, creative and helpful, but sometimes he is a bit shy and absent-minded. In his new job he is looking for a lot of supervision and advice from his future colleagues.

***Ivan Nikolaev,*** **30.** He graduated from the University of Moscow. He is a lawyer. Ivan specializes in Human Rights and has 7 years of experience of advice work. That job was very skilled and creative but unfortunately badly-paid. He is very quiet, polite and everybody likes him. He is extremely competent and intelligent. He has moved from Russia to England and is looking for a new job. He also has a perfect command of Microsoft Word, Excel and Power Point. At the moment Ivan is doing some unskilled work to make the ends meet.

***Sofia Brown,* 23.** She has got no special education but loves working with people. Sofia is extremely attractive and has got perfect taste and manners. She always dresses very well, she is charismatic and competitive. Sofia speaks fluent French and German. Sofia's problem is that she's very lazy. She worked as a secretary 4 years ago but found the job too boring and unskilled**.** However her employers gave her perfect recommendations. Then she travelled the world for **3** years and now she is ready to start her career.

## 1.13 Decide if the statements are true or false.

1. Sofia Brown is very tactful and delicate.
2. Jane Webster isn't sure of herself and her abilities.
3. The company sacked Alex because his last project was a complete success.
4. Ivan's last job was very unskilled and badly-paid.
5. Meeting people we judge them on how they look.
6. Sofia's employers were very impressed with her job.
7. Alex needs a lot of supervision because he is extremely competent.
8. At the moment Ivan doesn't have to save money.
9. All of them speak a few foreign languages.
10. Jane is good at playing volleyball.

## 1.14 In the texts above find the adjectives which match the descriptions.

1. Never do things on time.
2. Like to say how good they are at something.
3. Never get excited or nervous about things.
4. Find it easy to produce new original ideas and things.
5. Hate to lose at anything.
6. Are usually sure of their own ability to do things.
7. Feel uncomfortable in social situations.
8. Are always trying to control others without thinking too much how they feel.
9. Hate waiting for things and have no sympathy towards people's weakness.
10. Are always delicate and tactful to people.

**1.15 Fill in the table of adjectives describing people's character.**

| *Positive* | *Negative* |
|---|---|
| 1. helpful | a) lazy |
| 2. | b) |
| 3. | c) |
| 4. | d) |
| 5. | e) |
| 6. | f) |
| 7. | g) |
| 8. | h) |
| 9. | i) |
| 10. | j) |

**1.16 Match the words with similar meaning.**

| | |
|---|---|
| 1. ambitious | a) to demand |
| 2. attractive | b) qualified |
| 3. polite | c) to be good at |
| 4. absent-minded | d) a hacker |
| 5. competent | e) drawback |
| 6. to require | f) to save money |
| 7. computer freak | g) competitive |
| 8. to have a good command of | h) delicate |
| 9. to make both ends meet | i) careless |
| 10. mistake | j) pretty |

**1.17 Answer the questions.**

1. Now, what can you say about your appearance? Speak about yourself.
2. What positive qualities do you consider absolutely necessary for everyone?
3. Which negative traits can't you agree with? Why?
4. Which traits of character would you try to develop in yourself?

## 1.18 Read and smile.

### FATTY TAKES AN EXAM

In the middle of the examination time Digamma Pi Fraternity had to work on Fatty Pfaff to help him to take the exam in anatomy. Fatty had failed in the mid-year anatomical and now he had to pass a special exam before he could take the final exam.

There was a certain fondness for him in Digamma Pi, Fatty was soft, Fatty was a fool, yet they were fond of him the way people are fond of an old car or a dirty dog.

The night before his special examination they kept him awake working till two, with wet towels and black coffee. They ran about the room, holding up their hands and crying, "Will he never remember a thing?" and then, "Don't get excited, Fatty. Take it easy. Just listen to this quietly, will you. And try. Try to remember one thing at least!"

They led him carefully to bed. He was so full of facts that they were afraid he might lose them on his way to bed. When he woke at seven, with red eyes, he realized he forgot everything he had learned.
"He's got to have a crib, "said the president of Digamma Pi, “even if he gets caught with it. I prepared one for him yesterday. It'll cover enough of the questions so he'll get through.”

Fatty protested, "It's against my principles. I think a fellow who can't get through an examination can't be a doctor. That's what my father always said." The president of Digamma Pi took Fatty by the shoulder and said slowly in a low voice, "Look here, I am going to put this crib into your pocket, behind your handkerchief."
"I won't use it, "whispered Fatty, "it's all the same to me if I fail." They pushed Fatty through the door, on his way to Anatomy building. They watched him go.

"Is it possible he's going to be honest?" somebody wondered.

They saw Fatty stop, take the handkerchief out of the pocket - and discover the crib. They saw him look at it, begin to read it, put it back into his pocket and continue his way to with a more resolute step.

They joined hands and danced about the room singing, "He'll use it - it's all right - he'll get through!"

He got through.

***Notes to the text***

| | |
|---|---|
| **Digamma Pi** | *название одного из студенческих обществ* |
| **crib** | *шпаргалка* |
| **resolute** | *Решительный* |

## 1.19 Choose the correct answer.

1. What kind of exam was Fatty taking?
   a) A special exam
   b) A mid-year exam
   c) A final exam
   d) A written exam
2. Why were the students fond of Fatty?
   a) He was a fool.
   b) He was soft.
   c) He aroused pity.
   d) He had an old car.
3. What happened in the morning?
   a) Fatty overslept.
   b) Fatty didn't remember a thing,
   c) Fatty continued learning
   d) Fatty overexcited.
4. What decision did his friends make?
   a) To make him use a crib prepared for him.
   b) To make him take a textbook to the exam.
   c) To be with him at the examination
   d) To ask the examiner not to be strict with him.
5. Why did he protest against his friends' help?
   a) He was very independent
   b) He thought it was not right
   c) He was bad at cheating
   d) He didn't want to get through the exam.
6. What did Fatty do with the crib?
   a) He read it.
   b) He threw it away.
   c) He never took it out.
   d) He tore it into pieces.

**1.20 Write the essay about a famous person.**

## GRAMMAR

*Table 1.1*

**Articles**

| **A (an)** = one<br>I see **a** man in the street. | **The** = that<br>**The** man I see is your brother. |
|---|---|
| Jobs: **a** doctor, **an** artist<br><br>Nouns, denoting such numbers as: **a** hundred, **a** thousand, **a** million, **a** billion | Rivers: **the** Thames, **the** Ob<br>Mountains: **the** Alps (but: Everest).<br>States: **the** Russian Federation, **the** USA, **the** United Kingdom<br>Ordinal numbers: **the** first, **the** twenty-fifth<br>Superlative degrees: **the** best, **the** most important<br>Expressions: in / to **the** east, at **the** theatre, **the** same, in **the** city / country / world, *etc*., to play **the** guitar, to **the** left / right |
| **No article is used**<br>Cities: Tomsk, London, Moscow<br>Countries: Russia, Germany (but: the Ukraine)<br>Noun + cardinal number: flat five | |

**1.21 Fill in articles if necessary.**

1. I see … man in … street. … man is my English teacher.
2. My father likes reading … newspapers.
3. … Emma is … his girlfriend.
4. … Sun and … Moon are … Earth's satellites.
5. We are in … room seven now.
6. Open … window please.
7. His grandparents are retired and live in … country.

8. … Washington is … capital of … USA.
9. … Russian Federation is … largest country in … world.
10. … population of … Russia is about 50 million people.
11. … highest mountains of our land are … Altai, … Urals and … Caucasus.
12. … Everest is … very high mountain.
13. We went to … South of … France.
14. … Crocodiles live in … rivers.
15. … students in … our class have a good command of … English.
16. They speak … Portuguese in … Brazil. It's … official language of … country.

**1.22 Complete the following texts with *a, an, the* or знак "–".**

1. We live in … St. Petersburg. … St. Petersburg is … very large city. It is one of … largest cities in Russia. A lot of tourists from different countries come to … St. Petersburg. They want to see one of … most beautiful city in … world.

2. My name is Charlie. I come from … pretty big family. I have … two brothers and … sister. I am … oldest and my sister is … youngest; she plays … violin really well and wants to be … professional musician. She has other hobbies, too, and she often goes swimming with her friends if … weather is nice.

3. There is … map of … world on … wall of … classroom. There are many … seas and … lakes on … map. This is … Mediterranean Sea and that is … Red Sea. These are … Himalayas. They are … highest mountains in … world.

*Table 1.2*

**Plurals**

| **Regular Plurals** | | | |
|---|---|---|---|
| | **-s** | | |
| | **-s [z]** | | **-s [s]** |
| a boy + **-s** | boy**s** | a parent + **-s** | parent**s** |
| a girl + **-s** | girl**s** | | |

| |
|---|
| **-es [ɪz]**<br>an address + **-es** addresses<br>a potato – potato**es**<br>**Exceptions**: a piano – piano**s**, a solo – solo**s**, a photo – photo**s**, radio – radio**s**, studio – studio**s** |
| a family + **-es** famil**ies** |
| **-f**, **-fe**: a wi**fe** – wi**ves**, a scar**f** – scar**ves**<br>**(but**: a chief – chief**s**, a roof – roof**s**) |

**Irregular Plurals**

| | |
|---|---|
| a m**a**n – m**e**n, a wom**a**n – wom**e**n<br>a t**oo**th – t**ee**th, a g**oo**se – g**ee**se, a f**oo**t – f**ee**t<br>a m**ous**e – m**i**ce, a l**ous**e – l**i**ce | |
| an ox – ox**en**, a child – child**ren** | |
| a person – **people** | |
| an aircraft – **aircraft**, a sheep – **sheep**, a swine – **swine**, a fish – **fish**, a deer – **deer** | |
| an analys**is** – analys**es**, a bas**is** – bas**es**, a cris**is** – cris**es**, a thes**is** – thes**es**, a criteri**on** – criteri**a**, a dat**um** – dat**a**, a phenomen**on** – phenomen**a** | |
| **Only singulars:**<br>money, hair, business, fruit, progress, advice, information, news, knowledge, furniture, luggage, peace, love | **Only plurals:**<br>trousers, jeans, shorts, glasses, scissors, people, police, clothes, goods, riches, manners, thanks |

## 1.23 Choose the correct variant.

1. Maths *is / are* difficult to me.
2. These jeans *is / are* very fashionable.
3. The gentleman *is / are* very polite.
4. Women *is / are* not allowed to visit this place.
5. The money *is / are* not enough to buy this car.
6. His data *is / are* reliable.
7. My teeth *is / are* white.
8. There *is / are* some men in the office.
9. These mice *is* / *are* white.
10. The news *is / are* very interesting.

## 1.24 Choose the right plural form.

1. Peter and Sam like fried ... very much.
   a) potatos b) potatoes
2. I had three ..., but now I'm single.
   a) wifes b) wives
3. There are a lot of ... in the house.
   a) mouses b) mice
4. These shoes are too large for my … .
   a) feet b) foots
5. There are a lot of ... in our woods.
   a) wolfs b) wolves
6. Our … are very competent.
   a) chiefs b) chieves
7. She doesn't like ... .
   a) partys b) parties
8. Are these workers … ?
   a) Englishmen b) Englishmans
9. These … are my sons.
   a) childs b) children
10. They are good … .
    a) secretarys b) secretaries

*Table 1.3*

**Possessive Case**

| |
|---|
| Diana**'s** brother (= the brother of Diana)<br>but:<br>Diana and Richard**'s** brother ( = brother of Diana and Richard)<br>She is **Dan's** girlfriend = She is **his** girlfriend.<br>**[s]** Kate**'s** boyfriend<br>**[z]** Ronald**'s** car; Anna**'s** flat<br>**[ɪz]** Bess**'s** computer |
| his son**'s** name = the name of his son<br>his son**s'** names = the names of his sons<br>**But:** his children**'s** names = the names of his children |

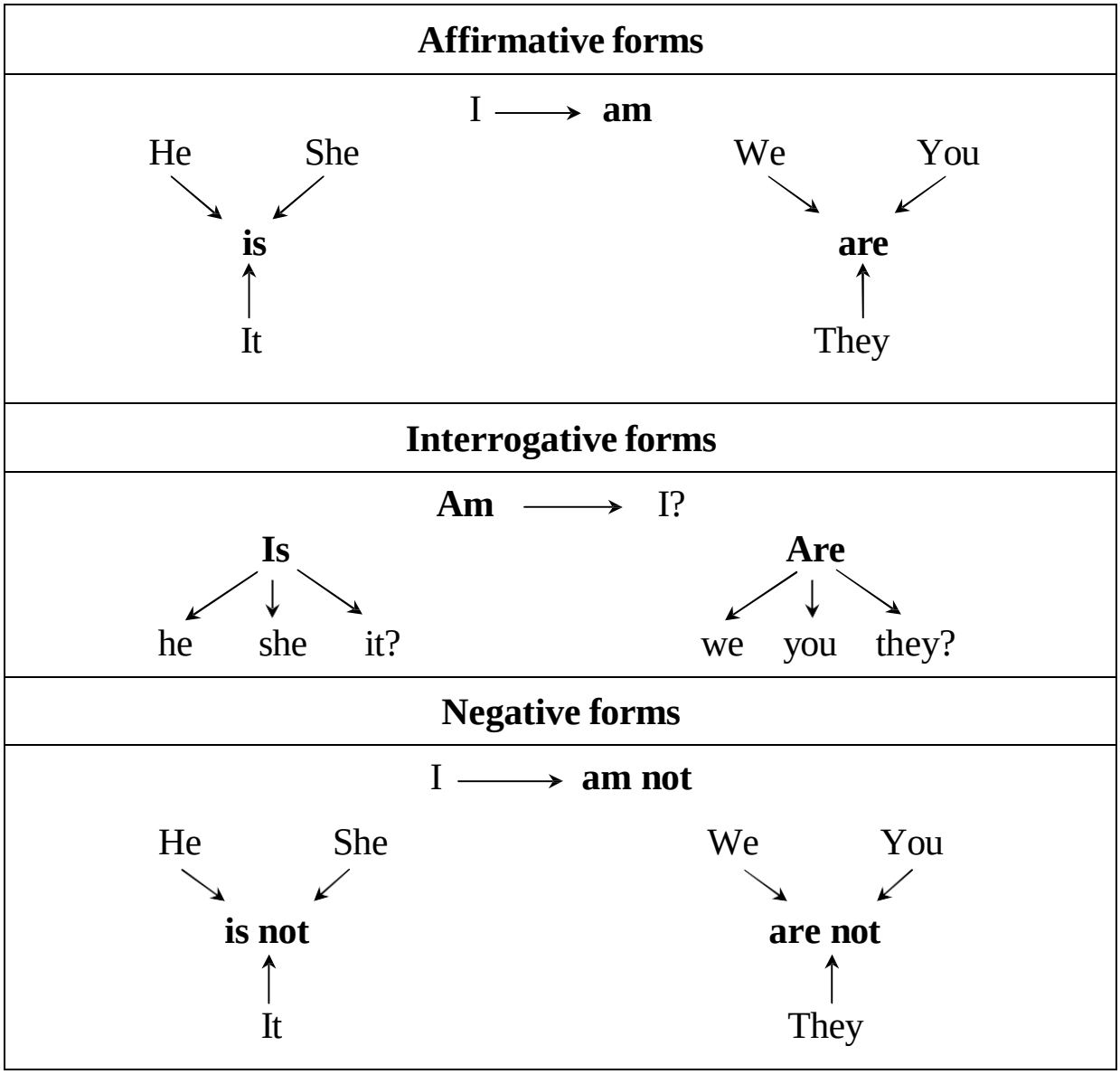
## 1.25 Change the following phrases using right possessive forms of the nouns in brackets, as in the model.

**Model:** the house of Mr. Smith – Mr. Smith's house

The skateboard of that man; the questions of my son; the wife of my brother; the table of our teacher; the poems of Pushkin; the new club of the workers; the car of my parents; the life of this woman; the paintings of Rembrandt; the bags of those women.

*Table 1.4*

**Present Simple Forms of the Verb *to be***



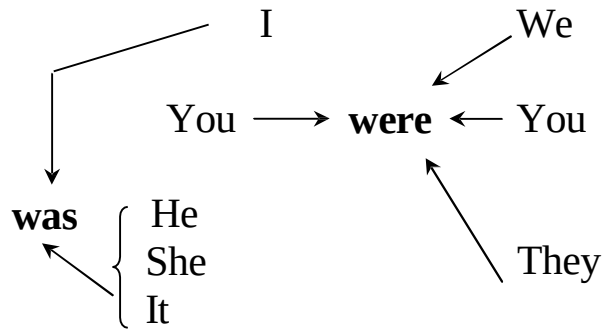
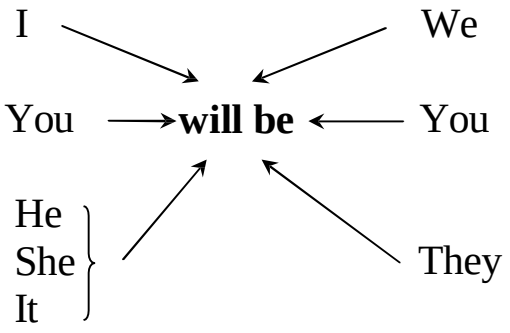
## 1.26 Make the following sentences negative or interrogative, as in the model.

**Model:** – I am seventeen. (–)
– I'm not seventeen.
– She is my daughter. (?)
– Is she your daughter?

1. All my friends are students. (–)
2. Sofia is from Russia. (?)
3. Tom is in the garden with his dog. (–)
4. They are computer freaks. (?)
5. I am single. (–)
6. Her name is Julia. (?)
7. They are programmers. (–)
8. Tomsk State university is the oldest in Siberia. (?)
9. I am from Italy. (–)
10. It is very cold today. (–)

*Table 1.5*

**Past Simple and Future Simple Forms of the Verb *to be***

| Past Simple | Future Simple |
|---|---|
|  |  |
| Short negative forms:<br>**wasn't, weren't** | Short negative form:<br>**won't be** |

## 1.27 Make true sentences with the verb *to be.*

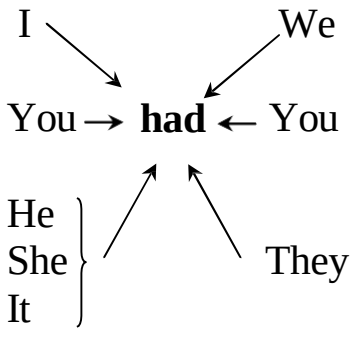
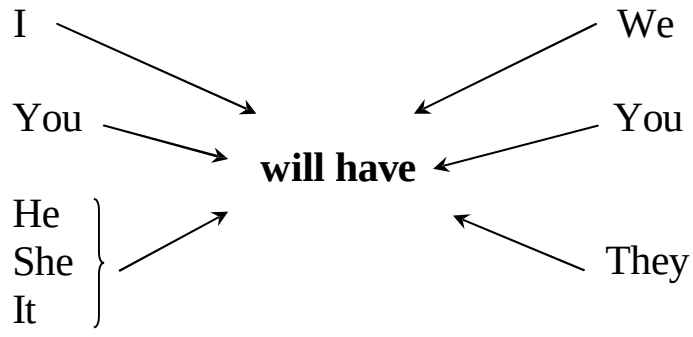
**Model:** I'm not at home.

1. The students … in class.
2. It … Wednesday today.

3. My teacher's name … Galina Petrovna.
4. My father and mother … at work.
5. I … married.
6. My grandmother … seventy-five years old.
7. Leonardo DiCaprio and Richard Gere … my friends.
8. We … in the café. We … in the classroom.
9. Last year I … at school but now I … a student.
10. Yesterday we … at the theatre.
11. … you a good student at school? – Yes, I …. / No, I ….
12. In five years' time I … an engineer.

*Table 1.6*

**Present, Past and Future Forms of the Verb *to have (got)***

<table>
<tr><td colspan="2">I, you, we have got He, she, it has got<br>I have got a PC. He has got a car.<br>Short forms: I've got (= I have got)<br>She's got (= She has got)</td></tr>
<tr><td colspan="2">Have you got a brother? – Yes, I have. / No, I haven't. (= have not)<br>Has he got a car? – Yes, he has. / No, he hasn't. (= has not)<br>Have you got any children?<br><br>I haven't got a brother.<br>He hasn't got a car.<br>We haven't got any children.</td></tr>
<tr><td>Past forms</td><td>Future forms</td></tr>
<tr><td rowspan="2"> 
</td><td> 
<br>Short form – 'll</td></tr>
<tr><td>Short negative form: won't have</td></tr>
</table>

## 1.28 Make the sentences negative. Correct the sentences.

**Model:** Moscow **is** in Germany.
– Moscow **isn't** in Germany. It**'s** in Russia.

1. You are English.
2. Andrey's elder brother Alex has got two children.
3. I have (got) a Rolls-Royce car.
4. In three years' time we will be engineers.
5. My parents were students five years ago.
6. I was in Cuba last summer.
7. When I was younger I had a lot of friends.
8. The garden is near our house.
9. His girlfriend has got curly hair.
10. He'll have a new car in two months.

## 1.29 Make the following sentences interrogative, as in the model.

**Model:** *My girlfriend* **is** from Kemerovo. – **Is** *she* from Kemerovo?
She **has got** a well-paid job. – **Has** she **got** a well-paid job?

1. My name is John Winston.
2. I have got a lot of cousins.
3. They are retired.
4. I was at school last year.
5. I'm a first-year student now.
6. They have got a new car.
7. Moscow is the capital of the Ukraine.
8. My parents were abroad for two weeks.
9. The library has got a great number of books and magazines.
10. In our group there are students from other countries.

## 1.30 Complete the following sentences with the correct form of the verbs *to be* or *to have.*

1. Alex … a computer freak.
   a) am b) were c) is

2. His hobbies… playing chess and skiing when he … 16 years old.
   a) are, were b) were, was c) was, was
3. They … active members of the English club last year.
   a) will be b) were c) are
4. The weather … fine tomorrow.
   a) is b) was c) will be
5. Last year they … at school, next year they… second year students.
   a) were, are b) were, will be c) was, are
6. Andrey's cousin … two children.
   a) have b) is c) has
7. The students usually … 6 classes a day at university.
   a) will be b) have c) has
8. I hope this autumn … rainy.
   a) won't be b) isn't be c) was
9. What country … you from?
   a) were b) are c) was
10. … your friend … a computer?
    a) Is … have b) Has … got c) Have… got

## 1.31 Complete the following sentences with the correct form of the verbs *to be* and *to have* (*got*).

1. He … a second-year student now.
2. When I was younger, I … a lot of friends, but now I … any.
3. I'm sure I … a modern computer in two years' time.
4. My father … a good sense of humour.
5. … he at the university yesterday? No, he … at home.
6. I hope you … free on Saturday.
7. Where … you yesterday evening?
8. They … three children: a son and two daughters.
9. Sofia … married to an American.
10. Last year he … a well-paid job but it … boring.

# Unit 2 OUR UNIVERSITY

| | |
|---|---|
| **Text A** | **Tomsk State University of Control Systems and Radioelectronics** |
| **Text B** | **Higher Education in Russia** |
| **Grammar:** | **Present Simple and Present Progressive Tenses; Conditional I, Past Simple and Present Perfect Tenses** |

## Text A

## TOMSK STATE UNIVERSITY OF CONTROL SYSTEMS AND RADIOELECTRONICS

***Pretext exercises***

### 2.1 Read the words and word combinations and try to guess their meaning.

University, faculty, status, computer systems, innovative technologies, electronic, specialist, specialty, information security, economics, social work, cooperate, course material, lecture, interview, characterize, professional, unique, volunteer, infrastructure, assistance, priority, detailed, individual, consultation, instructor, metallurgy, Germany, process, organization, chemical industry, industrial, sport, football, volleyball, basketball, aerobics, studio, debate club.

### 2.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| university | [ˌjuːnɪ'vɜːsətɪ] | bachelor | ['bæʧ( ə)lə] |
| control | [kən'trəul] | specialty | ['speʃ(ə)ltɪ] |
| faculty | ['fæk(ə)ltɪ] | process | ['prəuses] |
| design | [dɪ'zaɪn] | guidance | [ˈgaɪdəns] |
| engineering | [ˌendʒɪ'nɪərɪŋ] | characterize | [ˈkærɪktəraɪz] |
| technology | [tek'nɔlədʒɪ] | career | [kəˈrɪə] |
| acquire | [əˈkwaɪə] | experienced | [ɪksˈpɪərɪənst] |

| | | | |
|---|---|---|---|
| remotely | [rɪˈməʊtlɪ] | acquire | [əˈkwaɪə] |
| detailed | [ˈdiːteɪld] | unique | [juːˈniːk] |
| law | [lɔː] | ensure | [ɪnˈʃʊə] |
| infrastructure | [ˈɪnfrəstrʌkʧə] | region | [ˈriːʤən] |
| priority | [praɪˈɒrɪtɪ] | volunteer | [vɒlənˈtɪə] |
| Taiwan | [taɪˈwɑːn] | metallurgy | [ˈmetəlɜːʤɪ] |
| security | [sɪ'kjuərətɪ] | judo | ['ʤuːdəu] |
| emergency | [ɪˈmɜːʤənsɪ] | debate | [dɪˈbeɪt] |
| surgery | [ˈsɜːʤərɪ] | aerobics | [eə'rəubɪks] |
| opportunity | [ˌɔpə'tjuːnətɪ] | | |

### *Memorize the following words and expressions*

| | | | |
|---|---|---|---|
| **to found** | *основывать* | **through** | *с помощью, посредством* |
| **control systems** | *системы управления* | **to introduce** | *представлять, внедрять, вводить* |
| **to acquire** | *приобретать* | **to suppose** | *считать, полагать, предполагать* |
| **currently** | *в настоящее время* | **experienced staff** | *опытные, квалифицированные специалисты* |
| **remotely** | *удаленно, дистанционно* | **bachelor** | *бакалавр* |
| **to equip (with)** | *оборудовать, оснащать* | **master** | *магистр* |
| **term** | *семестр, полугодие* | **postgraduate** | *аспирант* |
| **to train** | *обучать* | **opportunity** | *возможность* |
| **in the field of …** | *в области …* | **approach** | *подход, метод, способ* |
| **to intend** | *намереваться, предназначать* | **environment** | *среда, обстановка* |
| **to guide** | *вести, руководить, направлять* | **engineering** | *проектирование, разработка, техника* |

## 2.3 Complete the sentences with the words and expressions given above in the correct form.

1. During the second … the students will have to a lot of individual work.
2. The university is staffed with … teachers.
3. Tomsk State University … in 1788 became the first university in Siberia.
4. Full name of TUSUR is Tomsk State University of … … and Radioelectronics.
5. In what … of science and technology does TUSUR cooperate with foreign universities?
6. The effect of electromagnetic radiation … space was demonstrated by H. Hertz in 1888.
7. Having a … degree gives additional … to find a good job after you graduate.
8. Many labs in our research institute are … with modern devices.
9. This … is not very efficient.
10. Do you … to be a full-time student or to study … ?

## 2.4 Match the words with similar meaning.

| | |
|---|---|
| 1. up-to-date | a) method |
| 2. training | b) request |
| 3. means | c) to make |
| 4. to acquire | d) distantly |
| 5. to include | e) semester |
| 6. opportunity | f) technology |
| 7. to launch | g) education |
| 8. inquiry | h) by means of |
| 9. assistance | i) to contain |
| 10. to create | j) to obtain |
| 11. remotely | k) operation |
| 12. term | l) to believe |
| 13. to guide | m) to run |
| 14. to intend | n) support |
| 15. through | o) to make |
| 16. to suppose | p) recent |
| 17. engineering | q) to direct |

| | |
|---|---|
| 18. surgery | r) possibility |
| 19. field | s) to plan |
| 20. to create | t) sphere |

## 2.5 Read the text.

### TOMSK STATE UNIVERSITY OF CONTROL SYSTEMS AND RADIOELECTRONICS

TUSUR (Tomsk State University of Control Systems and Radio Electronics) was founded on 21 April, 1962 on the basis of two faculties of Tomsk Polytechnic Institute: Radio Engineering faculty and Radio Control faculty. In 1997 the institute acquired the status of the university and was renamed TUSUR. Now there are 13 full-time and part-time faculties at the university: Radio Engineering, Radio Design, Electronic Engineering, Computer Systems, Control Systems, Human Sciences, Law, Economics, Security, and Innovation Technologies. Currently, about 5,000 students study remotely, which makes it possible to get higher education without leaving their native places.

More than 11500 students (including 2000 students from 36 countries) are trained in 140 specialties in the field of radio engineering, electronic engineering, information technology, electronic and computing equipment, information security, economics, social work, and much more.

The academic year at TUSUR consists of two terms: fall term which starts in September and spring term which starts in February and continues till the end of May. The students have lectures which are intended to guide them through the course material by explaining main points of a topic, give the most up-to-date information and introduce new topics for detailed study in practical classes. Laboratory works and workplace practical training are supposed to develop the students' practical skills under supervision of experienced staff. The students may also have individual consultations with the instructors where they may get more focused guidance on the work they do.

At the end of each term the students take credits or examinations to show their knowledge which may be written or computer tests, as well as oral examination or interview.

Today TUSUR offers 28 bachelor programs, 39 Master and 10 Postgraduate ones.

Bachelor program is characterized by practice-oriented approach, it involves four years of training and is granted a diploma of higher professional education.

Master program takes two more years of training and offers wide career and employment opportunities both in Russia and abroad.

Postgraduate program is available for those who have obtained a specialist degree (five years of education) or a master degree. On its completion, the academic degree of "Candidate of Sciences" is conferred. Education in TUSUR provides top-notch professional training, studying recent computer technologies, computer tools, and telecommunication means, and acquiring unique knowledge of science-intensive business functions.

In combination these components ensure high quality education and great employment opportunities.

TUSUR is providing support to the schools of Tomsk and Tomsk region: more than 20 digital volunteers address technical and organizational aspects of e-learning. The university has also made its own technologies and infrastructures available to schools and has launched a hotline that will process any inquiries and request for volunteer assistance.

The mission of TUSUR is to create educational, research, and innovative environment to serve the country and the world. Now the university is the primary source of HR specializing in electronics, information and telecommunication technologies. The university cooperates with 20 universities and organizations from the USA, Great Britain, Germany, France, Taiwan and other countries in eight priority research areas such as aircraft and space engineering, railway transport, surgery and emergency assistance, metallurgy, machine building and chemical industry.

TUSUR University has 29 active sports clubs for the students interested in academic rowing, sports orientation, powerlifting, judo, aerobics, basketball, volleyball, football, athletics, a good sports complex with halls for tennis, sports grounds for mini-football, gyms, oriental and street dance studios, a debate and rock clubs and much more.

## 2.6 Match the following words and expressions with their Russian equivalents.

| | |
|---|---|
| 1. to acquire the status | a) получить высшее образование |
| 2. to get higher education | b) программа для аспирантов |
| 3. experienced staff | c) объяснять |
| 4. information security | d) сдавать зачеты |
| 5. to continue | e) подробное изучение |
| 6. to explain | f) под руководством |
| 7. to provide | g) собеседование |
| 8. topic | h) присуждать степень |
| 9. detailed study | i) получить статус |
| 10. a postgraduate program | j) студия восточного танца |
| 10. under supervision | k) обеспечивать |
| 11. to take credits | l) информационная безопасность |
| 12. an interview | m) тема |
| 13. to confer a degree | n) квалифицированные преподаватели |
| 14. oriental dance studio | o) продолжать |

## 2.7 Decide if the sentences are true or false.

1. Tomsk State University of Control Systems and Radio Electronics was founded in the middle of the 19$^{th}$ century.
2. TUSUR is located in the center of Tomsk opposite Novosobornaya square.
3. There is no possibility to get higher education distantly in TUSUR.
4. On completion of bachelor's course the students do not receive a higher education diploma.
5. Many universities from all over the world cooperate with TUSUR in the sphere of education and research.
6. The students of the university are not engaged in doing sports.
7. TUSUR takes active part in international programs.
8. Getting a master's degree gives the students of the university the opportunity to find a promising job.
9. The development of new technologies give the students new opportunities.
10. TUSUR is not among the leading universities in our country.

## 2.8 Read the text again and answer the questions.

1. When was TUSUR founded?
2. What's the full name of the university?
3. Is TUSUR a humanitarian university?
4. How many faculties are there in TUSUR? What are their names?
5. Is it possible to get higher education at the university without leaving native towns or cities? How?
6. How many specialties are the students trained at? Can you name some of them?
7. What foreign universities does TUSUR cooperate with? In what fields?
8. What sports are popular in TUSUR?
9. How does TUSUR support the schools of Tomsk and Tomsk region?
10. What's the main goal of the university?
11. What can the students do in their free time?

## 2.9 If you talked to a foreign student, what would you tell him/ her about your university?

# Text B

# HIGHER EDUCATION IN RUSSIA

***Pretext exercises***

## 2.10 Read the following words and word combinations and try to guess their meaning.

Specialist, progress, teacher, engineer, doctor, professional, Russian, student, fundamental, mathematics, physics, history economics, to concentrate, special interest, course, percent, to sponsor, sport center, process, culture, information.

## 2.11 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| thorough | ['θʌrə] | concentrate | ['kɔn(t)s(ə)ntreɪt] |
| instruction | [ɪn'strʌkʃ(ə)n] | course | [kɔːs] |
| fundamental | [ˌfʌndə'ment(ə)l] | percent | [pə'sent] |
| science | ['saɪən(t)s] | enterprise | ['entəpraɪz] |
| curriculum | [kə'rɪkjələm] | process | ['prəuses] |
| foreign | ['fɔrɪn] | preserve | [prɪ'zɜːv] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to play an important part** | *играть важную роль* | **curriculum** | *курс обучения, учебный план* |
| **to train** | *обучать* | **specialized course** | *специализированный курс* |
| **higher educational establishment** | *высшее учебное заведение* | **research** | *научное исследование* |
| **academic year** | *учебный год* | **to preserve** | *сохранять* |
| **instruction** | *обучение* | **values** | *ценности* |

## 2.12 Complete the sentences with the words and expressions given above.

1. In my opinion, higher education … … … in our life.
2. Our university … future bachelors and masters.
3. In Russian … … … the … usually starts on the 1st of September.
4. The students obtain thorough … in the fundamental sciences.
5. The … include foreign languages, history and economics.
6. … … will help students to become good specialists.

## 2.13 Read the text.

### HIGHER EDUCATION IN RUSSIA

Higher education plays an important part in the life of any country as it provides the country with highly-qualified specialists for future development and progress. It trains people to become teachers, engineers, doctors and other professional workers.

In Russian higher educational establishments the academic year usually lasts 9 months and is divided into two terms. The first- and second-year students obtain thorough instructions in the fundamental sciences of mathematics, physics, as well as computer engineering and a number of others. The curricula are enriched and broadened by instructions in such subjects as foreign languages, history and economics. At the third year students get more advanced knowledge and begin to concentrate on their special interests and take many courses in this subject. Specialized study and courses will help students to become specialists and prepare them for their future work.

After four years students will get a bachelor's degree. Then the students may go on with their studies and in a year or two of further study and research get a master's degree. After graduating from the university they may go on with their study and research and may get a still higher degree. About 75 percent of students receive state grants and 15 percent are sponsored by enterprises.

Universities have their own students' hostels and some of them have large and excellent sport centers.

Education is a process through which culture is preserved, knowledge and skills are developed, values are formed, and information is exchanged.

Education is the way to success.

## 2.14 Decide if the statements are true or false.

1. Higher education is of great importance.
2. In Russian higher educational establishments the academic year is divided into three terms.
3. At the third year students take many specialized courses. After four years students will get a bachelor's degree.
4. About fifty percent of students are sponsored by enterprises.
5. All universities have large and excellent sport centers.
6. Education leads to success.

## 2.15 Answer the questions.

1. What part does higher education play in the life of any country?
2. How long does the academic year usually last?
3. What subjects do the curricula include?
4. When will students get a bachelor's degree?
5. When may they get a master's degree?
6. How many percent of students receive state grants?
7. Do universities have their own students' hostels?
8. Is education the way to success?

## Window on Britain: Schools

## 2.16 Watch the video and decide if the statements are true or false.

1. 90% of British schools are independent, that is parents pay for their children's education.
2. British students have a wide choice of subjects.
3. Some of state schools are boarding schools: the students don't live at home.
4. British children do or play a lot of sports after school.
5. The most popular foreign languages in Great Britain are Spanish and Italian.
6. At school students don't wear a uniform.
7. After leaving a secondary school about 40% of all students go to university or another kind of education or training.
8. At 18 the students take "A Level" examination.
9. On average in a secondary school class there are about 27 students.
10. Eton is a very famous independent school near Windsor.

## 2.17 Watch the video again and answer the following questions.

1. How long do English students study at primary school?
2. What examination do they take at 16?
3. What subjects do they learn at secondary school?
4. What are the most popular foreign languages?
5. What sports do the students like to play after school?
6. Are state schools free?
7. What are boarding schools like?
8. Do you think education in Britain is better than in our country? Why?/ Why not?

## 2.18 Read about the style of teaching in Oxford University and decide if the sentences below are true (T) or false (F).

For many new students, the style of teaching at Oxford University may be unfamiliar. At the beginning of each term (there are three terms in the Oxford academic year) a list of lectures is published and every student can choose which lectures he will attend. Attendance at lectures is not compulsory, and no records of attendance are kept.

Apart from lectures, teaching is realized by means of the tutorial system, which is a system of individual tuition. Each student goes to his tutor's room once every week to read out an essay which he has written, and for an hour he and the tutor discuss the essay. A student does not necessarily go only to his own tutor but may be assigned to another one when he is studying some particular topic which is outside the special interest of his own tutor.

1. There are two terms in the Oxford academic year.
2. Each undergraduate has his own tutor.
3. Students of Oxford must attend all the lectures.
4. There are no records of attendance.
5. Students may go to another tutor.

## GRAMMAR

*Table 2.1*

**Present Simple and Present Progressive Tenses**

| **Present Simple Tense** | **Present Progressive Tense** |
|---|---|
| **1. Permanent action (state)** | **1. Temporary action (state)** |
| **time expressions:**<br>always, never, usually, sometimes, often, every day, *once / twice / three times* a week | **time expressions:**<br>now, right now, at the moment, at present |
| We **write** tests *once a month*.<br>We **do not (don't) write** tests once a month.<br>**Do** you **write** tests once a month?<br>– **Yes**, we **do**. / – **No**, we **don't**.<br>*How often* **do** you write tests?<br>– Once a month. | We **are writing a test** *now*.<br>We **are not (aren't) writing** a test *now*.<br>**Are** you **writing a test** *now*?<br>– **Yes**, we **are**. / – **No**, we **aren't**.<br>What **are** you **writing**?<br>– A test. |
| **2. Future actions according to the time-table** | **2. Plans for the nearest future** |
| **verbs:**<br>leave, arrive, begin, start, end, finish | **time expressions:**<br>this Saturday, next week, *etc.* |
| The concert **begins** at 7 p.m. | I usually don't work on Saturdays, but *this Saturday* **I am working**. |

## 2.19 Choose the correct variant.

1. We sometimes … to the cinema.
   a) are going  b) go  c) going
2. Tim never … television.
   a) is watching  b) watches  c) watching
3. Andy … to music at the moment.
   a) listen  b) listens  c) is listening

4. Kate and her sister .. live in Rome.
   a) aren't b) doesn't c) don't
5. Sue … coffee.
   a) doesn't like b) don't like c) not like
6. I … a newspaper now.
   a) don't read b) 'm not reading c) not reading
7. You may turn off the radio. We … to it.
   a) don't listen b) aren't listening c) not listen
8. … you have lectures in the morning?
   a) Do b) Are c) Does
9. What time … your mother start work?
   a) do b) does c) is
10. … you … on the project now?
    a) Are… working b) Do … work c) Is … working
11. I don't know Spanish, but I … it now.
    a) am learning b) learn c) learning
12. Dan usually … on Saturdays.
    a) isn't working b) doesn't work c) don't work
13. Don't give him cigarettes. He … .
    a) isn't smoking b) doesn't smoke c) don't smoke
14. They … German now.
    a) speak b) speaking c) are speaking
15. Helen is in her office. She … to somebody.
    a) talks b) is talking c) talking

## 2.20 Complete the following sentences with the present simple or present progressive form of the verb, as in the model.

**Model:** Excuse me, **do you speak** English? (*to speak*)
They **don't watch** TV very often. (*not to watch*)
Tom **is having a** shower at the moment. (*to have*)

1. How often … you … a newspaper? (*to read*)
2. Excuse me, but you … on my place. – Oh, I'm sorry. (*to sit*)

3. Please, speak more slowly. I … (*not to understand*).
4. Where are you, Roy? – I'm in the sitting-room. I … TV. (*to watch*)
5. What time … you … work every day? (*to finish*)
6. He … usually … to work. He usually … (*not to drive; walk*)
7. Have a cigarette. – No, thank you, I … . (*not to smoke*).
8. What … she …? – She is a dentist. (*to do*)
9. I …to go out. It … . (*not to want; to rain*)
10. Where … you … from? – Canada. (*to come*)
11. How much … it … to send a letter to Australia? (*to cost*)
12. I can't talk to you at the moment. I … . (*to work*)
13. George is a good tennis player but he … play very often. (*not to play*)
14. … you … a dictation now? – No, we … Exercise 9. *(to have; to do)*
15. Is Dan in the office? – No, he isn't. He … letters. *(to deliver)*
16. I … any foreign language but … English now. (*not to speak; to learn*)
17. Jane is fond of reading books in French. But she … at the moment. She … TV. *(not to read; to watch)*
18. What are they talking about? – They … about literature. They always .. about literature when they see each other. *(to talk; to talk)*
19. What are you doing? – I … a letter to my grandmother. I … to her very often. (*to write; to write*)
20. … Helen … her homework in the reading-room now? – No, as a rule she … at home. (*to prepare; to work*)

## 2.21 Read the following sentences and decide if the verb refers to the present or future.

1. Jane likes reading novels.
2. The train arrives at six tomorrow.
3. She is drinking tea at the moment.
4. Listen! Somebody is singing.
5. I don't like cooking.
6. I'm visiting Anna tomorrow.

7. He likes swimming in the sea.
8. I can't meet you tomorrow afternoon. I'm playing tennis.
9. The film begins at 4.30.
10. They are not going to have a party.
11. The show usually finishes at 11 p.m.
12. Nobody is watching TV at the moment.
13. I don't want to go home by bus. I'm going to walk.
14. I'm leaving for Paris tomorrow.
15. They like playing computer games.

*Table 2.4*

**Conditional I**

| |
|---|
| **If** you **study** hard, you **will pass** your exams.<br>**If** he **studies** hard, he **will not (won't) fail** the test. |
| **If** *you* **don't study** hard, you **will not** (**won't) pass** your exams.<br>**If** he **doesn't study** hard, he **will fail** the test. |

## 2.22 Choose the correct variant.

1. If you *lend / will lend* me the money, I *will pay / pay* you back next month.
2. If you *won't / don't* help me, I *won't pass / not pass* the exam tomorrow.
3. If Bob *will get / get /gets* a good job, he *will buy / buy / buys* a new car.
4. If we *will leave / leave* at 7 o'clock, we *will arrive / arrive* on time.
5. I *will be / am / be* late for the concert if I *won't find / don't find / doesn't find* a taxi.
6. If I *find / finds / will find* her address, I *will send / send* her an invitation.
7. If you *will be / are / is* more careful, you *won't make / makes / make* so many mistakes.
8. If she *know / knows / will know* English, she *will try / try* to enter the university.
9. If you *makes / make / will make* a mistake, someone *will let / let* you know.

10. If he *asks / ask / will ask* me, I *will consider / consider* his proposal carefully.
11. If you *check / checks / will check* the documents, we *discuss / will discuss* the project.
12. Our teacher *will be / is* happy if we *answer / will answer* all the questions correctly.

## 2.23 Find and correct the mistakes.

1. If he don't know the words, he won't be able to understand the text.
2. I will be very angry with Nick if he will forget my CD again.
3. If I will see her, I am glad.
4. If you will be busy, I will leave you alone.
5. What will you do if you finds out the truth?
6. If they will have enough money, they buy a new car.
7. If he not gets up early, he will be late for classes.
8. If he go to London, he will visit the Houses of Parliament.

## 2.24 Match the expressions in columns A and B. Then, complete the dialogues below, as in the model.

| A | B |
|---|---|
| 1. **live in Moscow** | a) tell him my secret |
| 2. become Prime Minister | b) take part in the concert |
| 3. find a good friend | c) come to see you |
| 4. learn to play the guitar very well | d) **visit the Tretyakov Gallery** |
| 5. be free | e) reduce taxes |
| 6. work too much | f) get tired |

**Model:** **A:** What will you do **if** you live in Moscow?
**B: If I live in Moscow**, **I'll visit** the Tretyakov Gallery.

1. **A:** What will you do if you become Prime Minister?
   **B:** … .
2. A: What will you do if you find a good friend?
   **B:** … .

3. **A:** What will you do if you play the guitar very well?
   **B:** … .
4. **A:** What will you do if you are free?
   **B:** … .
5. **A:** What will you do if you work too much?
   **B:** … .

*Table 2.5*

**Past Simple Tense**

| | |
|---|---|
| **S + $V_{ed/2}$** | I **went** to the theatre *yesterday*. |
| **Did + S + V?** | **Did** you **go** to the theatre *yesterday?*<br>– **Yes**, I **did**. / – No, I **didn't.** |
| **S + did not + V**<br>Short form: **didn't** | I **didn't go** to the theatre *yesterday.* |
| **Time expressions** | yesterday, two days ago, when I was ten years old, *etc.* |

## 2.25 Complete the following sentences with the past simple form of the verb, as in the model.

**Model:** He always goes to work by car. Yesterday *he went to work by car*.

1. They always get up early. Yesterday they … .
2. Bill often loses his keys. He … last Saturday.
3. I write a letter to Jane every week. Last week … .
4. She meets her friends every evening. She … yesterday.
5. I usually read two newspapers every day. … yesterday.
6. They come to my house every Friday. Last Friday … .
7. We usually go to the cinema on Sunday. … last Sunday.
8. They buy a new car every year. Last year … .
9. Ann often takes photographs. Last weekend … .
10. We leave home at 8.30 every morning. … yesterday morning.

## 2.26 Put the verbs in the correct the past simple form.

1. The film wasn't good. I ... it very much. (*to enjoy*)
2. I knew Sarah was very busy, so I … her. (*to disturb*)
3. We went to Kate's house but she … at home. (*not to be*)
4. It was a funny situation but nobody … . (*to laugh*)
5. The hotel wasn't very expensive. It …very much. (*to cost*)
6. I was in a hurry, so I … time to phone you. (*to have*)
7. I ... tennis yesterday but I ... . (*to play; not to win*).
8. We … the bus but it … . (*to wait for; not to come*).
9. That's a nice T-shirt. Where … you … it? (*to buy*)
10. She … me but she … to me. (*to see; not to speak*)
11. … yesterday? – No, it was a nice day. (*to rain*)
12. That was a stupid thing to do. Why … you … it? (*to do*)

*Table 2.6*

**Present Perfect Tense**

| | |
|---|---|
| **S + has/have + $V_{ed/3}$** | I **have** *just / already* **written** the test. |
| **Have/Has + S+ $V_{ed/3}$?** | **Have** you *already* **written** test?<br>– **Yes,** I **have. / No,** I **haven't.** |
| **S + *have*/*has* not + $V_{ed/3}$**<br>Short forms:<br>**haven't, hasn't** | I **haven't written** the test yet. |
| **Time expressions** | just, already, recently, lately, several times, ever, never, yet |

## 2.27 Complete the following sentences with the present perfect form of the verb.

1. Do you know where Julia is? – Yes, I … just … her. (*to see*)
2. What time is David leaving? – He … already … (*to leave*).
3. What's in the newspaper today? – I don't know. I … it yet. (*not to read*)
4. Is Ann coming to the cinema with us tonight? – No, she … already … the film.(*to see*)
5. Are your friends here yet? – Yes, they … just … . (*to arrive*)

6. What does Tim think about your plan? – I … him yet. (*not to tell*)
7. Are they still having dinner? – No, they … . (*to finish*)
8. I … some new shoes. Do you want to see them? (*to buy*)
9. Is Tom here? – No, he … to work. (*to go*)
10. Where's your key? – I don't know. I … it. (*to lose*)
11. Look! Somebody … that window. (*to break*)
12. Your house looks different. … you … it? (*to paint*)
13. I can't find my umbrella. Somebody … it. (*to take*)
14. I'm looking for Sarah. Where … she …? (*to go*)
15. Do you want the newspaper? – No, thanks. I … it. (*to read*)

*Table 2.7*

**Present Perfect and Past Simple Tenses**

| **Present Perfect Tense** | **Past Simple Tense** |
|---|---|
| **have / has + $V_{ed/3}$** | **$V_{ed/2}$** |
| Wow! I **have passed** my Physics exam! | I **passed** my Physics exam two days ago. |
| **Have** you *ever* **eaten** frogs? – Yes, I **have**.<br>*When* **did** you **eat** them? – I **ate** them *when I was in France*. | |

## 2.28 Choose the correct variant.

1. They have just finished / just finished this work.
2. He opened / has opened a new restaurant in our town last year.
3. She has started / started her own business recently.
4. David and Sarah haven't passed / didn't pass the exams yet.
5. They have seen / saw the film "War and Peace" several times.
6. He has just returned / returned home at 8 p.m
7. She hasn't read / didn't read the newspaper yesterday.
8. He has been to / was in Vienna several times.
9. Look! Alan has already written / wrote the test.
10. I have never been to / wasn't in Washington.
11. We haven't solved / didn't solve the problem yet.
12. She has already closed / closed the shop at 9 o'clock in the evening.

## 2.29 Make questions and answers, as in the model.

**Model:** be / to Paris - in 2015

**Have** you *ever* **been** to Paris? – Yes, I **have**. I **was** in Paris in 2015.

1. play / golf – when / be / in England
2. be / to Australia – twice
3. lose / your passport – two months ago
4. sleep / in the park – never
5. eat / Chinese food – when / be / in Chinese restaurant
6. win / a lot of money – recently
7. break / your leg – when / be / ten years old
8. run / a marathon – once in my life
9. speak / to famous people – several times
10. live / in another town – in 2005.

## Revising Tenses

## 2.30 Choose the right variant and complete the following sentences.

1. Paul is never late. He always … to work on time.
   a) get b) is getting c) gets
2. Look! You … a lot of mistakes in your test.
   a) have made b) made c) make
3. He is an architect but he … at the moment.
   a) doesn't work b) isn't working c) don't work
4. The books were not very expensive. They … very much.
   a) don't cost b) didn't cost c) weren't cost
5. We … any results on our laboratory work yet.
   a) haven't received b) didn't receive c) don't receive
6. I've got a computer but I … it much.
   a) am not using b) not use c) don't use
7. She usually has lunch at 12.30 but yesterday she … it at 14.30.
   a) has b) had c) is having
8. Susan really loves this film. She … it ten times.
   a) hasn't seen b) has seen c) is seeing

9. Kelly worked hard last term, but this term she … any progress yet.
   a) hasn't made  b) doesn't make  c) didn't make
10. They … their parents every weekend.
   a) visit  b) visits  c) visited
11. When … you write to your parents last time?
   a) do  b) did  c) are
12. She is playing tennis … .
   a) every Monday  b) an hour ago  c) at this moment
13. Who …. the competition last year?
   a) wins  b) won  c) has won
14. Have you … been to California?
   a) ever  b) never  c) sometimes
15. … you meet her at the station yesterday?
   a) Does  b) Was  c) Did

## 2.31 Read the Eugene's letter. Pay attention to the using of present simple, present progressive, future simple, past simple and present perfect forms.

Hello, Dan!

I am writing to you to share my success. I have just passed my last exam and now I am free till the first of September. You know I was always good at Mathematics and Physics at school. My parents bought me a computer when I was 10. Since then I have dreamt to become a programmer. I have never failed the exams. I haven't had any satisfactory marks yet.

Yesterday I read several advertisements in the newspaper. They offer a lot of vacancies in the sphere of computer science. So, there are a lot of employment opportunities in my specialty. I hope if I work hard, I'll graduate from the university with excellent marks and get the Bachelor's degree in Computer Science.

Give my regards to Ann and wish me luck.

Sincerely yours, Eugene.

### 2.32 Answer the questions according to the letter.

1. Who is Eugene writing to?
2. Has Eugene passed his last exam?
3. Was he good at Physics at school?
4. When did Eugene's parents buy him a computer?
5. Has he ever failed the exams?

### 2.33 Write a letter to a pen-friend.

# Unit 3 THE RUSSIAN FEDERATION

**Text A The Russian Federation**
**Text B Tomsk**
**Grammar: Present Simple Passive, Past Simple Passive**

## Text A

## THE RUSSIAN FEDERATION

***Pretext exercises***

### 3.1 Read the following words and word combinations and try to guess their meaning.

Federation, ocean, Europe, Asia, kilometer, steppe, territory, metre, climatic zones, central, climate, continental, natural gas, strategic minerals, to concentrate, official, constitutional republic, the Prime Minister, criminal, financial, transportation, horizontal, symbol, to symbolize, national.

### 3.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| area | ['eərɪə] | deposit | [dɪ'pɔzɪt] |
| surface | ['sɜːfɪs] | strategic | [strə'tiːʤɪk] |
| separate | ['sep(ə)rət] | suburb | ['sʌbɜːb] |
| Europe | ['juərəp] | approve | [ə'pruːv] |
| Asia | ['eɪʃə] | executive | [ɪg'zekjutɪv] |

| | | | |
|---|---|---|---|
| mild | [maɪld] | legislative | ['ledʒɪslətɪv] |
| south | [sauθ] | mountain | ['mauntɪn] |
| constitutional | [ˌkɔn(t)stɪ'tju:ʃ(ə)n(ə)l] | government | ['gʌv(ə)nmənt] |
| official | [ə'fɪʃ(ə)l] | supreme | [s(j)u:'pri:m] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **total area** | *общая площадь* | **official language** | *государственный язык* |
| **to separate** | *разделять* | **minerals** | *природные ископаемые* |
| **to border on** | *граничить с* | **legislative power** | *законодательная власть* |
| **vast** | *обширный, огромный* | **executive power** | *исполнительная власть* |
| **to head** | *возглавлять* | **judicial power** | *судебная власть* |
| **highland** | *возвышенность* | **suburb** | *пригород* |
| **mountain chain** | *горная цепь* | **deposit** | *запас* |
| **petroleum** | *нефть* | **to adopt** | принимать, одобрять |
| **lowland** | *равнина, низменность* | | |

## 3.3 Complete the sentences with the words and expressions given above.

1. The … … of Great Britain is English.
2. In the west the Russian Federation … … Norway, Finland, Baltic states, Belarus, the Ukraine.
3. The largest … … , the Urals, … Europe and Asia.
4. The Russian Federation is a constitutional republic … by the President.
5. Russia has three branches of power: … , … , and … one.
6. People prefer to live in cities and their … .
7. In Russia we have steppes, … , … , deserts and mountains.
8. The Russian Federation has abundant … of … such as natural gas, oil, iron ores, coal, *etc*.
9. It's difficult for strangers … our way of living.
10. Strezhevoy is a … zone of Tomsk region.

## 3.4 Read the text.

### THE RUSSIAN FEDERATION

The Russian Federation is the largest country in the world by land area. It extends from the Arctic Ocean to the Black Sea and from the Baltic Sea to the Pacific Ocean. Russia is located both in Europe and Asia. Its total area is over 17 million square kilometres. Russia borders on many countries such as Finland, the Ukraine, Baltic states, China, Mongolia and others. The surface of the country is various. There are lowlands and highlands, forests and steppes on its territory. The longest mountain chains are the Urals, which separate Europe and Asia, the Caucasus, the Altai. Europe's biggest river, the Volga flows into the Caspian Sea. The main Siberian rivers, the Yenisei, the Ob and the Lena flow from the south to the north. Lake Baikal in Siberia is the world's deepest lake (1,600 metres). There are different climatic zones on the vast area of our country. The climate conditions are rather different: from arctic and moderate to continental and subtropical. Russia has major deposits of petroleum, natural gas, coal, timber and many strategic minerals. Three quarters of the minerals are concentrated in Siberia and the Far East.

The population of the Russian Federation is over 147 million people. The European part of the country is densely populated. Most of people prefer to live in cities, towns and their suburbs. The official language is Russian. The Russian Federation is a constitutional republic with the President at the head. The political system consists of three branches of power:

The Federal Assembly represents the legislative branch of power. It's made of two Houses: the Federal Council and the Duma. Both chambers are headed by chairmen called speakers. Each law to be adopted must be approved by the President.

The Federal Government represents the executive branch of power. The President appoints its head, the Chairman of the Government (the Prime Minister) but the Duma must approve his appointment.

The judicial branch of power consists of the Constitutional Court, the Supreme Court and lower courts. The Supreme Court is the highest instance for civil and criminal cases.

Moscow is the capital and the country's economic, financial, educational and transportation centre.

The Russian flag has horizontal stripes which symbolize: white – the earth, blue – the sky, red – the freedom. There is another national symbol of Russia – the two-headed eagle.

***Notes to the text***

| | |
|---|---|
| **the Federal Assembly** | *Федеральное Собрание* |
| **the Federation Council** | *Совет Федерации* |
| **the Constitutional Court** | *Конституционный суд* |
| **the Supreme Court** | *Верховный суд* |

## 3.5 Decide if the sentences are true or false.

1. The Russian Federation is a parliamentary monarchy.
2. The president is elected by the Duma.
3. The government consists of the Federal Assembly and the Federal Council.
4. Russia is rich in mineral resources.
5. Russia is situated in two parts of the world.
6. The head of the state is the Prime Minister.
7. The president controls the three branches of power.
8. The capital of the country is in Asia.
9. The deposits of minerals are mostly concentrated in the European part of the country.
10. The Volga flows into the Baltic Sea.

## 3.6 Read the text again and answer the questions.

1. What is the total area of the Russian Federation?
2. Where is Russia located?
3. What is the surface of the country like?
4. What climate conditions are there in Russia?
5. Can you name the longest rivers of the country?
6. What lake is the deepest in Russia?
7. Which minerals is the Russian Federation rich in?
8. What is the population of the country?
9. How many branches of power are there in Russia? What are they?
10. What do the stripes on the Russian flag symbolize?

# Text B

# TOMSK

***Pretext exercises***

## 3.7 Read the following words and word combinations and try to guess their meaning.

Architecture, construction, strategic, base, attack, emblem, steppe, monument, surprising, planetarium, territory, incubator, technology, technological, technical, institute, medical, control, orchestra, forum.

## 3.8 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| mouth | [mauθ] | cyclonic | [saɪ'klənɪk] |
| strategic | [strə'tiːʤɪk] | scientific | [ˌsaɪən'tɪfɪk] |
| significance | [sɪg'nɪfɪkən(t)s] | nuclear | ['njuːklɪə] |
| remind | [rɪ'maɪnd] | submarine | [ˌsʌbm(ə)'riːn] |
| source | [sɔːs] | honour | ['ɔnə] |
| marshland | ['mɑːʃlænd] | architecture | ['ɑːkɪtekʧə] |
| surprising | [sə'praɪzɪŋ] | technological | [ˌteknə'lɔʤɪk((ə)l)] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to found** | *основывать* | **thick** | *зд. густой* |
| **to complete** | *завершать, заканчивать* | **to be related to** | *иметь отношение к* |
| **to provide** | *обеспечивать* | **nuclear** | *атомный, ядерный* |
| **to protect** | *защищать* | **research** | *исследование, изучение* |
| **significance** | *важность, значимость* | **to establish** | *учреждать, основывать* |
| **to remind** | *напоминать* | **power plant** | *электростанция* |
| **trade** | *торговля* | **business incubator** | *бизнес инкубатор* |

## 3.9 Complete the sentences with the words and expressions given above.

1. Tomsk fortress was … by Tsar Boris Godunov and in 1604 the construction was … .
2. Tomsk has a lot of businesses closely … to science.
3. Tomsk is also called Siberian Athens because there are many … institutions and universities.
4. Many old buildings in our city are of historical … .
5. A … … obtains its primary energy from the heat generated in … reactions.
6. … … provide help and support for new companies using advanced technology.
7. Our mission was to work out a … agreement.
8. Will you ... me about that appointment?
9. The plants grow so … there that you can't walk in between them.
10. Celebrities employ lifeguards … them from fans.

## 3.10 Read the text.

### TOMSK

Tomsk is a city situated in the east of West Siberia. The population of Tomsk is about 572 thousand (2017), the area – 295 square kilometres.

Tomsk fortress was founded on the right bank of the River Tom 60 kilometres from the Ob and not far from the mouth of the small river Ushaika in the early 17$^{th}$ century. In October 1604 the construction was completed. Tomsk became a strategic military base which provided protection to the local population during the 17$^{th}$ century – in 1614, 1617, 1657 and 1698 it repelled the attacks of the nomads. In the 18$^{th}$ century the local nomadic tribes were defeated and Tomsk lost its military significance. The horse depicted on the emblem of Tomsk reminds about carrier's trade that served as a source of income for a large part of the population.

Tomsk is located on the border of taiga: there are thick forests and marshlands to the north and forests and steppes to the south. The climate is continental-cyclonic.

The city is an important scientific centre. There are a lot of businesses closely related to science; IT industry is also well developed.

K-150 «Tomsk» a Russian nuclear submarine was named in honour of the city.

Tomsk has a large number of different monuments, some of them are quite surprising and unusual. In the city there are 6 theatres, 20 cinemas and entertainment centres, a planetarium and about 15 museums including University's museums. Tomsk is also rich in monuments of wooden and stone architecture of the $18^{th}$- $20^{th}$ centuries. The territory of the city includes many green areas: parks and gardens.

Tomsk is a big educational, scientific and innovation centre. There are 9 higher schools, 15 research institutes, Technology Innovative Special Economic Zone and 6 business incubators. Tomsk State University founded in 1888 is the oldest university in Siberia, Tomsk Polytechnic University founded in 1896 and opened in 1900 is the oldest technical institute in Siberia, Siberian Medical University is one of the oldest and highest rated medical schools in Russia. There is also a Pedagogical University, Tomsk State University of Control Systems and Radioelectronics and the University of Architecture and Construction.

Tomsk was the first to:

– establish a university and a technological institute in the Asian part of Russia,

– build a power plant and a television station in Siberia,

– open a public library and a Botanical garden in Siberia,

– create a philharmonic orchestra in Siberia,

– establish a Technological park in USSR and a student business incubator in Russia,

– start an innovation forum in Russia.

### *Notes to the text*

| | |
|---|---|
| **to repel** | *отражать, побеждать* |
| **nomads** | *кочевники* |
| **tribe** | *племя* |
| **to defeat** | *наносить поражение* |
| **to depict** | *изображать* |
| **carrier' trade** | *извоз, извозный промысел* |
| **Technology Innovative Special Economic Zone** | *особая экономическая зона технико-внедренческого типа* |

## 3.11 Match the words and expressions with similar meaning.

| | |
|---|---|
| 1. to complete | a) deal with |
| 2. to depict | b) to establish |
| 3. to repel | c) to comprise |
| 4. to found | d) investigation |
| 5. significance | e) to be situated |
| 6. to include | f) to finish |
| 7. source | g) to defeat |
| 8. research | h) origin |
| 9. to be related | i) importance |
| 10. to be located | j) to paint |

## 3.12 Match the words with opposite meaning.

| | |
|---|---|
| 1. to lose | a) to win |
| 2. to start | b) peaceful |
| 3. to defeat | c) boring |
| 4. local | d) thin |
| 5. square | e) to find |
| 6. military | f) agriculture |
| 7. thick | g) round |
| 8. surprising | h) to complete |
| 9. industry | i) residents |
| 10. nomads | j) widespread |

## 3.13 Read the text again and answer the questions.

1. When was Tomsk founded? Why?
2. Where is Tomsk situated?
3. How many people live in the city?
4. What's the climate like in Tomsk region?
5. What served as a source of income for people in old times?
6. Why is Tomsk known as a scientific and educational centre?
7. What are the most prominent universities in Tomsk?
8. When were they founded?
9. What university do you study at?
10. Why is the city known as a cultural centre of Siberia?
11. What is Tomsk famous for?
12. Do you like Tomsk? Why? / Why not?

## An Englishman in Tomsk

### 3.14 Watch the video and answer the following questions.

1. When and where was the city of Tomsk founded?
2. What's the home of much of the government of Tomsk?
3. What is there in the centre of Lenin Square?
4. When was Tomsk State University opened?
5. Where is New Cathedral Square located?
6. Why is it named Novosobornaya Square?
7. What can you see on the square and around it?
8. When did the oldest Monastery in Tomsk start? What is it famous for?
9. When was the bell added?
10. How many wooden houses are there in Tomsk?
11. When was the most famous wooden house built?

### 3.15 Watch the video again and match the two parts to make a sentence.

| | |
|---|---|
| 1. Lagerny Sad on the banks of the river Tom. | a) a small square to commemorate the history of the city. |
| 2. Voskresenskaya Mountain is the location. | b) because there are so many international and exchange students there. |
| 3. In 2004 on 400 year anniversary of the city they built. | c) where Tomsk was founded. |
| 4. Lots of wooden houses are decorated. | d) was built in the early 18th century. |
| 5. In Tomsk people speak many languages. | e) includes the city war memorial. |
| 6. The most famous house of "firebirds". | f) with lace window frames. |

## GRAMMAR

*Table 3.1*

**Present Simple Passive and Past Simple Passive**

| | |
|---|---|
| **Present Simple Passive (am / is / are + $V_{ed/3}$)** | The main building is often rebuilt.<br>It isn't rebuilt.<br>Is it rebuilt? |
| **Past Simple Passive (was / were + $V_{ed/3}$)** | It was rebuilt last year.<br>It wasn't rebuilt.<br>Was it rebuilt last year? |
| **Passive Voice** is used when the object of the action is more important than the subject.<br>**Present Simple Passive** is used to talk about present facts.<br>**Past Simple Passive** is used to talk about past actions. | |

### 3.16 Complete the following sentences with the correct passive present simple form of the verb.

1. English, Spanish, and French... all over the world. (*to speak*)
2. Physics ... during the whole course of the university. (*to study*)
3. The new laboratory ... with some modern devices. (*to equip*)
4. Mobile phones ... in different countries. (*to make*)
5. The university library ... by the students of different faculties. (*to visit*)
6. Every lecture the teacher ... a lot of questions. (*to ask*)
7. Tea ... in Africa, South Asia and China. (*to grow*)
8. These computers ... in Taiwan. (*to manufacture*)
9. Cricket ... in Australia. (*to play*)
10. A cinema is a place where films.....(*to show*).

### 3.17 Complete the following sentences with the correct passive past simple form of the verb.

1. Thousands of new cars … last year. (*to manufacture*)
2. The monument to Marshal I.S. Konev … in April, 2020 in Prague. (*to destroy* )

3. A large box of chocolates … to my mother for her birthday. (*to present*)
4. The novel "Three Comrades" by Erich M. Remarque … in 1936. (*to publish)*
5. This novel … into an American film of the same title in 1938. (*to make*)
6. Mainly the works of famous Russian artists … in the Tretyakovskaya gallery in Moscow because it is rather small. (*to exhibit*)
7. The document … in the safe in his working room.. (*to hold*)
8. The articles … in 2016. (*to publish*)
9. They … after a fight in the nightclub. (*to arrest*)
10. The Christmas Party … last Friday. (*to organize*)

## 3.18 Complete the following sentences. Use the correct passive present simple or past simple form of the verb.

1. Tomsk State University of Control Systems and Radioelectronics … in 1962. (*to found*)
2. Ice hockey … in Canada, Russia, the USA and other countries. (*to play*)
2. Ice hockey … in Canada. (*to play*)
3. Australia … in the 17th century. (*to discover*)
4. Tomsk … in West Siberia. (*to situate*)
5. The Eiffel Tower … (*to build*) in Paris.
6. This coat … four years ago. (*to buy*)
7. Coca Cola … in Russia as well as all over the world. (*to sell*)
8. The 2014 Winter Olympics … in Sochi, Russia. (*to hold*)
9. The washing machine … every day. (*to use*)
10. Only a few people … in the invention of radio. (*to involve*)

## 3.19 Make up sentences. Use Passive Voice.

**Model:** 10 schools / build / last year. (*В прошлом году было построено 10 школ.)*
**10 schools were built last year.**

1. The museum / open / in 2005. (*Музей был открыт в 2005 году.)*
2. 3000 books / sell / every week. (*3000 книг продается каждую неделю.*)
3. The newspapers / deliver/ in the morning. (*Газеты доставили утром.*)
4. The flight / not cancel / because of the rain. (*Рейс не отменили из-за дождя.*)
5. Paper /make / from wood. (*Бумагу изготавливают из дерева.*)
6. Coffee / not grow / in Russia. (*Кофе не выращивают в России.)*
7. Christmas tree / decorate / last night. (*Елку украсили вчера вечером.*)
8. The village /surround /with thick forest. (*Поселок окружен густым лесом*.)
9. I / tell / keep silence. (*Мне велели молчать.)*
10. All his holidays/spend/in the countryside. (*Все его отпуска проводятся в сельской местности*.)

## 3.20 Rewrite the following sentences in passive as in the model.

**Model:** Shakespeare **wrote** "Romeo and Juliet".
– "Romeo and Juliet" **was written** by Shakespeare.

1. Popov invented radio in Russia.
2. Every four years people elect a new president in the USA.
3. The police caught a bank robber last night.
4. Sorry, we don't allow dogs in our safari park.
5. My mum made a delicious cherry pie for dinner.
6. In Europe they celebrate Christmas in December.
7. George didn't repair my clock.
8. In Rome they sell souvenirs everywhere.
9. Agatha Christie wrote more than 80 detective stories.
10. People know Tomsk as a cultural centre of Siberia.

## 3.21 Write the questions for the sentences.

1. Ann was offered a good job because she was very competent. (*Why?)*
2. Italian pizza is sold in many countries. (*Where?*)
3. He was born in a village among dark forests and lakes in 1889. (*When?*)
4. I am invited to his birthday party every year. (*Who?*)
5. The men were paid &800 to do the work. (*How much?*)
6. Service is included in the bill. (*What?*)
7. The computer is used every day. (*How often?*)
8. Tomsk State University was founded in 1888. (*What year?*)
9. The post is delivered at 8 o'clock in the morning. (*What time?*)
10. St. Valentine's Day is celebrated on the 14th of February. (*What holiday?*)

## 3.22 Make the following sentences negative.

1 The agreement was signed in January.
2. The Olympic Games are held every two years.
3. Hockey is played in autumn.
4. French and Spanish are spoken in Germany.
5. These houses were repaired last year.
6. Paper was invented by Americans.
7. Millions of Russian cars are exported to Canada every year.
8. English is studied in our university in the third year.
9. American programs are often shown on Russian television.
10. The debt on the loan was repaid yesterday.

## 3.23 Translate the following sentences.

1. Volleyball is a team sport in which two teams of six players are separated by a net.
2. The 90th anniversary of Gorky Central Park of Culture and Leisure in Moscow was celebrated in August 2018.
3. The city of New York is often called the Big Apple.
4. On September 11, 2001 two twin towers in New York were destroyed as a result of the plane crash in the matter of minutes.

The life of the big city was paralyzed completely for more than a month.

5. Chicago is known as “The Windy City”.
6. Moscow is served by a comprehensive transit network, which includes four international airports, nine railway terminals, a tram system, and most notably the Moscow Metro, the busiest metro system in Europe.
7. Moscow State University was established in 1755. Its main building was rebuilt after the 1812 fire by Domenico Gilardi, an Italian architect.
8. St. Petersburg, the second largest city in Russia was founded in 1703 by Peter the Great. It was called the “Window on the West”. Thousands of workers were brought from all parts of Russia to build a new city at the mouth of the Neva River.
9. The castle can be seen from a long distance.
10. You are asked to tell about your journey to South America.
11. The first computer was invented in 1823 by Charles Babbage.
12. In Russia, 70% of the economy is controlled by the state and state-owned companies.
13. Usually I’m asked a lot of questions about this problem.
14. They were expected to arrive on Tuesday.
15. This exhibition is much spoken about.
16. Most clothes sold in Russia are made in China and Turkey.
17. The electric bulb was invented in the 19$^{th}$ century.
18. They were accused of stealing a large amount of money.
19. You are not allowed to leave the room until the test is finished.
20. This rule must be taken into consideration.

# Unit 4 THE UNITED KINGDOM

| | |
|---|---|
| **Text A** | **The United Kingdom** |
| **Text B** | **London** |
| **Grammar:** | **Revising Verbals** |

## Text A

## The United Kingdom

***Pretext exercises***

### 4.1 Read the following words and try to guess their meaning.

Commercial, separate, continent, climate, oceanic, total, million, industrial, machinery, electronics, textile, navigation, monarchy, practice, Europe, party, rugby, cricket, boxing, golf, cultural, tradition, centre, university, intellectual.

### 4.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| island | ['aɪlənd] | moderate | ['mɔd(ə)rət] |
| Ireland | ['aɪələnd] | oceanic | [ˌəuʃɪ'ænɪk] |
| separate | ['sep(ə)rət] | constituent | [kən'stɪtjuənt] |
| vary | ['veərɪ] | parliamentary | [ˌpɑːlə'ment(ə)rɪ] |
| mountainous | ['mauntɪnəs] | reign | [reɪn] |
| climate | ['klaɪmət] | originate | [ə'rɪʤ(ə)neɪt] |

***Memorize the following words***

| | | | |
|---|---|---|---|
| **island** | *остров* | **plain** | *равнина, низменность* |
| **to separate** | *разделять* | **to influence** | *оказывать влияние* |
| **coast** | *берег, побережье* | **equipment** | *оборудование* |
| **to wash** | *омывать* | **shipbuilding** | *кораблестроение* |
| **to vary** | *отличаться* | **to originate** | *зарождаться,* |
| **valley** | *долина* | **chief** | *главный* |

## 4.3 Complete the sentences with the words and expressions given above.

1. The United Kingdom (the UK) or Britain is a country lying off the north-western … of the European mainland.
2. The Irish sea … Great Britain and Ireland.
3. One of the … industries of the country is … .
4. The … to the north of Cardiff are the heart of the Welsh coal and steel industries.
5. The western coast of Great Britain is … by the Atlantic Ocean.
6. The surface of the British Isles … greatly.
7. The Atlantic Ocean, the Gulf Stream and the mountains … the climate of Great Britain.
8. The UK produces and exports navigation … .
9. A number of sports such as golf, cricket, rugby … in Britain.
10. Britain has a varied countryside where you can find mountains, … , valleys and sandy beaches.

## 4.4 Read the text.

### THE UNITED KINGDOM

The British Isles consist of two large islands, Great Britain and Ireland, and about five thousand small islands. The United Kingdom is made up of four constituent countries: England, Wales, Scotland and Northern Ireland. Their capitals are London, Cardiff, Edinburgh and Belfast respectively. The capital of the UK is London, its political, economic and commercial centre.

The British Isles are separated from the European continent by the North Sea and the English Channel. The western coast of Great Britain is washed by the Atlantic Ocean and the Irish sea. The surface of the British Isles varies greatly. The north of Scotland is mountainous and is called the Highlands while the south which has beautiful valleys and plains is called the Lowlands. The north and the west of England are mountainous but the mountains are not very high. Ben Nevis in Scotland is the highest mountain (1343 m). There are a lot of rivers in Great Britain but they are not very long. The Severn is the longest river while the Thames is the

deepest and the most important one. There are many lakes in Great Britain too. The Lake District is the most beautiful. The mountains, the Atlantic Ocean and the warm waters of the Gulf Stream influence the climate of the British Isles. It is moderate oceanic and wet. The UK is a small country compared to other European countries, its total area is 244,800 square kilometres. The population is over 65.5 million people.

Great Britain is a highly developed industrial country. It is known as one of the world's producers and exporters of machinery, electronics, textile, aircraft and navigation equipment. One of the chief industries is shipbuilding. The main industrial centres are Birmingham, Manchester and Glasgow.

The UK is a parliamentary monarchy. In law the head of the state is the Queen. In practice, the Queen reigns but she does not rule. The country is ruled by the Government with the Prime Minister at the head. The Parliament of Great Britain consists of two Houses: the House of Lords and the House of Commons. There are three main political parties in the UK: the Labour party, the Conservative and Liberal ones. English is not the only language, Scottish, Welsh and Irish are also used.

A number of sports originated in the United Kingdom including rugby, cricket, tennis, boxing and golf.

Great Britain is the country of old cultural traditions and customs. The most famous educational centres are Oxford and Cambridge universities.

***Notes to the text***

| | |
|---|---|
| **The British Isles** | *Британские острова* |
| **The English Channel** | *пролив Ла-Манш* |
| **The Highlands** | *Хайленд (Шотландия, Великобритания) – возвышенность, высокогорье* |
| **The Lowlands** | *низменность* |
| **The Gulf Stream** | *теплое течение Гольф-Стрим* |
| **The House of Lords** | *палата Лордов* |
| **The House of Commons** | *палата Общин* |

## 4.5 Match the words with similar meaning.

| | |
|---|---|
| 1. to vary | a) to affect |
| 2. greatly | b) tradition |
| 3. aircraft | c) to govern |
| 4. high | d) to differ |
| 5. to influence | e) to include |
| 6. to rule | f) manufacturer |
| 7. to consist of | g) very much |
| 8. custom | h) to think |
| 9. to consider | i) tall |
| 10. producer | g) airplane |

## 4.6 Match the words with opposite meaning.

| | |
|---|---|
| 1. island | a) to unite |
| 2. to separate | b) north |
| 3. various | c) republic |
| 4. south | d) continent |
| 5. mountains | e) cold |
| 6. high | f) agricultural |
| 7. wet | g) similar |
| 8. industrial | h) dry |
| 9. monarchy | i) plain |
| 10. warm | g) low |

## 4.7 Decide if the sentences are true or false.

1. The UK is situated on the European continent.
2. The capital of Scotland is Belfast.
3. The power of the Queen is limited by the Parliament.
4. The River Severn is the deepest in Great Britain.
5. The British Parliament consists of two Houses: the Senate and the House of Lords.
6. Oxford and Cambridge are intellectual centres of Europe.
7. The mountains in Great Britain are very high.
8. Shipbuilding is very important for the British economy.
9. Rugby and cricket appeared in the UK.
10. The British Isles are separated from Europe by the Irish Sea.

## 4.8 Read the text again and answer the questions.

1. Where is the UK situated?
2. How many constituent countries does it consist of? What are they?
3. What kind of state is the UK?
4. The capital of the country is London, isn't it?
5. Why is the climate of Great Britain so wet?
6. Is the UK an agricultural country?
7. Is the power of the Queen absolute?
8. How many political parties are there in the country? What are they?
9. What sports originated in the UK?
10. What are the most famous British universities?

# Text B

# LONDON

***Pretext exercises***

## 4.9 Read the following words and word combinations and try to guess their meaning.

Cultural, industry, kilometre, commercial, financial, centre, bank, office, park, residence, historical, geographical, special, Prime Minister, monarch, legend, statue, theatre, concert hall, gallery, industrial.

## 4.10 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| column | ['kɔləm] | buried | ['berɪd] |
| authorities | [ɔː'θɔrɪtɪz] | chief | [ʧiːf] |
| sightseer | ['saɪtˌsiːə] | century | ['senʧ(ə)rɪ] |
| luxury | ['lʌkʃ(ə)rɪ] | appearance | [ə'pɪər(ə)n(t)s] |
| immortalize | [ɪ'mɔːt(ə)laɪz] | heart | [hɑːt] |
| surround | [sə'raund] | associate | [ə'səusɪeɪt] |
| commemoration | [kəˌmemə'reɪʃ(ə)n] | financial | [faɪ'nænʃ(ə)l] |
| square | [skweə] | commercial | [kə'mɜːʃ(ə)l] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **heart** | *сердце, центр* | **district** | *район* |
| **to surround** | *окружать* | **residence** | *резиденция* |
| **to bury** | *похоронить* | **chief** | *главный, правитель* |
| **to dominate** | *определять, управлять, контролировать* | **century** | *век* |
| **palace** | *дворец* | **appearance** | *внешний вид* |
| **to gather** | *собираться* | **to face** | *быть обращенным к* |
| **to extend** | *простираться, охватывать* | **as many as** | *больше(чем)* |

## 4.11 Complete the sentences with the words and expressions given above.

1. London is … with a "green belt" of agricultural and wooded land to control the growth of the city.
2. A few famous English writers and poets are … in Westminster Abbey.
3. London … over an area of about 1,580 square kilometres.
4. Buckingham … (situated in the West End) is the Queen's residence.
5. Modern London … the life in Britain.
6. The East End is unattractive in … but it is very important to the commerce of the country.
7. … 50 thousand people … on Piccadilly Circus on special occasions.
8. London is the … port of the country.
9. Till the end of the 13$^{th}$ … Wales was independent of England.
10. At nine in the evening the whole front of the palace … the river was blazing with light.

## 4.12 Read the text.

### LONDON

London is situated upon both banks of the River Thames. It is the largest city in Britain and one of the largest in the world. Its population is more than 8.5 million people.

London dominates the life of Britain. It is the chief port of the country and the most important commercial, manufacturing and cultural centre. London consists of three parts, the City of London, the West End and the East End.

The City extends over an area of about 2.6 square kilometres in the heart of London. About half a million people work in the City but less than 8,000 live here. It is the financial centre of the UK with many banks, offices and Stock Exchange. But the City is also a market for goods of almost every kind, from all parts of the world.

The West End can be called the centre of London. Here are the historical palaces as well as the famous parks. Hyde Park with its Speaker's Corner is also here. Among other parks are Kensington Gardens, St. James's Park. In the West End there is Buckingham Palace, which is the Queen's residence, and the Palace of Westminster which is the seat of Parliament. The best-known streets here are Whitehall with important Government offices, Downing Street, the London residence of Prime Minister and the place where the Cabinet meets, Fleet Street where most newspapers have their offices, and some others. Piccadilly Circus is a fine street which has seen much history over the centuries. For generations Piccadilly has been the heart of London. Nowadays it is a local point where on special occasions, such as a Coronation or on New Year's Eve, as many as 50,000 people gather there. Trafalgar Square is so-named in commemoration of Nelson's great victory. In the middle there is the famous Nelson Column with the statue of Nelson 170 feet high. One of the "musts" for the sightseer are the Houses of Parliament, facing the Thames, on one side, and Parliament Square and Westminster Abbey, on the other.

Westminster Abbey is the crowning and burial place of British monarchs. It has its world famed Poet's Corner with memorials to Shakespeare,

Dickens, Hardy, Kipling and other leading writers. Only a few, however, are actually buried there.

The name "West End" is associated with wealth, luxury, and goods of high quality. It is the area of the largest department stores, cinemas and hotels. There are about 40 theatres, several concert halls, many museums including the British Museum, and the best art galleries.

It is in the West End that the University of London is centered.

The Port of London is to the east of the City. Here today are kilometres of docks, and the great industrial areas that depend upon shipping. This is the East End of London, unattractive in appearance, but very important to the country's commerce. In recent times London has grown so large, that the Government has decided that it must spread no further. It is now surrounded by a "green belt" – a belt of agricultural and wooded land on which new buildings may be put only with the permission of the planning authorities.

***Notes to the text***

| | |
|---|---|
| **The London Stock Exchange** | *Лондонская фондовая биржа* |
| **Hyde Park** | *(Гайд-Парк) самый известный парк в самом центре Лондона* |
| **Speaker's Corner** | *Уголок ораторов (место в Гайд-Парке (Hyde Park), где по выходным выступают ораторы на различные темы)* |
| **Piccadilly Circus** | *площадь и транспортная развязка в центре Лондона, район Вестминстер* |
| **"green belt"** | *зеленый пояс Лондона* |

## 4.13 Read the text again and answer the questions.

1. Where is London situated?
2. Is London the largest city in Britain?
3. What is its population?
4. What is the role of London in the life of Britain?
5. What parts does London consist of?
6. What places of interest are situated in the West End?

7. What are the best known streets?
8. What is the most famous park in London?
9. What is Downing Street known for?
10. What is the name "West End" associated with?
11. Why is Trafalgar Square so-named?
12. Where were British monarchs crowned?
13. London is a big cultural centre, isn't it?
14. Why is Buckingham Palace so interesting for tourists?
15. What is the financial centre of Great Britain?
16. Is the East End of London attractive in appearance?
17. Who lives there?
18. What famous places of interest would you like to visit in London?

## 4.14 Match the words with similar meaning.

| | |
|---|---|
| 1. to dominate | a) chief |
| 2. to consist of | b) tourist |
| 3. heart | c) memorial |
| 4. best-known | d) to include |
| 5. great | e) leading |
| 6. various | f) to allow |
| 7. sightseer | g) centre |
| 8. statue | h) different |
| 9. monarch | i) to control |
| 10. to permit | j) huge |

## 4.15 Read the story and decide if the sentences are true or false.

Big Ben is one of the most popular places of interest in London and symbols of England. Every year many people visit the capital of Great Britain to see it and take some photos with it in the background. It is thought that Big Ben is a high tower with a very big clock but that's not really true. In fact, this tower is called Saint Stephens Tower, but people, even those who live in the UK, call it "Big Ben". Actually Big Ben is a huge bell inside the building. Its weight is about thirteen tons and it rings every hour daily: once at one o'clock, twice at two o'clock, and so on. It

considered to be the biggest clock ever made in the country. The bell was used for the first time in 1859 but soon it cracked because of the heavy hammer which struck too strong. The hammer was changed but that crack is still there.

There are many ideas for the origin of the name "Big Ben". The most popular one suggests that the bell was named after Benjamin Hall who was responsible for its installation. People say he was really tall and many of them believe the bell is called Big Ben because of its size. The tower is closed to the public but people with 'special interest' might be offered an excursion for additional payment.

1. Big Ben is the biggest clock in the country.
2. Big Ben is high tower with a hammer inside.
3. In 1859 the bell cracked because of the fault in design.
4. Most people think the bell was named after Benjamin Hall who was really very tall.
5. Tourists are allowed to visit the tower on special occasions.

## 🎧 Window on Britain: an Introduction to Britain

### 4.16 Watch the video and decide if the statements are true or false.

1. Great Britain is a country situated on one large island.
2. Great Britain is a very popular place for tourists.
3. Lake District is located in the north-west of the country.
4. Welsh people do not speak English. They only speak Welsh.
5. 75% of working people in the country are farmers.
6. The residence of the Queen is 10 Downing Street.
7. Edinburgh, the capital of Northern Ireland, is famous for its old castles.
8. In Cambridge and Oxford most people drive a car.
9. Stonehenge is believed to be either a temple, or a city calendar or a clock.
10. 42 million people come to see Great Britain every year.

**4.17 Watch the video again and answer the following questions.**

1. How many countries does Great Britain consist of? What are they?
2. What is the population of the capital city?
3. Why is Buckingham Palace so popular for tourists.
4. What is Liverpool famous for?
5. Where was William Shakespeare born?
6. How do trains from Great Britain go to France and Belgium?

## GRAMMAR

## Revising verbals

**4.18 Translate the sentences. Pay attention to the verbals.**

**A.** 1. We all listened with great interest to the speaker criticizing the new book.
2. Criticizing the work of our sports club, he said that it was not satisfactory.
3. We were criticizing the work of the committee at that moment.

**B.** 1. Explained again, the rule became quite clear to everybody.
2. The rule being explained is not easy.
3. The rule explained is difficult.

**C**. 1. The man saved was a Norwegian sailor.
2. Having saved the boy's life the doctor felt happy.
3. The passengers are being saved.

## 4.19 Make up sentences and translate them.

| | | | |
|---|---|---|---|
| I | hates | the idea of | becoming a designer |
| | | | going to London |
| Donald | likes | | going out in such a weather |
| Who | doesn't like | | spending the week-end out of town |
| | suggested | | consulting Mr. Howard |

## 4.20 Translate the following sentences. Find the verbals.

1. English spoken by most educated people in Britain is known as the Queen's English or Standard English. It is the English taught in universities and schools.
2. The project being realized was proposed by a team of scientists.
3. When entering or leaving a room with ladies, don't rush before them. Remember the golden rule of every gentleman: "Ladies first".
4. When asked if he realized the danger, he said he did.
5. Having prepared all the necessary equipment, they began the experiment.
6. The governments of all states are responsible for saving peace.
7. Such doings could hardly be explained.
8. Instead of phoning his friend, he went to see him.
9. There is nothing to speak about.
10. To understand is to forgive.
11. I am sorry to trouble you.
12. I am sorry to have troubled you.
13. He doesn't like to ask questions.
14. He doesn't like to be asked questions.
15. The letters to be posted are on the table.

## 4.21 Make up sentences using the gerund. Translate them.

**Model:** Consider the possibility / send him a fax.
**– Consider the possibility of sending him a fax.**

1. What is their method / solve these problems?
2. I don't approve / you walk in the forest late.

3. Don't worry / he is away from home, he'll find a good excuse / he stays with the Blakes.
4. We can rely / he keeps the promise.
5. I'm sorry / you were waiting. I had trouble / start the engine.

## 4.22 Identify the *-ing* forms (participle I or gerund) and translate the following sentences.

1. Coming home is joy.
2. He is coming back home at last.
3. He insists on coming home early.
4. He likes to sit and watch the coming people.
5. Having come home he saw a visitor.
6. On coming home he saw a visitor.
7. Our cat knows the way of coming back home.

## 4.23 Choose the correct form of the participle.

1. *Writing / Written* in Japanese the article was difficult to translate.
2. People *travelled / travelling* the world are more intelligent.
3. When *translated / translating* the text the students used a dictionary.
4. The Atlantic Ocean *washing / washed* Great Britain influence the climate of the country.
5. The River Severn *separated / separating* England and Wales is the longest in the UK.
6. The UK is a highly *developed / developing* country.
7. The British Parliament *consisted / consisting* of two Houses (the House of Lords and the House of Commons) limits the power of the Queen.
8. Lots of people *involved / involving* in financial, business and computer services work in trade and industry.
9. The variety of landscape, a long history and a rich mixture of peoples *living / lived* in the country make the image of Great Britain excited / exciting.
10. The City *being / been* the financial and business centre of London is very important for the economy of the whole country.

## 4.24 Choose the right variant and translate the sentences. Pay attention to the functions of the gerund and participle I.

1. While **playing t**ennis, be sure you hold the racket in the right way.
   a) Игра b) Играя c) Играющий
2. **Measuring** temperature is necessary in many experiments.
   a) Измеряя b) Измерение c) Измеряющий
3. **Making** this experiment they came across some very interesting phenomena.
   a) Проводя b) Проведение c) Проводящий
4. **Solving** such problems helps us greatly.
   a) Решая b) Решающий c) Решение
5. **Applying** the method we get better results.
   a) Применение b) Применяя c) Применяющий
6. **Saving** your work on a computer is of great importance.
   a) Сохраняя b) Сохраняющий c) Сохранение
7. When **crossing** the street in London, look first to the right, then to the left.
   a) Переходящий b) Переход c) Переходя
8. Dr. Hovard's **consulting** was very important for me.
   a) Консультация b) Консультируя c) Консультирующий
9. While **studying** at university he received grants.
   a) Обучающий b) Обучение c) Учась
10. The engineer insisted on **experimenting** as the best method to solve this problem.
    a) эксперимент b) экспериментируя c) экспериментальный

## 4.25 Choose the right variant.

1. There are good reasons for … a compromise.
   a) made b) make c) making
2. … the car radar the engineers started complex tests.
   a) having designed b) designing c) designed

3. The basic job of computers is … of information.
   a) processing b) being processed c) process
4. … in pencil the article was difficult to read.
   a) writing b) write c) written
5. All components … for a computer are included on a single chip.
   a) needed b) need c) needing
6. Some people insist on … this question in the conference program.
   a) included b) including c) having included
7. The device … in our laboratory will be used in industry.
   a) made b) make c) making
8. … information about this technique may be obtained from a computer.
   a) detailing b) detail c) detailed
9. … the energy of the atom we produce electric energy at atomic power plants.
   a) use b) using c) used
10. … English is necessary for every engineer.
   a) reading b) having read c) of reading

## 4.26 Use the right infinitive form (active or passive), as in the model. Translate the sentences.

**Model 1:** I'd like **to go** home early today. (*go* – simple active)
**Model 2:** He expected **to be met** by Helen at the station. (*meet* – simple passive)

1. Howard wants … Spanish. (*to teach* – simple active)
2. Arthur expected … a good job. (*to offer* – simple passive)
3. The child liked … . (*to read* – simple passive )
4. The child likes … . (*to read* – simple active)
5. I am sorry … you. (*to disturb* – perfect active)
6. I am glad … them. (*to invite* – perfect active)
7. I am glad … . (*to invite* – perfect passive)
8. He hoped … (*to listen* – simple passive)
9. He doesn't like … people. (*to criticize* – simple active)
10. He doesn't like … . (*to criticize* – simple passive)

## 4.27 Choose the best translation.

1. Он будет счастлив посетить Эрмитаж.
   a) He will be happy to have visited the Hermitage.
   b) He will be happy to visit the Hermitage.
2. Я очень рада, что сумела помочь Вам.
   a) I am glad to have helped you.
   b) I am glad to help you.
3. Простите, что беспокою Вас.
   a) I'm sorry to trouble you.
   b) I'm sorry to have troubled you.
4. Мы надеемся встретить его на конференции.
   a) We hope to have met him at the conference.
   b) We hope to meet him at the conference.
5. Кажется, он сейчас спит.
   a) He seems to sleep.
   b) He seems to be sleeping.
6. Я считаю, что стал хорошим инженером.
   a) I consider to be a good engineer.
   b) I consider to have been a good engineer.
7. Она рада, что ей предложили эту работу.
   a) She is glad to have offered this job.
   b) She is glad to have been offered this job.
8. Роберт гордится тем, что работает с мистером Смитом.
   a) Robert is proud to have worked with Mr. Smith.
   b) Robert is proud to work with Mr. Smith.
9. Вальтер сожалел, что принял приглашение.
   a) Walter was sorry to have accepted the invitation.
   b) Walter was sorry to accept the invitation.
10. Вам жаль, что вы уходите так рано?
    a) Are you sorry to leave so early?
    b) Are you sorry to have left so early?

# Unit 5 THE UNITED STATES OF AMERICA

**Text A The United States of America**
**Text B Washington**
**Grammar: Revising Verbal Constructions**

## Text A

## THE UNITED STATES OF AMERICA

***Pretext exercises***

### 5.1 Read the following words and try to guess their meaning.

Occupy, central, peak, climate, natural, mineral, resources, metal, special, economy, economic, federal, the Vice-President, the Cabinet, the Congress, the Senate, senator, veto, dispute, political factor, official, national, symbol, statue, industry, industrial, automobile, electrical, electronic, machinery, mechanic, mass production, corporation, sanction, partner, investment.

### 5.2 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| Michigan | [ˈmɪʃɪgən] | textile | [ˈtekstaɪl] |
| Rio Grande | [ˈriːəʊ grænd] | fuel | [fjʊəl] |
| Ontario | [ɒnˈteərɪəʊ] | pearl | [pɜːl] |
| Missouri | [mɪˈzʊərɪ] | precious | [ˈpreʃəs] |
| Cordillera | [kɔːdɪlˈje(ə)rə] | dispute | [dɪsˈpjuːt] |
| Houston | [ˈhjuːstən] | statue | [ˈstætʃuː] |
| Chicago | [ʃɪˈkɑːgəʊ] | foreseeable | [fɔːˈsiːəbl] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **to occupy** | *занимать* | **a bill** | *законопроект* |
| **to stretch** | *простираться* | **majority vote** | *большинство голосов* |
| **to cover** | *охватывать* | **term of office** | *срок полномочий* |
| **to border on** | *граничить с* | **to appoint** | *назначать* |

| | | | |
|---|---|---|---|
| **according to** | *согласно чему-либо, в соответствии с* | **to settle** | *урегулировать, улаживать* |
| **the powers** | *власть, полномочия* | **dispute** | *спорный вопрос, разногласия* |
| **to divide into** | *делить на* | **to contradict** | *противоречить* |
| **to represent** | *представлять* | **nearly** | *приблизительно, примерно, почти* |
| **to elect** | *избирать* | **currently** | *в настоящее время* |
| **to make a law** | *написать закон* | **aircraft** | *авиационная техника* |
| **to pass a law** | *принять закон* | **to remain** | *оставаться, сохраняться* |
| **to veto** | *запретить, наложить вето* | **ties** | *связи* |
| **agriculture** | *сельское хозяйство* | **despite** | *несмотря на* |

## 5.3 Complete the sentences with the words and expressions given above.

1. The USA … the central part of the North American continent.
2. The southwest United States generally … from the Ohio River to south includes wet forests.
3. Which countries does the USA … on?
4. The main industrial branches are …, rocket, automobile, electronics, and others.
5. Americans are made up of … all races and nations.
6. … the US Constitution the president of the country serves a four-year term and may be … no more than twice.
7. Your long … of … will be forever be inscribed in the annals of our community.
8. All states and their residents are … in the federal Congress consisted of the Senate and the House of Representatives.
9. Federal courts decide cases including federal law, … between citizens and different states.
10. For a … becomes a law it must be read, studied in committees, and commented on in the Senate.

11. If the bill … it is sent to the other house to be studied and commented on.
12. To overcome the President's … the bill must get a 2/3 … in each chamber.

## 5.4 Read the text.

### THE UNITED STATES OF AMERICA

The United States of America is the 4th largest country in the world after Russia, Canada and China. The country occupies the central part of North America. It stretches from the Pacific to the Atlantic Ocean. The total area of the USA (including the D.C.) is over 9.8 million square kilometers. Inland waters cover 507,788 square kilometers.

The country borders on Canada in the north and Mexico in the south. It also has a territorial water border with Russia in the northwest. The five Great Lakes are located in the north-central portion of the USA, four of them forming part of the border with Canada. Lake Ontario, Lake Michigan, and the Great Lakes on the border with Canada are the largest and deepest in the country. The longest rivers are the Mississippi, the Missouri, the Columbia, and the Rio Grande. The highest mountains are the Rocky Mountains, the Sierra Nevada, and the Cordillera. The highest peak, Mount McKinley, is in Alaska. Due to its large size and wide range of geographical features, the United States contains examples of nearly every global climate. The country has rich deposits of coal, oil, iron, copper, silver, natural gas, uranium, and nonferrous metals.

The USA is made up of 50 states (including Hawaii and Alaska) and the District of Columbia, a special area where the capital of the country is situated. The states differ in size, population, and economic development. Each state has its own capital. There are many large cities in the country: New York, Los Angeles, Chicago, Philadelphia, Detroit, San Francisco, Boston, Houston, and some others.

The USA is a federal state headed by the President. According to the US Constitution the powers of the Government are divided into three branches: legislative, executive, and judicial.

The legislative branch of the Government, or the Congress, represents all the American states. The Congress consists of two parts: the House of Representatives and the Senate. Each state has two senators, who are elected every six years. A senator must be at least 30 years old, a citizen of the USA for nine years, and live in the state. The job of the Congress is to make laws. The President can veto a bill but the Congress can pass the law if it gets a two-thirds majority vote.

The executive branch of the Government consists of the President, the Vice-President, and the Cabinet. The President's term of office is four years, together with the Vice-President, chosen for the same term. The President is the head of the executive branch of the government, he appoints the Cabinet.

The judicial branch of the government is headed by the Supreme Court which settles disputes between the states and may veto any law of the Congress if it contradicts the Constitution of the USA. Federal judges are appointed by the President for life.

There are several political parties in the USA, the Republican and the Democratic being the largest of them.

The population of the country is nearly 329 million people of nearly all races and nations. The official language is English. The US national flag – "Stars and Stripes" – is red, white, and blue. Thirteen stripes represent 13 original English colonies which in 1776 became independent of England; the fifty stars represent the current number of states. One of the most famous symbols of the USA is the Statue of Liberty situated in New York on Liberty Island.

The USA is a highly developed industrial and agricultural country. Currently, its economy has the highest GDP in the world ($16 trillion dollars – 22% of world GDP). The leading fields of the US industry are aircraft and spacecraft, electronics, automobile and machine building, shipbuilding, radio-engineering, textile, and many others. The country exports electrical and electronic equipment, machinery, planes, mineral fuel (including oil), plastics, pearl, precious stones, metals and coins, meat, fruits, nuts, and etc. More than 20 million people are involved in agriculture. A large portion of the country's agricultural products are grown in the Great Plains.

The USA is home to such large companies as General Motors, Ford, Chrysler, Coca Cola, Apple, Microsoft, Facebook, and Google. Automotive building is a national branch of industry with its capital in the city of Detroit (Michigan). It was there that self-taught mechanic Henry Ford used to test a homemade car. Then he was the first to start mass production of cheap cars. Since then, "Ford Motors" has been one of the largest corporations in the world.

Despite sanctions, "the cold war", and other political factors, the United States is and will remain an important economic partner for Russia for the foreseeable future. The true volume of trade and especially investment ties could be several times larger than official statistics indicate and it would appear that the United States is among Russia's top five trade and economic partners.

***Notes to the text***

| | |
|---|---|
| **the Congress** | *Конгресс США, законодательный орган, один из трёх высших федеральных органов государственной власти* |
| **the Senate** | *Сенат (одна из палат Конгресса США)* |
| **the House of Representatives** | *палата представителей (одна из палат Конгресса США)* |
| **the Cabinet** | *кабинет министров (руководящая группа министров, определяющая общую политическую стратегию администрации или консультирующая по этому вопросу президента)* |
| **GDP (Gross Development Product)** | *валовой внутренний продукт* |
| **the Great Plains** | *Великие Равнины (предгорное плато в США и Канаде высотой 700–1800 м над уровнем моря)* |

## 5.5 Match the words with similar meaning.

| | |
|---|---|
| 1. corporation | a) to extend |
| 2. investment | b) manufacturing |
| 3. to stretch | c) freedom |
| 4. to elect | d) resident |
| 5. peak | e) valuable |
| 6. resources | f) real |
| 7. liberty | g) company |
| 8. true | h) aviation |
| 9. citizen | i) deposits |
| 10. aircraft | j) contribution |
| 11. precious | k) to choose |
| 12. production | l) mountain top |

## 5.6 Match the words with their Russian equivalents.

| | |
|---|---|
| 1. range | a) черный металл |
| 2. inland | b) серебро |
| 3. iron | c) судья |
| 4. nonferrous metals | d) число, количество |
| 5. deposit | e) товар, продукция |
| 6. products | f) законодательная власть |
| 7. a judge | g) судебная власть |
| 8. pearl | h) законопроект |
| 9. number | i) цветные металлы |
| 10. a bill | j) внутренний |
| 11. silver | k) жемчуг |
| 12. legislative power | l) месторождение |
| 13. executive power | m) полоса |
| 14. judicial power | n) исполнительная власть |
| 15. a stripe | o) многообразие, объем |

## 5.7 Read the following statements and decide if they are true (T) or false (F).

1. Canada and Mexico are the two neighboring countries of the USA.
2. The Great Lakes are the deepest in the world.
3. The USA is rich in natural and mineral resources.

4. There are 48 states in the USA.
5. The US is one of the largest countries in the world.
6. The Congress of the United States consists of the Senate and the House of Commons.
7. The Democratic and Republican Parties are the two dominant parties in the US policy.
8. There are fifteen stars on the US flag.
9. The fifty stars on the US flag represent all the former English colonies.
10. The President of the country is elected every five years.
11. Very few people are involved in US agriculture.
12. Russia and the USA have never been partners in the field of trade and economy.

## 5.8 Answer the questions on the text "The USA".

1. Is the United States a very large country? What is its total area?
2. Which countries does the USA border on?
3. What is the climate of the country like? Why is it so various?
4. Where are the Great Lakes located?
5. What rivers are the longest?
6. How many states does the USA consist of? What is the "DC"?
7. Who is the head of the state?
8. How many parts does the Federal Government consist of? What are they?
9. What is the job of the Congress? How many houses are there?
10. How does the Supreme Court act?
11. Who is the President of the USA at the moment?
12. What political parties are dominant in the USA?
13. What are the national symbols of the country?
14. How is the flag of the US called? Why?
15. What are the leading fields of US economy and agriculture?
16. What are the prospects of cooperation between Russia and the United States?

## 5.9 Remember these facts from the history of the USA and complete the sentences.

1. The names of three Columbus's ships were … .
2. The first holiday celebrated by American colonies was … .
3. The Pilgrims came to America for … .
4. The name of the Pilgrims' ship was … .
5. The traditional food on Thanksgiving Day is … .
6. 50 stars and 13 stripes on the flag of the USA mean … .
7. The first American president was … .
8. 1600 Pennsylvania Avenue, Washington, is the address of … where the President lives and works.
9. One of the most famous symbols of the USA is … .
10. The country presented the Statue of Liberty to the USA was … .
11. The longest river of the country is … .
12. One of the best universities of the USA is … .
13. The street in New York where the most theatres are located is … .
14. The most popular sport in the USA is … .
15. The best animated cartoons were created by … .
16. English is used as a native language in … .

## 5.10 Read the story and decide if the sentences below are true or false.

The word "dollar" has German origin and is much older than the USA and its currency. In 1516 in Bohemia, in a place called "Joachimsthalers" (which means "Joachim's valley" – today the town of Joachimsthal lies within the borders of the Czech Republic) a silver mine was opened and they started to produce coins known as "Joachimsthalers". This long word was soon shortened to "thalers" and called "dalers" by the Dutch. The English changed this word to "dollar" and began to use it when speaking of any large foreign silver coin. In North America, for instance, English settlers referred to the Spanish piece of eight reals as the "Spanish dollar".

Later on, the English version of the name 'dollar" was also applied to similar coins, not only ones minted in central Europe but also the Spanish peso and the Portuguese eight-real piece. Both these large silver coins were practically identical in weight and fineness. Those coins,

particularly the Spanish peso or dollar, circulated widely in Britain's North American colonies because of the shortage of official British coins. Thus, after the United States gained its independence the new nation chose "dollar" as the name for its currency instead of keeping the pound.

***Notes to the text***

| | |
|---|---|
| **Bohemia** | *Богемия, Чехия* |
| **a mine** | *рудник* |
| **the Dutch** | *голландцы* |
| **real, peso, pound** | *реал, песо, фунт* |
| **to mint** | *чеканить* |
| **a piece (coin)** | *монета* |
| **fineness** | *проба* |
| **shortage** | *недостаток, отсутствие* |
| **to gain** | *получить, добиться* |
| **currency** | *деньги, валюта* |

1. The word 'dollar' comes from Portugal.
2. The word 'thaler' is connected with a certain place name.
3. The Dutch brought German thalers to Britain.
4. In English the word "dollar" was at first used to describe any silver coin.
5. Both Spanish peso and Portuguese real were made of gold of the same fineness.
6. At first the USA didn't have any currency of its own.
7. After achieving independence Americans decided to keep pound which is now their national currency.

## 5.11 Read the text and answer the following questions.

In 1770s the Boston tea party was one of the most important events leading to the American revolution. Tea was a very popular drink in the American colonies. All the tea shipped to the American colonies from Great Britain was taxed. The tax was imposed without consulting the colony's representatives in the British Parliament. That unfair tax became the cause for the revolution. "No taxation without representation" became a popular slogan of the time.

In the 1770s Boston was full of patriotic merchants who denounced the tea tax. They formed a group called “The sons of freedom”. In 1773 many of those sons of freedom disguised themselves, went to Boston Harbour and boarded the ships loaded with the tea packs. They threw more than 300 tea chests filled with tea into the ocean. That action became widely known as “The Boston tea party”. Great Britain was so angry with the city of Boston that it closed the port. That punishment only made the other colonies resist Great Britain more. They all decided to stop buying British goods and their boycott was one of the causes of the War for Independence from Britain.

1. Why did colonies refuse to pay the tea tax?
2. What was the popular slogan of that time?
3. What was the group “the Sons of freedom”?
4. What did they do?
5. What was Great Britain's reaction?
6. How did the other American colonies act?

# Text B

# WASHINGTON, D.C.

***Pretext exercises***

## 5.12 Read the following words and try to guess their meaning.

Abbreviation, form, subtropical, climate zone, centre, finance, industry, federal, population, administrative machine, process, public, organization, tourism, planned, architecture, monument, memorial.

## 5.13 Read the following words and mind their pronunciation.

| | | | |
|---|---|---|---|
| abbreviation | [əbriːvɪˈeɪʃn] | honour | [ˈɒnə] |
| architecture | [ˈɑːkɪtekʧə] | sightseeing | [ˈsaɪtsiːɪŋ] |
| finance | [faɪˈnæns] | Christopher | [ˈkrɪstəfə ] |
| foreign | [ˈfɒrɪn] | Columbus | [kəˈlʌmbəs] |
| bureau | [ˈbjʊ(ə)rəʊ] | wheat | [wiːt] |

***Memorize the following words and expressions***

| | | | |
|---|---|---|---|
| **abbreviation** | *сокращение* | **to estimate** | *подсчитывать, оценивать* |
| **humid (humidity)** | *влажный (влажность)* | **to be related to** | *относиться к* |
| **chilly** | *прохладный, холодный* | **to host** | *принимать, размещать(ся)* |
| **cattle** | *крупный рогатый скот* | **embassy** | *посольство* |
| **cotton** | *хлопок* | **to go sightseeing** | *осматривать достопримечательности* |
| **to vary** | *разнообразить, отличаться* | **to attract** | *привлекать* |

## 5.14 Complete the sentences with the words and expressions given above.

1. Now, just at present, though the days are quite …, the evenings are quite … .
2. This man is one of the secretaries of the Republican … at Paris who made a trip to London to meet people of the American Red Cross.
3. Jan Oort (a Dutch astronomer) was also the first to correctly … the distance between the sun and the centre of our galaxy.
4. … prices are dropping.
5. She told that she wanted to stay in Chicago as long as possible, but they must arrange things so as not to … attention.
6. We'll go … if we stay in New York for a few days.

## 5.15 Read the text.

### WASHINGTON, D.C.

The capital of the United States of America is Washington, D.C. The city itself forms the District of Columbia abbreviated into D.C. The District was named in honour of Christopher Columbus, the discoverer of America.

The name of the capital is always used with this abbreviation not to be mixed up with another Washington, a state on the Pacific Coast. The city

was named after the first President of the USA George Washington who chose the place for the capital between the states of Virginia and Maryland not far from the Potomac River.

Washington, D.C. is in the northern part of the humid subtropical climate zone. Winters are usually chilly with light snow, and summers are hot and humid.

Washington is like no any other city in the USA. If New York is a centre of finance, shopping and fun, Chicago sells wheat and cattle, New Orleans deals with cotton, Washington's only industry is government. All three branches of the US federal government are centered in the District: the Congress (legislative), the President (executive), and the Supreme Court (judicial). The White House where the US President lives and works, the Capitol, where the US Congress meets, and the Supreme Court are all in Washington, D.C. Not far from the Capitol is the Library of Congress. It holds five million books.

The US Census Bureau estimates that the District's population was 705, 749 in July, 2019. About three-quarters of the population in Washington, D.C. are involved in the administrative machine and the general process of government. The District also has growing industries not directly related to government, especially in the area of education, finance, public policy, and scientific research. The city hosts nearly 200 foreign embassies and international organizations such as the World Bank, the International Monetary Fund (IMF), the Organization of American States, the Inter-American Development Bank, the Pan American Health Organization, and the American Red Cross.

Tourism is Washington's second largest industry. Washington, D.C. is not the largest city in the USA but it is one of the most beautiful and unusual cities in the country, the first carefully planned capital in the world. The city is quite new as it was founded in 1791.The architecture of Washington varies greatly. It is one of the most visited cities in the world, with more than 20 million tourists annually. If you go sightseeing your attention will be attracted not only by such famous buildings as the Capitol and the White House, but also by the Washington Monument, the Lincoln Memorial, the Thomas Jefferson memorial, and others.

***Notes to the text***

| | |
|---|---|
| **to meet** | *зд. заседать* |
| **the US Census Bureau** | *бюро переписи населения США* |
| **the Capitol** | *Капитолий, конгресс США* |
| **the Supreme Court** | *Верховный суд* |
| **the International Monetary Fund (IMF)** | *Международный Валютный Фонд* |
| **the Inter-American Development Bank** | *Межамериканский Банк Развития* |
| **the Pan American Health Organization** | *организация здравоохранения Пан-Американ* |

## 5.16 Match the words with similar meaning.

| | |
|---|---|
| 1. abbreviation | a) to count |
| 2. humid | b) memorial |
| 3. chilly | c) every year |
| 4. to estimate | d) money |
| 5. to vary | e) sphere |
| 6. go sightseeing | f) acronym |
| 7. to form | g) to differ |
| 8. monument | h) see the sights |
| 9. finance | i) to develop |
| 10. greatly | j) cold |
| 11. area | k) much |
| 12. annually | l) wet |

## 5.17 Match the words with their Russian equivalents.

| | |
|---|---|
| 1. government | a) оценивать |
| 2. to mix up | b) пшеница |
| 3. to choose | c) посольство |
| 4. to deal with | d) значительно |
| 5. to host | e) связанный с |
| 6. annually | f) содержать, владеть |
| 7. to estimate | g) развлечения |
| 8. greatly | h) влажный |
| 9. related to | i) отличаться |
| 10. fun | j) выбирать |
| 11. to vary | k) заниматься, иметь дело с |

| | |
|---|---|
| 12. wheat | l) государственная власть, управление |
| 13. humid | m) ежегодно |
| 14. embassy | n) перепутать |
| 15. to hold | o) размещать, принимать |

## 5.18 Read the following statements and decide if they are true (T) or false (F).

1. Washington, D.C. is one of the largest cities in the world.
2. It was the first US President who found the place for the capital.
3. The District of Columbia was named after one of the American presidents.
4. The city of Washington lies in the state with the same name.
5. Chicago and New Orleans deal with cattle breeding and cotton growing.
6. The executive branch of power is represented by the system of courts.
7. Embassies from almost all countries are located in Washington, D.C.
8. Washington can't be called a tourist attraction.
9. The capital is famous for its unusual architecture.
10. Most residents of Washington, D.C. are involved in government.

## 5.19 Answer the questions on the text "Washington, D.C.".

1. Is Washington situated in the state of Washington?
2. Who chose the place for the capital?
3. Was the city founded in 1871?
4. What is the climate of the US capital like?
5. Which industry do the residents of Washington mostly deal with? Why?
6. What other industries are found in the city?
7. Why is Washington, D.C. called one of the most visited cities?
8. What is unusual in Washington's architecture?
9. What famous buildings are located in the city?
10. What's the Library of Congress known for?

## New York City

### 5.20 Watch the video and do the quiz.

1. New York is often referred to as … .
   a) New Amsterdam
   b) the Big Apple
   c) Manhattan
2. New York's financial centre is … .
   a) Broadway
   b) Times Square
   c) Wall Street
3. The largest city in the United States in terms of population is New York.
   a) true
   b) false
4. When was the World Trade Centre attacked and destroyed?
   a) 11 September
   b) 9 September
   c) 11 November
5. Most Broadway theatres are located in and around Times Square in New York.
   a) true
   b) false
6. Which of the following is not true?
   a) New York is the financial and media capital of the USA.
   b) New York is the headquarters of the United Nations.
   c) New York is the capital of the USA.
7. How many people live in New York?
   a) around 3 million
   b) around 5 million
   c) around 8 million
8. In the song entitled "New York, New York", New York is called … .
   a) the city that never eats

b) the city that never sleeps
c) the city that never dances

9. What is the name of New York's rapid transit system?
   a) the Subway
   b) the Underground
   c) the Metropolitan
10. New York is located in … .
    a) the north-west region of the USA
    b) the north-east region of the USA
    c) south-west of the USA

## 5.20 Watch the video again and choose the correct answer.

| | |
|---|---|
| 1. 9/11 Memorial and Museum | a) Its permanent collection contains over two million paintings and sculptures from nearly all European and American masters. |
| 2. The Skyscraper Museum | b) it is one of the most visited places on the corner of Broadway and 7th Avenue, the heart of the New York Theatre District. |
| 3. Museum of Modern Art (MoMA) | c) the financial heart of the USA and the most important banking centre of the USA. |
| 4. Solomon R. Guggenheim Museum | d) expression of freedom to people all over the world. |
| 5. Metropolitan Museum of Art | e) it is one of the most impressive and tall skyscrapers ever created. |
| 6. Central Park | f) this museum contains extraordinary exhibitions and the world's finest collection of modern and contemporary art. |
| 7. Empire State Building | g) it is the most known centre of retail world with famous department stores and wonderful jewelry shops. |
| 8. Statue of Liberty | h) through exhibitions, publications and programs, this museum explores tall buildings as objects of design, technology, construction and real investments. |

9. Fifth Avenue — i) both the outdoor memorial and accompanying museum with two man-made waterfalls designed by Michael Arad in commemoration of nearly 3,000 victims who lost their lives during the terrorist attacks in 1993.
10. Wall Street — j) millions of visitors come here to gawk at its spiraling rotunda and see its art shows and collection which includes more than 6,000 paintings of impressionists, postimpressionists and abstractionists.
11. Times Square — k) a place with beautiful fountains, sculptures, meadows and lakes , where New Yorkers come to have rest, relax and express themselves.

## GRAMMAR

## Revising Verbal Constructions

### 5.21 Read the sentences and then write other sentences with the same meaning.

Model: *It is believed* that the wanted man is living in New York.
The wanted man *is believed* to be living in New York.

1. It is considered that Mr. Hardy is a very good mechanic.
2. It is reported that three people were seriously injured in the accident.
3. It is thought that people use this road very often.
4. It is said that the film is very exciting.
5. It is known that the President approves the new law.
6. It is expected that he will become a good specialist.
7. It is supposed that the delegation will arrive on Thursday.
8. It is believed that Mr. Huxley knows five languages.

9. It was reported that fifteen planes were taking part in the operation.
10. It was said that Dr. Storm had realized his plans in time.

## 5.22 Translate the following sentences paying attention to the complex subject.

1. The letter is expected to be delivered on Saturday.
2. Our head engineer was known to have made an important discovery.
3. Victoria was thought to be rather selfish.
4. Mr. Johnson is considered to be an experienced lawyer.
5. The conference was announced to have started its work.
6. Margaret was heard to argue with the manager.
7. English is known to have adopted a lot of French words.
8. Mr. Russel is believed to have lived in Sweden for over ten years.
9. Mr. Hook was believed to be living in Holland.
10. The task was understood to have been solved correctly.
11. He is said to be working at his report.
12. The boy was seen to help an old woman.

## 5.23 Open the brackets using complex object.

1. I want (she, be) my friend.
2. They would like (we, learn) English.
3. Do you want (they, stay) at a hotel?
4. We expect (they, arrive) at 6 p.m.
5. The students found (the lecture, be) boring.
6. The teacher watched ( the students, write) the test.
7. My friend's parents know (I, enter) the University.

## 5.24 Make sentences with complex object.

| | | |
|---|---|---|
| I would like | you | to forget it. |
| She wants | me | to remember that. |
| They expect | the nurse | to take care of the children. |
| He ordered | the proposal | to tell the truth. |
| The student | the facts | to be proved. |

| | | |
|---|---|---|
| The teacher saw | everybody | make the same mistake. |
| Do you want | | to be adopted. |
| | | to do his duty. |
| | | to hurry. |
| | | to sign the paper. |

## 5.25 Translate the following sentences paying attention to the infinitive construction with *for*.

1. It's important for the researchers to do their work in time.
2. It takes more time for the reaction to complete at low temperature.
3. It is impossible for the driver to stop the car at such a high speed quickly.
4. The problem I spoke to you about is too difficult for the designers to solve it in a year or two.
5. Here is one more important point for the speaker to explain.
6. Two hours were sufficient for the reaction to occur.
7. There is a tendency for the method to be used in all the experiments.
8. It took a long time for mathematicians to realize that not all continuous functions have a derivative.
9. A computer is a suitable machine for them to use in their research work.
10. This is required for the document to be signed.

# PROFESSIONAL READING

# Text 1

## WHAT ARE TELECOMMUNICATIONS?

Telecommunications, also called telecommunication, is the exchange of information over significant distances by electronic means. A complete, single telecommunications circuit consists of two stations, each equipped with a transmitter and a receiver. The transmitter and receiver at any station may be combined into a single device called a transceiver. The medium of signal transmission can be electrical wire or cable (also known as "copper"), optical fiber or electromagnetic fields. The free-space transmission and reception of data by means of electromagnetic fields is called wireless.

The simplest form of telecommunications takes place between two stations. However, it is common for multiple transmitting and receiving stations to exchange data among themselves. Such an arrangement is called a telecommunications network. The Internet is the largest example. On a smaller scale, examples include:

– corporate and academic wide-area networks (WANs);
– telephone networks;
– police and fire communications systems;
– taxicab dispatch networks;
– groups of amateur radio operators.

Data is conveyed in a telecommunications circuit by means of an electrical signal called the carrier or carrier wave. In order for a carrier to convey information, some form of modulation is required. The mode of modulation can be broadly categorized as either analog or digital. In analog modulation, some aspect of the carrier is varied in a continuous fashion. The oldest form of analog modulation is amplitude modulation (AM), still used in radio broadcasting at some frequencies. Digital modulation actually predates analog modulation; the earliest form was Morse code. During the 1990s, dozens of new forms of modulation were developed and deployed, particularly during the so-called "digital revolution" when the use of computers among ordinary citizens became widespread.

In some contexts, a broadcast network, consisting of a single transmitting station and multiple receive-only stations, is considered a form of telecommunications. Radio and television broadcasting are the most common examples.

Telecommunications and broadcasting worldwide are overseen by the International Telecommunication Union (ITU), an agency of the United Nations (UN) with headquarters in Geneva, Switzerland. Most countries have their own agencies that enforce telecommunications regulations formulated by their governments.

## 1.1 Match the English terms with their definitions.

| | |
|---|---|
| 1. transceiver | a) a term used to describe telecommunications in which electromagnetic waves (rather than some form of wire) carry the signal over part or all of the communication path |
| 2. wireless | b) a series of points or nodes interconnected by communication paths |
| 3. modulation | c) a method of sending text messages by keying in a series of electronic pulses, usually represented as a short pulse (called a “dot”) and a long pulse (a “dash”) |
| 4. network | d) a combination of transmitter/receiver in a single package |
| 5. amateur radio | e) the addition of information to an electronic or optical carrier signal |
| 6. Morse code | f) a hobby enjoyed by several hundred thousand people in the United States and by over a million people worldwide a hobby enjoyed by several hundred thousand people in the United States and by over a million people worldwide |

## 1.2 Match the words to make phrases (according to the text) and translate them.

| | |
|---|---|
| 1. electromagnetic | a) modulation |
| 2. signal | b) wave |
| 3. electrical | c) field |
| 4. optical | d) fiber |

| | |
|---|---|
| 5. amplitude | e) telecommunications regulations |
| 6. Morse | f) wire |
| 7. transmitting | g) transmission |
| 8. to convey | h) code |
| 9. to enforce | i) station |
| 10. carrier | j) information |

## 1.3 Match up the words which have a similar meaning.

| | |
|---|---|
| 1. combine | a) general |
| 2. predate | b) spread out |
| 3. deploy | c) join |
| 4. common | d) numerous |
| 5. multiple | e) precede |

## 1.4 Fill in the table according to the text.

| | |
|---|---|
| 1. Forms of the medium of signal transmission | |
| 2. Examples of telecommunications network | |
| 3. The oldest form of analog modulation | |
| 4. The earliest form of digital modulation | |
| 5. The most common forms of telecommunications | |
| 6. Organizations for overseeing telecommunications and broadcasting | |

## 1.5 Read the text again and answer the questions.

1. What is telecommunication?
2. What does a single telecommunications circuit consist of?
3. What kind of device are the transmitter and receiver combined into?
4. What is wireless (transmission and reception)?
5. Which network is the largest?
6. How is data in a telecommunication circuit conveyed?
7. How can the mode of modulation be broadly categorized?
8. When were dozens of new forms of modulation developed and deployed?

## 1.6 Read the following sentences and say whether they are true (T) or false (F).

1. Telecommunication is the exchange of information by electric means.
2. A complete, single telecommunications circuit consists of two stations, each equipped with a transmitter.
3. The transmitter and receiver at any station may be combined into a single device called a transceiver.
4. The medium of signal transmission can be electrical wire or cable (also known as “copper”), optical fiber or electromagnetic fields.
5. The free-space transmission and reception of data by means of electromagnetic fields is called wireless.
6. The simplest form of telecommunications takes place between three stations.
7. Internet is the largest telecommunications network.
8. Data is conveyed in a telecommunications circuit by means of an electronic signal.
9. The mode of modulation can be broadly categorized as either analog or digital.
10. Amplitude modulation (AM) is the earliest form of analog modulation.

# Text 2

# LAN vs WAN

Local area networks and wide area networks are essentially the same in many aspects. They only differ in the area that is covered by the network. LANs are networks that are limited to a small geographic location. The computers connected to the network could be in a single room, a few rooms, or spread out in an entire building. WANs, on the other hand, cover great distances and are not limited to a single location. The biggest and most popular example of a WAN is the internet, which spans the whole globe and has millions of computers connected to it.

LANs are very common nowadays, it is commonplace in a work environment and even at home. It is necessary to implement a local area network in order to connect multiple computers to the internet using a

single DSL line. With regard to speed, LAN usually operates at much higher rates compared to WAN. This is largely due to the proximity of the computers and the lack of congestion in most cases. It is common to experience up to 80 or 90 mbps in a LAN while achieving 10 to 20mbps is already a great achievement for WAN.

LAN can be more secure due to the fact that all the computers are within a specific area and are physically easier to secure. The data on a wide area network needs to pass across public phone lines in order to reach its intended destination. The data is then vulnerable to attack by anyone with the right skills to penetrate your network. Unlike LAN, there is just no physical way of securing it, that's why electronic features are the only defense structure in place.

Cost also varies greatly between the two. Deploying a LAN is relatively much easier and cheaper than a WAN. It wouldn't require more than the cables, some switches, and optionally, routers to those who want to connect to the internet. With WAN, the long distances that the data travels would need miles and miles of cabling, or in some cases satellites. Signal deterioration is also a very real problem for WANs, that's why repeaters are used at intervals to amplify or rebuild the original signal.
Summary:

– LAN covers a small area while WAN covers a significantly larger area.

– LAN speeds are also significantly faster than WAN.

– LAN is more secure than WAN.

– WAN is much more expensive to implement than LAN.

## 2.1 Match the English terms with their definitions.

| | | |
|---|---|---|
| 1. amplitude modulation | a) | a device or, in some cases, software in a computer, that determines the next network point to which a packet should be forwarded toward its destination |
| 2. local area network | b) | a device that channels incoming data from any of multiple input ports to the specific output port that will take the data toward its intended destination |
| 3. internet | c) | a method of impressing data onto an alternating-current carrier waveform |

4. switch d) a device that receives a digital signal on an electromagnetic or optical transmission medium and regenerates the signal along the next leg of the medium
5. router e) a worldwide system of computer networks
6. repeater f) a group of computers and associated devices that share a common communications line or wireless link to a server

## 2.2 Match up the words which have a similar meaning.

| | |
|---|---|
| 1. span | a) in respect of |
| 2. area | b) considerably |
| 3. implement | c) extend |
| 4. with regard to | d) defenseless |
| 5. rate | e) sputnik |
| 6. vulnerable | f) space |
| 7. satellite | g) put into operation |
| 8. significantly | h) speed |

## 2.3 Read the text again and answer the questions.

1. How do LANs and WANs differ according to their geographic location?
2. What is the biggest and most popular example of a WAN?
3. What should be done in order to connect computers to the internet?
4. Which of the networks operates at higher rates: LAN or WAN?
5. Why can LAN be more secure than WAN?
6. Which of the networks is easier and cheaper to deploy and why?
7. What is a very real problem for WANs?
8. What are repeaters used for?

## 2.4 Read the following sentences and say whether they are true (T) or false (F).

1. LANs and wide WANs are very different in many aspects.
2. LANs are networks that are limited to a small geographic location.
3. WANs are not limited to a single location.

4. WAN usually operates at much higher rates compared to LAN.
5. LAN is much more expensive to implement than WAN.

## Text 3

## REMOTE CONTROL

The widespread use of television remote controls has turned people in coach potatoes. We can change channels, adjust the sound and the picture, and do a lot of other actions on the teletext systems with the push of a button.

A remote control is a device for controlling equipment from a short line-of-sight distance. This electronic device is used for operating the television set wirelessly. The remote control can be contracted to "remote" or "controller". Usually remote controls are consumer infrared (IR) devices used to command from a distance to televisions or other consumer electronics.

Most of modern remote controls communicate with their respective devices via IR signals and a few via radio signals. Television IR signals can be mimicked by a universal remote which is able to emulate the functionality of most major brand television remote controls. They are usually powered by small AAA or AA or sometimes A23 size batteries.
One of the earliest examples of remote control was developed in 1898 by Nicola Tesla. He demonstrated a radio-controlled boat to the public during an electrical exhibition in New-York. Tesla called his boat a "teleautomation". In 1903 Leonardo Torres Quevedo presented the "Telekino" at the Paris Academy of Science. The "Telekino" consisted of a robot that executed commands transmitted by electromagnetic waves. It meant the world's first apparatus for radio control and was a pioneer in the field of remote controls. The first remote controlled model aeroplane flew in 1932 and the use of remote control technology for military purposes was worked intensively during the Second World War.

The first remote which was intended to control a television was developed by Zenith Radio Corporation in 1950. The remote called "Lazy Bones" was connected to the television by a wire. A wireless remote control called the "Flashmatic" was developed in 1955. It worked

by shining a beam of light onto a special cell but the cell did not distinguish between light from the remote and light from other sources.
The "Flashmatic" also had to be pointed very precisely at the receiver in order to work. In the 1970s remote controls used ultrasonic tones.
A modern remote control contains keys and electronic components similar to those of a calculator. The keys are connected by wires which cross beneath each individual key. Pressing a key completes an electrical circuit and a signal is sent to a microchip which, in turn, sends a series of on-off electrical pulses to a light-emitting diode (LED) at the front of the handset. A code spelt out by the length and spacing of these pulses switches on the LED. The LED flashes on and off to send an infrared beam to the receiving 'eye" on the television set.

Since the first remote control there have been a lot of stages of its development. Nowadays the remote control is used in military, space, video games, photography and other fields of science.

***"Couch potatoes"*** are people who spend most of their time sitting on a couch (sofa) watching television.

## 3.1 Decide if the statements are true or false.

1. Couch potatoes are very useful vegetables.
2. A modern remote control looks like a calculator.
3. Remote controls are powered by solar energy.
4. A wireless handset was created in 1955.
5. A remote control is only used to change channels.
6. The first remote control was developed and demonstrated in 1988.
7. The controller called "Lazy Bones" was attached to the television by a wire.
8. The LED flashes on and off to send an ultraviolet beam to the receiving "eye" on the TV set.
9. The "Flashmatic" had to be pointed to very accurately at the receiver in order to work.
10. The Telekino robot executed commands transmitted by sound waves.

## 3.2 Answer the questions on the text.

1. What can you do using remote control?
2. How does a remote control work?
3. What consumer IR devices can work with remote controls?
4. How do modern remotes communicate with their respective devices?
5. What batteries do remote controls need?
6. How are modern remote controls used?
7. Is a remote control a useful device? Prove your answer.

## 3.3 Read paragraph 6 again and complete the gaps to show how a remote control works.

1. You press a key.
2. … .
3. A signal is sent to a microchip.
4. … .
5. These pulses switch on the LED.
6. … .

## 3.4 Match the words to make expressions. Translate them.

| | |
|---|---|
| 1. to shine | a) commands |
| 2. to change | b) and the picture |
| 3. to execute | c) channels |
| 4. respective | d) wirelessly |
| 5. to adjust the sound | e) the functionality |
| 6. to operate | f) a beam of light |
| 7. widespread | g) very precisely |
| 8. to be pointed | h) waves |
| 9. to emulate | i) devices |
| 10. electromagnetic | j) use |

## 3.5 Match the words with similar meaning.

| | |
|---|---|
| 1. precise | a) through |
| 2. field | b) to process |
| 3. via | c) to contain |
| 4. to operate | d) to regulate |
| 5. to emulate | e) accurate |
| 6. to consist | f) ray |
| 7. to adjust | g) to carry out |
| 8. to transmit | h) to imitate |
| 9. beam | i) to send |
| 10. to execute | j) sphere |

## 3.6 Match the words with opposite meaning.

| | |
|---|---|
| 1. to receive | a) darkness |
| 2. light | b) different |
| 3. push | c) short |
| 4. similar | d) to expand |
| 5. to complete | e) civil |
| 6. long | f) uselessness |
| 7. to contract | g) pull |
| 8. functionality | h) common |
| 9. military | i) to transmit |
| 10. individual | j) to start |

## 3.7 Translate the following word-groups.

Teletext system, line-of-sight distance, remote control technology, consumer electronics, brand television remote control, light-emitting diode, pulse switch, light beam, radio control, a remote controlled model aeroplane.

# Text 4

## HACKERS

The word “hacker” is derived from the verb “to hack through” that means “to break through”. The word combines two meanings: one negative – “hacker”, and the other – positive and is regarded as “master” or “expert”. While speaking about computers the verb “to hack” stands for two operations – to crack the system or to repair it. The idea of these both actions is the same – the mode, the computer and its programs work in.

The first hackers were the students of Massachusetts Institute of Technology (MIT). They were interested in creating innovative, stylistic, and technically clever circuits. During the spring of 1959 a new course was offered at MIT – a freshman programming class. Instead of creating a better circuit, hackers began to create a faster and more efficient program – with the least number of lines of code. Soon they formed a group and worked out the first set of hacker’s rules called the “Hacker’s Ethics”. The members of this group were engaged in writing and exchanging new programs and perfecting the hardware. They worked at MIT’s Artificial Intelligence laboratory and over the years introduced many innovations: LIFE – a game about survival; LISP – a new kind of programming language; the first computer chess game; the CAVE – the first computer adventure and SPACEWAR – the first video game.

There are four generations of hackers in the history of computer revolution. Each generation made its contribution to computer technology.

The first generation hackers came into being in the late 1960s – the early 1970s. They were university students of computer science departments. Using the time-sharing mode these hackers converted general-purpose computers (mainframes) into virtual personal ones.

The second generation hackers refer to the late 1970s. Their names are associated with the invention and production of personal computers. Following the Hacker’s Ethics they opposed the commercialism of the Internet by creating programs and making them available to everybody, the so-called “freeware” or “shareware”.

The third generation hackers appeared in the early 1990s. They created a lot of educational, application, and video games and programs for personal computers.

The present generation of hackers transformed the military Arpanet into a total digital world called the Internet.

But in the late 1990s the word ‘hacker’ began to associate with the word ‘cracker”. Today it refers to the people who intentionally crack the access control and penetrate into other people’s computers in unauthorized ways. Such hackers read private e-mails, steal confidential information, misappropriate and infect the computer programs. They cause great damage to economics, business, banking, and many other aspects of people’s relations. Moreover, it is unsettling to know that a great deal of computer crimes go undetected and a lot of computer criminals remain uncaught.

## 4.1 Choose a suitable title for the text.

1. Hackers and their role in information technology.
2. The four generations of hackers.
3. Computer revolution.

## 4.2 Read and translate the derivatives.

| | | | | |
|---|---|---|---|---|
| 1. | **to operate** | operation | operator | |
| 2. | **to program** | program | programming | programmer |
| 3. | **to create** | creating | created | creator |
| 4. | **to change** | to exchange | exchanging | changeable |
| 5. | **to innovate** | innovation | innovator | |
| 6. | **to contribute** | contribution | contributor | |
| 7. | **to produce** | production | productive | product |
| 8. | **to intend** | intention | intentional | intentionally |
| 9. | **technology** | technological | technologically | technologist |
| 10. | **technique** | technical | technically | technician |

## 4.3 Match the expressions with their Russian equivalents.

| | |
|---|---|
| 1. to crack the system | a) преступление, совершенное с помощью компьютера |
| 2. innovative circuit | b) прикладная программа |
| 3. freshman programming class | c) незаконно присвоить программу |
| 4. computer crime | d) причинять вред |
| 5. to misappropriate the program | e) взломать блок управления доступом |
| 6. computer science department | f) курс программирования для первокурсников |
| 7. to perfect the hardware | g) взломать систему |
| 8. application program | h) факультет вычислительной техники и ПО |
| 9. Artificial Intelligence laboratory | i) инновационная схема |
| 10. to crack the access control | j) ремонтировать систему |
| 11. to cause damage | k) совершенствовать комплектацию |
| 12. computer technology | l) лаборатория искусственного интеллекта |
| 13. to repair the system | m) компьютерные технологии |

## 4.4 Give the English equivalents.

| | |
|---|---|
| 1. набор правил | 8. работать в режиме |
| 2. персональный компьютер | 9. образовательная программа |
| 3. противостоять коммерциализации | 10. язык программирования |
| 4. бесплатное программное обеспечение | 11. конфиденциальная информация |
| 5. неправомочный путь | 12. электронное письмо |
| 6. бесплатное ПО | 13. режим разделения времени |
| 7. условно-бесплатное ПО | 14. обмениваться программами |

## 4.5 Match the words with similar meaning.

| | |
|---|---|
| 1. hacker | a) data |
| 2. to perfect | b) processing |
| 3. to misappropriate | c) improvement |
| 4. to convert | d) cracker |

| | |
|---|---|
| 5. efficient | e) equipment |
| 6. operation | f) manufacturing |
| 7. innovation | g) to steal |
| 8. production | h) to transform |
| 9. hardware | i) to improve |
| 10. information | j) productive |

## 4.6 Match the words with opposite meaning.

| | |
|---|---|
| 1. to combine | a) public |
| 2. negative | b) use |
| 3. a freshman | c) positive |
| 4. private | d) to contribute |
| 5. innovative | e) to separate |
| 6. damage | f) early |
| 7. to steal | g) out-of-date |
| 8. late | h) to repair |
| 9. to crack | i) a senior student |
| 10. clever | j) silly |

## 4.7 Decide if the statements are true or false.

1. Modern hackers are experts in repairing computers.
2. The first generation hackers created the Internet.
3. Creation, use and spreading harmful programs for PCs is a criminal offence.
4. The stylistic circuits of modern computers are the same as in 1960s.
5. Hackers have played an important role in the history of computer revolution.
6. The students of the first freshman programming class started with creating a better circuit.
7. The third generation hackers appeared in the early 1980s and they developed a lot of educational programs.
8. The first video game was introduced in the early 1960s.
9. Using the time-sharing mode the hackers transformed virtual PCs into general-purpose computers.
10. From the very beginning the aim of hackers was to steal private information.

## 4.8 Answer the questions on the text.

1. What is the origin of the word “hacker”?
2. What does the verb “to hack” mean?
3. What were the first hackers interested in?
4. How many generations of hackers are there in the history of computer revolution?
5. Did every generation contribute to computer technology? How?
6. What was the “Hacker’s Ethic”?
7. How do modern hackers cause damage to some aspects of people’s relations?
8. Is it possible to detect and punish computer criminals?

# Text 5

# SUPERCONDUCTIVITY

Superconductivity is a phenomenon observed in several metals and ceramic materials. When these materials are cooled to temperatures ranging from near absolute zero (0 degrees Kelvin, –273 degrees Celsius) to liquid nitrogen temperatures (77K, –196 C), their electrical resistance drops with a jump down to zero.

Superconductivity was once thought to be physically impossible. But in 1911 it was discovered by a Dutch physicist K.Onnes. He found the electrical resistivity of a mercury wire to disappear suddenly when cooled below a temperature of 4 Kelvin (–269 C). He also discovered that a superconducting material can be returned to its normal state either by passing a sufficiently large current through it or by applying a sufficiently strong magnetic field to it.

The temperature at which electrical resistance is zero is called the critical temperature and this temperature is a characteristic of such materials as zinc, mercury, tin and aluminium. Superconductivity can also occur in various metallic alloys and some heavily-doped semiconductors. Superconductivity does not occur in noble metals like gold and silver. The ceramic critical temperature is much higher than metal one. The value of the critical temperature is dependent on the current density and the magnetic field.

In a superconductor below its critical temperature there is no resistance and so superconducting materials can carry large amounts of electrical current for long periods of time without losing energy as heat. As a negatively-charged electron moves through the space between two rows of positively-charged atoms, it pulls inward on the atoms of the lattice. This distortion attracts a second electron to move in behind it. An electron in the matrix can interact with another electron.

The two electrons forming a weak attraction travel together in a pair and encounter less resistance. In a superconductor electron pairs are constantly forming, breaking and reforming flow with little or no resistance. The current is carried then by electrons moving in pairs called Cooper pairs. The second electron encounters less resistance, much like a passenger car following a truck on the motoway encounters less air resistance.

The future of superconductivity research is to find materials that can become superconductors at room temperature. Once this happens, the whole world of electronics will be revolutionized.

## 5.1 Match the words that have the similar meaning.

| | |
|---|---|
| 1. field | a) ordinary |
| 2. demands | b) result in |
| 3. use | c) enough |
| 4. get | d) change |
| 5. vary | e) apply |
| 6. lead | f) requirements |
| 7. common | g) obtain |
| 8. sufficient | h) sphere |

## 5.2 Match the words that have the opposite meaning.

| | |
|---|---|
| 1. easy | a) high |
| 2. conductor | b) huge |
| 3. below | c) solid |
| 4. low | d) above |
| 5. lose | e) difficult |
| 6. tiny | f) insulator |
| 7. liquid | g) find |

## 5.3 Choose the equivalents to the Russian words.

| | | | |
|---|---|---|---|
| 1. **проводимость** | conductive | conduction | conductor |
| 2. **сопротивление** | resistive | resistor | resistance |
| 3. **разнообразный** | variation | variable | variety |
| 4. **зависимость** | dependence | dependent | dependently |
| 5. **плотный** | density | dense | densely |
| 6. **двигаться** | motion | move | moving |
| 7. **взаимодействовать** | interact | interactive | interactivity |
| 8. **физик** | physics | physical | physicist |

## 5.4 Choose the appropriate word and fill in the blank with it.

1. The electrical resistance of some materials … down to zero.
   a) goes up b) drops c) changes
2. The critical temperature is the temperature at which electrical … is zero.
   a) resistance b) conductivity c) capacity
3. Superconductivity does not … in noble metals such as gold and silver.
   a) take part b) take off c) take place
4. If the large current … through the superconductor it returns to its normal state.
   a) is produced b) is passed c) is converted
5. The value of critical temperature depends on the … density and the magnetic field.
   a) voltage b) resistance c) current
6. Superconductors carry large amount of current for long periods of time without … energy as heat.
   a) losing b) getting c) producing
7. Electron pairs in a superconductor form, break and reform … with little or no resistance.
   a) variation b) conductor c) flow
8. Scientists try to find materials which can … superconductors at room temperature.
   a) change b) become c) attract

## 5.5 Find the words in the text that correspond to the following definitions.

1. the ability of a substance to prevent electricity from passing through it (para 1)
2. the overall physical condition of something (para 2)
3. to cause to have an effect, to use (para 2)
4. metal made by melting and mixing two or more metals (para 3)
5. to fail to keep or hold something wanted or valued (para 4)
6. a force that pulls something to something else (para 4)
7. to have or experience problems, difficulties (para 5)

## 5.6 Translate the following word combinations.

1. liquid nitrogen temperatures
2. sufficiently large current
3. magnetic field application
4. superconductivity theory development
5. useful superconductors quality
6. heavily-doped semiconductors
7. ceramic critical temperatures
8. critical temperature value
9. negatively-charged electron
10. strong electron interaction
11. high current density

## 5.7 Fill in the blanks with the following words.

| | | | | |
|---|---|---|---|---|
| **possible** | **discovery** | **lose** | **how** | **superconductors** |
| **production** | **unbelievable** | **continue** | **extremely** | |

In 1987 American physicist Paul Chu informed about sensational (1) ... he and his colleagues produced superconductivity at an 2 (...) before temperature 98K in a special ceramic material. At once in all leading laboratories throughout the world (3) … of critical temperature 100K and higher (that is, above the boiling temperature of liquid nitrogen) were obtained. Thus, potential technical uses of high temperature

superconductivity seemed to be (4) … and practical. Scientists have found a ceramic material that works at room temperature. But getting superconductors from the laboratory into (5) … will be no easy task. Some of them tend to break when produced, others (6) … their superconductivity within minutes or hours. All are (7) … difficult to fabricate into wires. Moreover, scientists lack a full understanding of (8) … ceramics become superconductors. This fact makes developing new substances largely a random process. It will (9) … until theorists give a fuller explanation of how superconductivity is produced in new materials.

## 5.8 Translate the sentences into English.

1. Достижения в области сверхпроводимости означают революцию в технологии и промышленности.
2. Явление сверхпроводимости было открыто голландским физиком в 1911 году.
3. Приложение сильного магнитного поля к сверхпроводнику возвращает его в нормальное состояние.
4. Представленная модель оказалась полезной для понимания электромагнитных свойств сверхпроводников.
5. Ученые сделали много открытий в области сверхпроводимости.
6. Они обнаружили, что металлокерамическое соединение становится сверхпроводником при температуре значительно выше 23К.
7. Голландский профессор считал, что свойства сверхпроводимости будут ценными и полезными, так как это позволит передавать электрические сигналы без потери энергии в проводах.
8. Разработка была слишком дорогой, чтобы использоваться для базовых исследований в области сверхпроводимости.

## 5.9 Answer the following questions.

1. What is superconductivity?
2. When is the electrical resistance of superconductors reduced to zero?

3. What did the Dutch physicist discover?
4. Can the superconducting materials return to their normal state? When?
5. Does the superconductivity take place in all the metals?
6. What does the value of critical temperature depend on?
7. Why can superconducting materials carry electric current for long periods of time?
8. What is the practical value of superconductivity?

## Text 6

## SUPERCONDUCTING DIPOLES

One of the world's first practical applications for high-temperature superconductors is a miniature dipole antenna developed at the University of Birmingham. Michael Mehler of the department of Electronic and electrical engineering has demonstrated in the laboratory an efficient dipole constructed from yttrium barium copper oxide ceramic material and operating at liquid nitrogen temperatures (77K).

Two obvious questions arise: why use superconductors when losses in conventional antennas aren't usually great and what's the practical value of an antenna if it has to be immersed into liquid?

The answers to both these questions have to do with the dipole size. There are many situations in which a full-size HF dipole, for example, would be out of place. Anything larger than a few tens of centimeters long would be difficult to accommodate on a fighter aircraft during its passage through the atmosphere. Scaling down a standard half-wave dipole or loop antenna to around a tenth of its normal size would thus be extremely advantageous.

Obviously it is not possible to get such a miniature antenna to radiate, though the losses under normal circumstances would be extremely large. Not only would the dipole impedance be very low it would have a large reactive component. Matching would be difficult and losses, even in a copper radiating element, would be high.

Attempts to circumvent resistive losses have been made in the past using conventional metallic superconductors operating at about 4K in liquid helium. Such attempts though successful have been unpractical and

prohibitively expensive for everyday applications. Mehler fabricated a 550MHz dipole a 20mm long from the new ceramic material. Surrounded be a glass dewar containing liquid nitrogen, the tiny assemble radiates just as well as full-size copper dipole.

As far as practicalities go, the ceramic dipole is connected to its RF source by means of wire wrapping and silver paint, no real problem. Nor is the refrigerant. Liquid nitrogen is cheap and readily available.
Michael Mehler is now refining the hardware and also developing other practical configurations such as loop antenna, *etc*.

## 6.1 Find the synonyms and translate them.

| | |
|---|---|
| 1. to understand | a) to improve |
| 2. antenna | b) environment |
| 3. to circumvent | c) to suit |
| 4. to refine | d) little |
| 5. surroundings | e) to overcome |
| 6. to match | f) conditions |
| 7. tiny | g) to diminish |
| 8. to happen | h) aerial |
| 9. circumstances | i) to comprehend |
| 10. to scale down | j) to occur |

## 6.2 Fill in the blanks with the following words.

| | | | | |
|---|---|---|---|---|
| **by means of** | **be out of place** | **to accommodate** | **liquid** | **copper** |
| **resistive** | **antennas** | | | |

1. This efficient dipole operated at … nitrogen temperatures.
2. Conventional metallic superconductors were used to circumvent … losses.
3. The ceramic dipole is connected to its RF source … wire wrapping.
4. The scientists are now developing different kinds of loop … .
5. A large antenna would be difficult … on a fighter aircraft.
6. In some situations a full-size HF dipole would … .
7. The tiny dipole antenna is able to radiate as well as full-size … dipole.

## 6.3 Translate the following word groups into Russian.

1. a few tenth of a centimeter
2. fighter aircraft
3. under normal circumstances
4. wire wrapping
5. loop antenna
6. matching network
7. copper radiating element
8. to be out of place
9. full-size copper dipole
10. standard halve-wave dipole

## 6.4 Choose the appropriate word to fill in the blank with it.

1. A miniature dipole antenna … at the University of Birmingham.
   a) is developing b) is developed c) has developed
2. It is of great importance … the half-wave dipole to about a tenth of its normal size.
   a) to reduce b) to increase c) to produced
3. The dipole … is very low and losses are rather high.
   a) conduction b) voltage c) resistance
4. Scientists used conventional … superconductors operating at 4K in liquid helium to prevent resistive losses.
   a) metal b) ceramic c) liquid
5. Conventional superconductors were very … for everyday applications.
   a) cheap b) useful c) expensive
6. It's not a problem to connect the ceramic dipole to its RF source … wire wrapping and silver paint.
   a) because of b) due to c) by means of
7. Transmitting antenna … electromagnetic oscillations into electromagnetic waves.
   a) is converted b) converts c) converting

## 6.5 Read the text and find the words to match with their definitions.

Heike Onnes, professor of physics at Leiden University, expected that superconductivity would be valuable because it would allow for the transmission of electrical power without a loss of energy in the wires. Those early hopes were dashed by the observation that there were few

materials that became superconducting at temperatures above 4K and that those materials stop superconducting if you try to pass much current through them. This is why for the next five decades most of the research in this field was centered on finding materials that could remain superconducting while carrying appreciable amounts of current. But that was not the only requirement for practical devices. The people working on them also needed to find superconducting materials that weren't too expensive and that could be drawn into thin, reasonably strong wires.
In 1962 researchers developed the first commercial superconducting wire, an alloy of niobium and titanium. At that time, the most promising application appeared to be in the giant magnets physicists used for particle accelerators, as superconducting magnets were able to offer much higher magnetic fields than ones made from ordinary coper wire.

With this and other similar applications in mind, engineers succeeded in building the world's first 10-tesla magnet using superconducting wire. Although a scientific and technical triumph, magnet was a commercial failure. Development costs ran to more than $200000, well above the fixed-price contract $75000.

1. very useful or helpful (para 1)
2. not to continue doing something (para 1)
3. large enough to be noticed or measured (para 1)
4. to some degree but not very or extremely, fairly (para 1)
5. likely to succeed or to be good (para 2)
6. to achieve the correct or desired result (para 3)
7. almost the same as something else (para 3)
8. a lack of success in some effort (para 3)

## 6.6 Translate the following sentences into English.

1. Антенна – это устройство, которое используется для излучения и приема радиоволн.
2. Передающая антенна преобразует электромагнитное колебание в электромагнитные волны.
3. Электромагнитное излучение, создаваемое антенной, обладает свойствами направленности и поляризации.
4. Только часть энергии источника антенна преобразует в электромагнитные волны, остальная часть расходуется в виде тепловых потерь.

5. Первые антенны были созданы Г. Герцем в 1888 году, когда он проводил эксперименты, чтобы доказать существование электромагнитных волн.
6. Форма, размеры и конструкция созданных антенн очень разнообразны и зависят от рабочей длины волны и назначения антенны.
7. Излучающая часть антенны, как правило, изготавливается с применением проводящих электрический ток материалов.

## 6.7 Answer the following questions.

1. What is the dipole antenna constructed from?
2. In what situation is a full-size HF dipole out of place?
3. What are the disadvantages of using a miniature antenna?
4. Were the attempts to prevent resistive losses successful?
5. What is the ceramic dipole?
6. What is the application of liquid nitrogen?

# Text 7

# RISE OF THE NANOWIRE TRANSISTOR

We cherish our smartphones for delivering entertainment and information on the go, but their need for daily charging is a problem. Battery life can't get any shorter than it is today. So when new smartphone models come on the market with microprocessors based on the latest foundry process, the increase in the number of transistors in the chips should be balanced by a reduction in the power that each transistor consumes.

This power reduction per transistor can be accomplished with today's workhorse device: the silicon FinFET. (It’s so named because the channel through which current flows is shaped like a vertical fin.) But continuing progress further into the future will require an overhaul of the transistor’s architecture. This overhaul will see the FinFET's silicon fin shrink vertically to become a nanometer wire made from semiconductors other than silicon.

The superior semiconducting alternatives include germanium and 111-V materials (so called because they combine group 111 element such as

gallium with a group V element such as arsenic). They transport charge faster and allow the production of transistors that can deliver the same amount of current as their silicon counterparts but at a lower voltage, saving power.

The change in geometry from fin to wire saves power in a different way. The gate, whose voltage controls the flow of current through the channel, can surround four sides of a nanowire channel but only three sides of a fin. So in the nanowire configuration, the gate is more effective at pinching off unwanted current that might otherwise leak through the channel, again saving power.

The building blocks of the CMOS circuits of today's processors require two types of transistors: one that transports electrons and another that carries holes, their positive counterparts. The scientists from the University in West Lafayette championed germanium-based nanowire transistors for both types of devices. Meanwhile, a team of researchers from universities in Singapore showcased the promise of an 111-V approach. And Niamh Waldron, principal engineer from the European microelectronics center, reported about the performance advances yielded by the pairing of an electron-transporting 111-V transistor with a hole-transporting germanium transistor.

## 7.1 Match the words to make an expression and translate them.

| | |
|---|---|
| 1. battery | a) flow |
| 2. to reduce | b) electrons |
| 3. nanometer | c) power |
| 4. current | d) transistor |
| 5. nanowire | e) life |
| 6. to transport | f) wire |
| 7. silicon | g) channel |

## 7.2 Translate the following word groups into Russian.

1. daily charging problem
2. transistor number increase
3. charge transportation speed
4. gate voltage control
5. CMOS circuits building blocks
6. germanium-based nanowire transistor
7. hole-transporting germanium transistor
8. transistor power reduction

## 7.3 Match the words which have the similar meaning.

| | |
|---|---|
| 1. to deliver | a) to go up |
| 2. information | b) stream |
| 3. to increase | c) consumption |
| 4. to reduce | d) data |
| 5. flow | e) efficiency |
| 6. requirement | f) to provide |
| 7. performance | g) to decrease |

## 7.4 Find the words in the text that correspond to the following definitions.

1. a very small piece of hard material (called silicon) in a computer or other device that contains many electronic circuits
2. change of something completely in order to improve it
3. getting smaller in amount, size or value
4. a quantity of something
5. someone or something that has the same job or purpose as another
6. a device that can be opened and closed to control the flow of electrons
7. to keep something from being lost or wasted
8. progress in the development or improvement of something

## 7.5 Fill in the blanks with the following words or word groups.

| operating | charge carriers | capability | new process |
|---|---|---|---|
| nanowires | highlight | defects | |

The process of making nanowire devices draws heavily on its in-house technology for making 111-V-based FinFETs. Here, the 111-V crystals are grown in V-shaped grooves in silicon, and the majority of the (1) … you'd ordinarily get are annihilated when the growing crystals meet the groove walls. To change a fin into a nanowire, one part of the fin composed of indium phosphide is etched away to leave indium gallium arsenide (InGaAs) (2) … .

Waldron and her colleagues first reported encouraging initial results for their InGaAs nanowires in 2014. They have now improved them by introducing a (3) … for adding an undisclosed material to the gate.
Electrical measurements at an (4)… voltage of 0,5 volt – which is about two-thirds of that used in circuits made with Intel's most modern process - (5) … the superiority of the new gate. Transconductance which reflects how quickly (6) … move in the channel has almost doubled to 2,200 microsiemence per micrometer.

The other key characteristic for assessing the suitability of these transistors is the subthreshold swing. This is related to the switching (7) … of the device and is governed by the quality of the interface between the transistor's channel and its gate dielectric.

# APPENDICES

# APPENDIX A

## Corrective Course

## Lesson 1

| | | | |
|---|---|---|---|
| **a – an** | *какой-то, один из* | **to be** | *являться, находиться* |
| **the** | *этот* | **I am** | |
| **one, two, three …** | *1, 2, 3…* | ***he / she / it* is** | |
| **eleven, twelve, thirteen …** | *11, 12, 13…* | ***we / you / they* are** | |
| **twenty, thirty, forty…** | *20, 30, 40* | ***I / he / she / it* was** | |
| **a hundred, a thousand, a million** | *100, 1000, 1000000* | ***we / you / they* were** | |
| **first, second, third …** | *1st, 2nd, 3rd…* | **will be** | |
| **eleventh, twelfth, thirteenth …** | *11th, 12th, 13th …* | **being** | *являющийся, находящийся,* |
| **twentieth, thirtieth, fortieth …** | *20th, 30th, 40th …* | **been** | *являвшийся, находившийся* |
| **this – these** | *этот – эти* | **to have** | *иметь, обладать* |
| **that – those** | *тот – те* | | |
| **all – any – some – no** | *все – любой – некоторый – никакой* | ***I / you / we / they* have** | |
| **another – other** | *другой - другие* | ***he / she / it* has** | |
| **every, each** | *каждый* | **had** | |
| **such** | *такой* | **will have** | |
| **many (students)** | *много (студентов)* | **having** | *имеющий(ся)* |
| **much (time)** | *много (времени)* | **had** | *имевший(ся)* |
| **more** | *больше* | | |

| | | | |
|---|---|---|---|
| **most** | *больше всего, наибольший* | **to do** | *делать* |
| **few (students)** | *немного (студентов)* | ***I / you / we / they* do** | |
| **little (time)** | *немного (времени)* | ***he / she / it* does** | |
| **less** | *меньше* | **did** | |
| **least** | *меньше всего, наименьший* | **will do** | |
| **I – he – she – it** | *я – он – она – оно* | **doing** | *делающий* |
| **we – you – they** | *мы – вы – они* | **done** | *сделанный* |
| **my – his – her – its** | *мой – его – ее - его* | **there + to be** | *иметься, находиться* |
| **our – your – their** | *наш – ваш - их* | **there is – there are** | *имеется (-ются)* |
| **me – him – her – it** | *мне (меня), ему (его), ей (ее), ему (его)* | **there was – there were** | *имелся (-лись)* |
| **us – you – them** | *нам (нас), вам (вас), им (их)* | **there will be** | *будет иметься* |

## Exercise 1. Read and translate the numerals.

Nine, four, ten, eight, eleven, first, third, twelfth, seventeen, twentieth, hundred, second, thirteen, tenth, eighteenth, forty, nineteen, fifteen, seventieth, sixtieth, twenty, thousand, third, eighty, nineteenth, two hundred and sixty, seven hundred and thirty- first, one thousand five hundred and forty, fifty-fifth, one hundred and eighty seven, four thousand one hundred and ninety, twenty seventh.

## Exercise 2. Read and translate the following words.

Many, every, another, no, all, such, those, this, least, little, much, each, other, less, some, that, these, any, more, few, some, the, most, those, no, every, these, most, some, more, few, any, that, less, each, little, this, some, other, much, least, those, all, another, many, such, no, every, some, that, other, any.

## Exercise 3. Read and translate the pronouns.

Me, its, them, he, us, you, her, we, his, their, it, she, my, her, your, our, they, me, it – its – it, their, his, my, us, them, him, our, it, me, its, your.

## Exercise 4. Read and translate the following groups of words.

It was, he had, they will be, I was, we were, it will be, there is, it has, there was, they were, she had, there will be, they will be, they will have, I did, we do, they have, he has, I will be, there were, they were.

## Exercise 5. Read and translate the following words.

Twelfth, another, that, eleven, any, some, such, few, more, us, it, there was, were, having, those, no, other, most, each, its, had, there will be, was, doing, there are, them, another, does, us, done, being, less, much, did, few, doing, such, each, its, our, their.

## Negative and interrogative forms of the verbs *to be, to have* and *there to be* construction

## Exercise 6. Make the following sentences negative or interrogative, as in the model.

**Model A:** – **I am** seventeen. (–)
– **I'm not** seventeen.
– She **is** *my* daughter. (?)
– **Is** she *your* daughter?

**Model B:** – I **have** got a brother. (–)
– I **haven't got** a brother. (*or:* I **have no** brother.)
– He **has got** a car. (?)
– **Has** he **got** a car?

**Model C:** – There **is** a pen on the table. (–)
– There **isn't** a pen on the table.
(*or:* There **is no** pen on the table.)
– There **are** *some* students in the class. (?)
– **Are** there *any* students in the class?

1. They are married. (–)
2. She is from Spain. (?)
3. I am a driver. (–)
4. There are some mistakes in your test. (?)
5. He has got some friends. (–)
6. They are from the USA. (–)
7. It is near the chair. (?)
8. They are programmers. (–)
9. I have got a personal computer. (?)
10. I am a student. (?)
11. He is a pilot. (–)
12. We are from Italy. (?)
13. There is some money in my pocket (-)
14. There is a marker on the desk. (?)
15. Her name is Julia. (–)

## Exercise 7. Fill in the blanks with the appropriate forms of the verbs *to be or to have.*

1. Peter … a sister.
2. Her name … Ann.
3. They … students of the university.
4. Last year they … schoolchildren.
5. In five years they … engineers.
6. I … at home.
7. … you at home two hours ago? No, I … not. I … at the university.
8. … you got a brother? Yes, I … .
9. How old … you? I … 17.
10. How old … your mother? She … 45.
11. … there a picture on the wall? No, there … no picture on the wall.
12. … there chairs there? Yes, there … .
13. Yesterday there … many students in the library.
14. Will you … lessons tomorrow?

## Exercise 8. Fill in the blanks with the possessive pronouns corresponding to the Russian pronoun *свой*.

1. He wants to read … translation to you.
2. She helps … sister.
3. They begin … work at nine o'clock.
4. We like … university.
5. In the morning my sisters take … books and go to school.
6. I work with … friend.
7. You must get … books from … bag and put them on the table.
8. He makes … experiment every day.
9. They make … experiment every day.

## Exercise 9. Fill in the blanks with the appropriate pronouns.

1. … state helps … to get higher education.
2. Will you show … … new hostel?
3. Do … friends help … in … work?
4. I saw … yesterday.
5. … lessons begin at 9 o'clock.
6. My friend came to see … last night.
7. An old man asked … to help … .
8. My friends invited … to … party.
9. The student couldn't answer … questions.
10. I can't do this work without … help.

## Exercise 10. Translate the following sentences from Russian into English.

1. У него нет уроков.
2. В лаборатории много современных приборов.
3. Их нет дома.
4. В нашей группе 20 студентов.
5. В нашем городе нет университетов.
6. В вашем городе есть институт?
7. Мы обычно бываем дома вечером.
8. У нас нет свободного времени.
9. Вчера его не было дома.

10. У них будет 4 экзамена в этом семестре.
11. В 5 часов вечера мы будем в библиотеке.
12. Там будет интересная лекция.

# Lesson 2

# Prepositions

| Cases | |
|---|---|
| **of** | *кого, чего* |
| **for** | *для* |
| **to** | *кому* |
| **by** | *кем, чем* |
| **with** | *чем, с* |
| **without** | *без* |
| **about** | *о* |

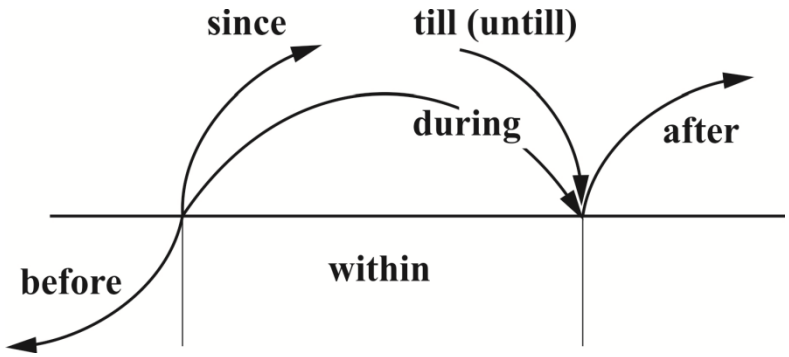
| Time | |
|---|---|
| **by** | *к* |
| **at** | *в* |
| **before** | *перед (тем как)* |
| **after** | *после (того как)* |
| **since** | *с* |
| **till (until)** | *до* |
| **during** | *в течение* |
| **for** | *во время* |
| **within** | *в рамках* |

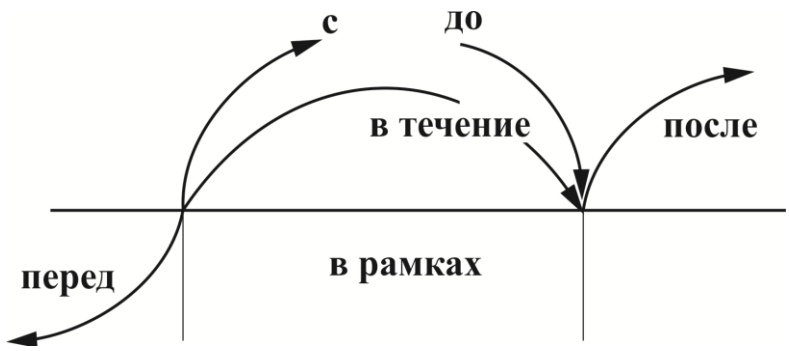
**in** 2010, **in** winter, **in** May
**on** Monday, **on** the 1st of May
**in** the morning / evening / afternoon
**at** (mid)night
**in** a day
**for** a week

| Place and movement | |
|---|---|
| **in** | *в* |
| **on** | *на* |
| **to** | *к* |
| **from** | *из, от* |
| **into** | *внутрь* |
| **out of** | *изнутри* |
| **near (at)** | *рядом (у)* |
| **behind** | *позади* |
| **over** | *выше* |
| **below** | *ниже* |
| **above** | *над* |
| **under** | *под* |
| **across** | *поперек* |
| **along** | *вдоль* |
| **around** | *вокруг* |
| **against** | *напротив* |
| **among** | *среди* |
| **between** | *между* |

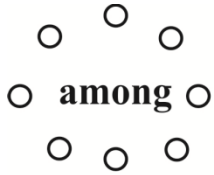
| Cause | |
|---|---|
| **because** | *потому что* |
| **because of** | *из-за* |
| **since, as, for** | *так как* |

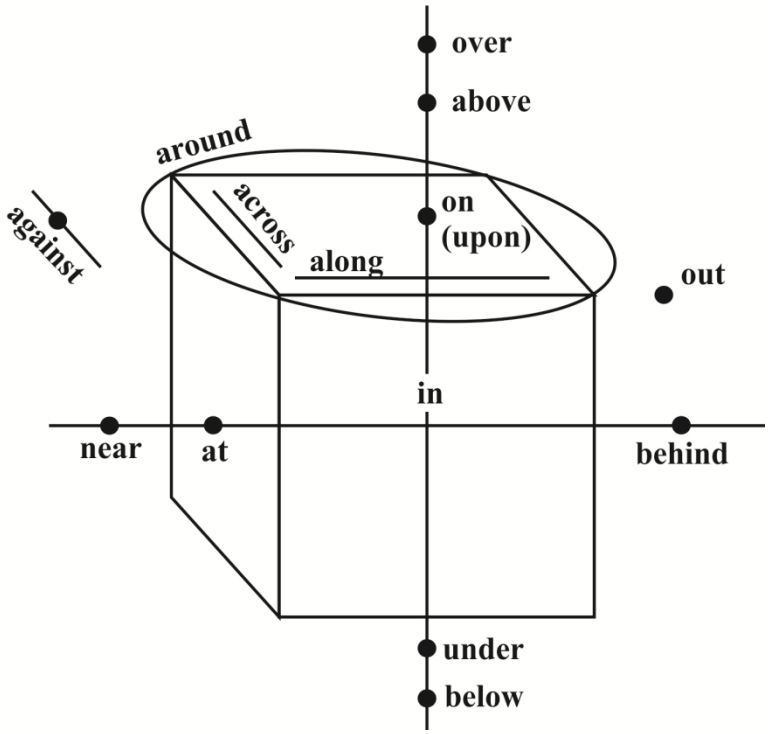
## Prepositions of time

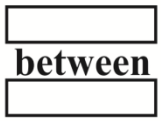


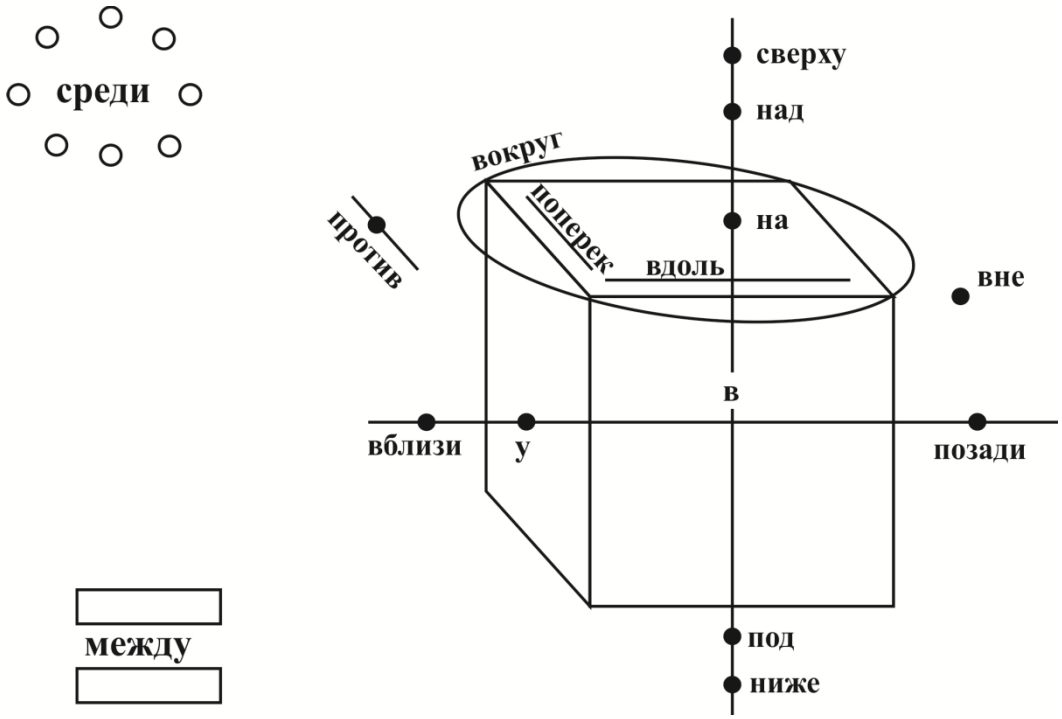




## Prepositions of place

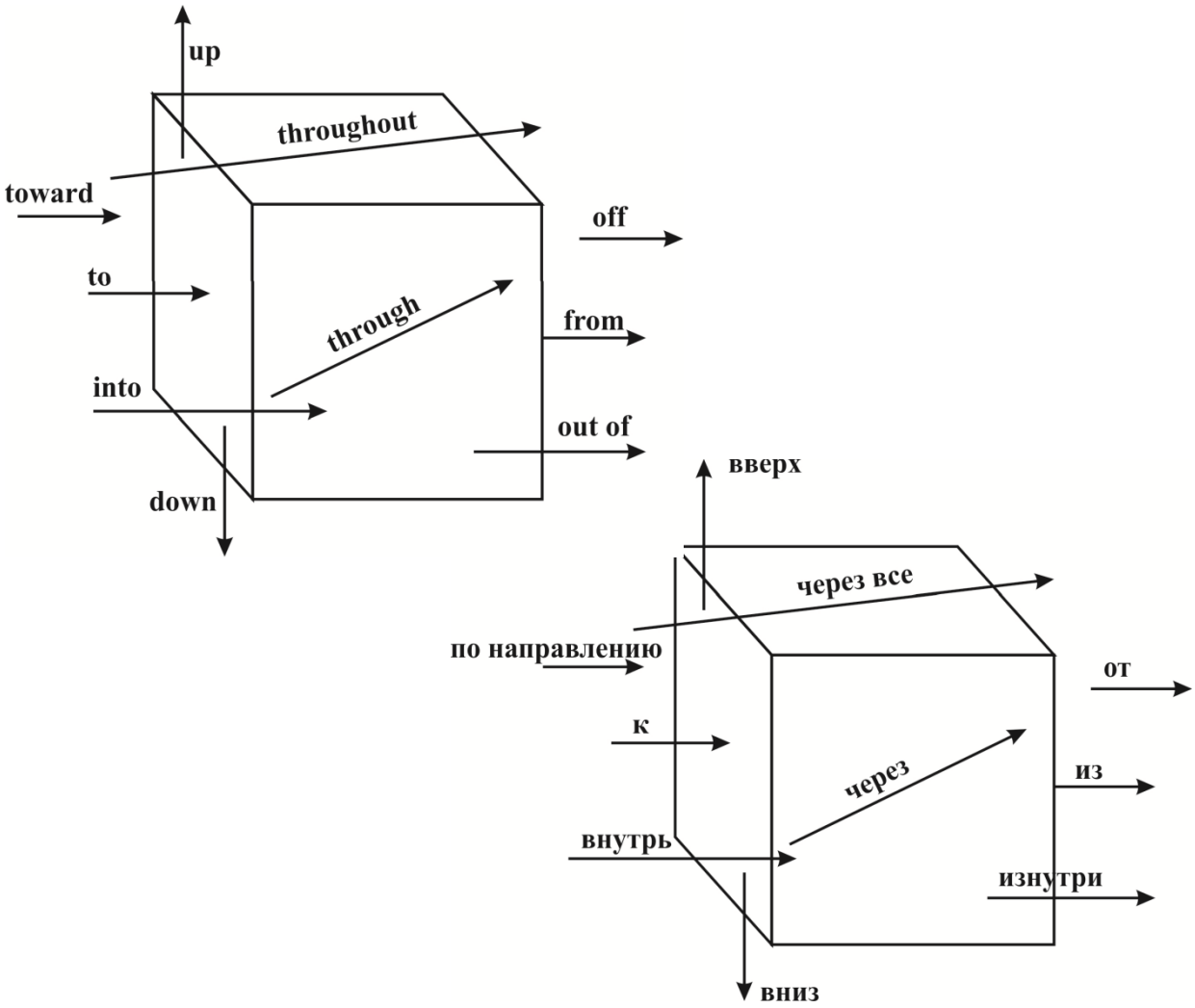


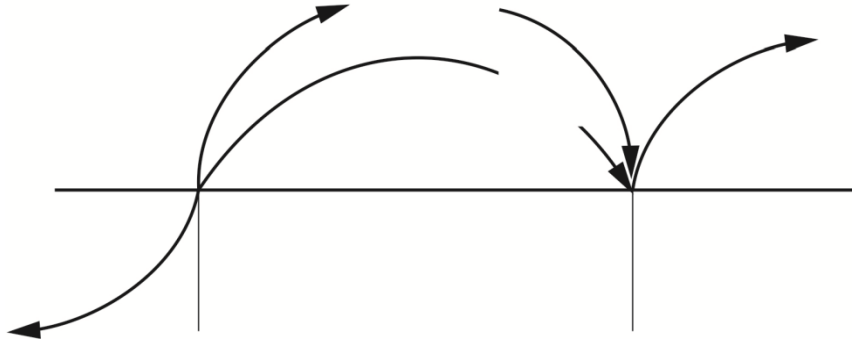



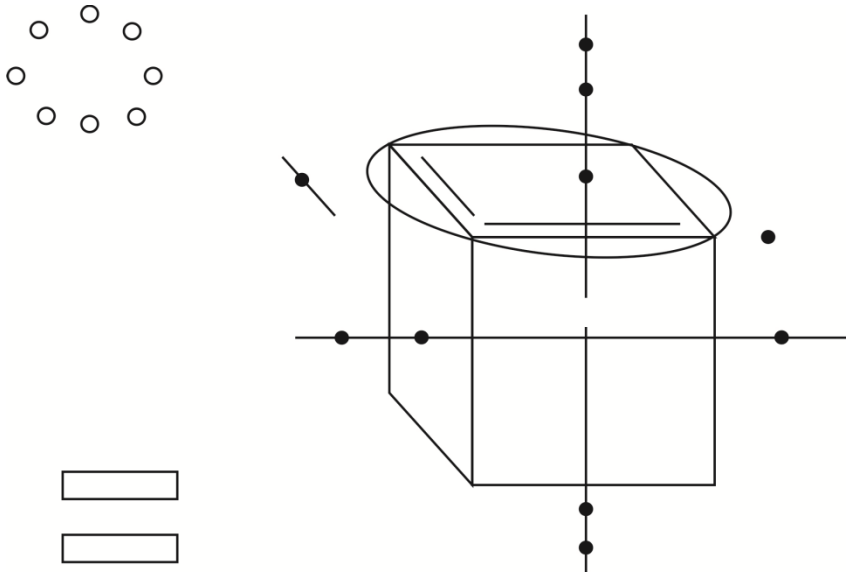


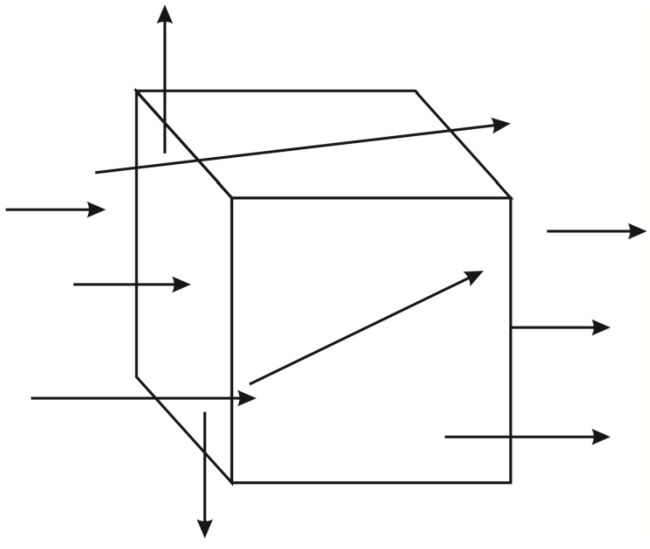

## Prepositions of movement



**Exercise 1. Write the appropriate prepositions.**







## Exercise 2. Read and translate the following prepositions.

By, with, without, as, because of, before, since, till, during, after, within, to, into, out of, from, of, near, at, in, behind, below, of, under, above, around, across, along, about, of, against, among, between, below, by, since, during, within, till, between, across, of, because of, for, as, along, under, into, to, with, without, by, during, of, since, behind, against, from, at, below, because of.

## Exercise 3. Read and translate the following word-groups.

In the morning, in the afternoon, in the evening, at night, in September, in spring, in autumn, in winter, in 2000, in a day, in five days, on the first of September, on the fifth of February, on Sunday, on Monday, on Tuesday, on Wednesday, on Thursday, on Friday, on Saturday.
At three o'clock, at seven o'clock, by five o'clock, by the morning, at night, for three days.
At the temperature, at the voltage, at a speed, under the action of, under (in) some conditions, in fact, on the basis of, as a result.

**Modal Verbs**

| | | | |
|---|---|---|---|
| **can**<br>*могу, умею* | *I **can** swim / speak English.* | **may (might)**<br>*могу (можно), может быть* | *May I come in? She may be at home.* |
| **could**<br>*мог, умел* | *When I was 10, I **could** run fast, but now I can't.* | **must**<br>*должен* | *Show must go on.* |
| **be able to**<br>*мочь, быть способным* | *I think I **will be able** to write a program.* | **need**<br>*нужно* | *I need money.* |

***Words to be learnt***

| | | | |
|---|---|---|---|
| **that** | *тот, что, который* | **though (although)** | *хотя* |
| **what** | *что, какой* | **however** | *однако* |
| **who** | *кто, который* | **thus** | *таким образом* |
| **which** | *который* | **then** | *затем, тогда* |
| **where** | *где* | **than** | *чем (сравнение)* |
| **why** | *почему, зачем* | **rather than** | *а не* |
| **how** | *как* | **as many as** | *так много, как* |
| **how many (much)** | *сколько* | **as well as** | *так же, как* |
| **when** | *когда* | **also** | *также* |
| **while / whereas** | *в то время как, когда* | **at least** | *по крайней мере* |

## Exercise 4. Read and translate the modal verbs.

Can, could, be able to, might, may, must, need, may, could, must, was able to, can, might, could, must, can, need, may, is able to, will be able to.

Can, that, what, because, was able to, how, though, must, could, where, while, might, need, when, also, could, which, at least, whereas, at least, is able to, after, could, as, must, that, can, though, might, while, how, since, as, for, why, how many.

## Exercise 5. Read and translate the following words.

That, what, who, which, while, when, how, where, whereas, though, because, as, since, before, after, where, how many, as many as, when, while, which, who, what, that, since, as, for, after, before, although, whereas, how, why, as well as, that, which, where, when, than, since, as, for, what, because, while, though, after, then, whereas, although, rather than, when, that, least, at least, why, how many.

## Exercise 6. Read and translate the following sentences. Pay attention to the modal verbs.

1. Students must take exams in January.
2. She can speak French well.
3. You may take this book till tomorrow.
4. We must learn new words every week.
5. You may come in.
6. We can take this book from the library.
7. She can't do this work in time.
8. They must go to Moscow for a few days.
9. We were able to read this article without dictionary.
10. Everyone must know a foreign language.
11. He could do this work without any help.
12. Students may ask a lot of questions after the lecture.
13. You couldn't translate the text as it had many new words.
14. You may enter any university in our country after you finish school.
15. You must pass all the exams well to enter the university.

## Exercise 7. Read and translate the following sentences.

1. We can see electrical devices everywhere.
2. Today we can't imagine the world without telephone and television.
3. We will study electronics for two years.
4. Computers and robots are important for industrial use.
5. We may communicate over long distances with the help of satellite systems.
6. People couldn't solve many complex engineering problems without computers.
7. You may take part in our discussion.
8. We must measure the distance between the elements.
9. After the invention of engine the first industrial revolution started.
10. New robots will have some manipulators that will carry out many functions.

## Exercise 8. Translate the sentences from Russian into English.

1. Она может читать и писать по-английски.
2. Он должен прочитать эту статью.
3. Вы можете идти домой.
4. Может быть, она во Франции.
5. Мне нужно больше времени, чтобы закончить это тест.

### Suffixes

| **Nouns** ***-er, -or, -tion, -ance, -ence, -ity, -ment, -ist, -ness, -age, -ogy, -ics, -sure, -ture*** |
|---|
| conductor, transformer, invention, assistance, difference, activity, movement, measure, scientist, darkness, resistance, worker, operator, computer, calculation, inventor, structure |
| **Adjectives** ***-al, -ic, -ive, -ous, -able, -ful, -less, -y*** |
| political, periodic, positive, various, suitable, useful, useless, rainy, atmospheric, cultural, negative, classical, numerous, variable, powerful, noiseless, stony |
| **Adverbs** ***-ly*** |
| rapidly, greatly, widely, clearly, primarily, generally, differently, commonly, mainly, cheaply, independently, attentively |
| **Verbs** ***-ize, -fy, -en, -ate*** |
| memorize, classify, widen, demonstrate, realize, electrify, deepen, calculate, , optimize, modify, broaden, separate |

### Prefixes

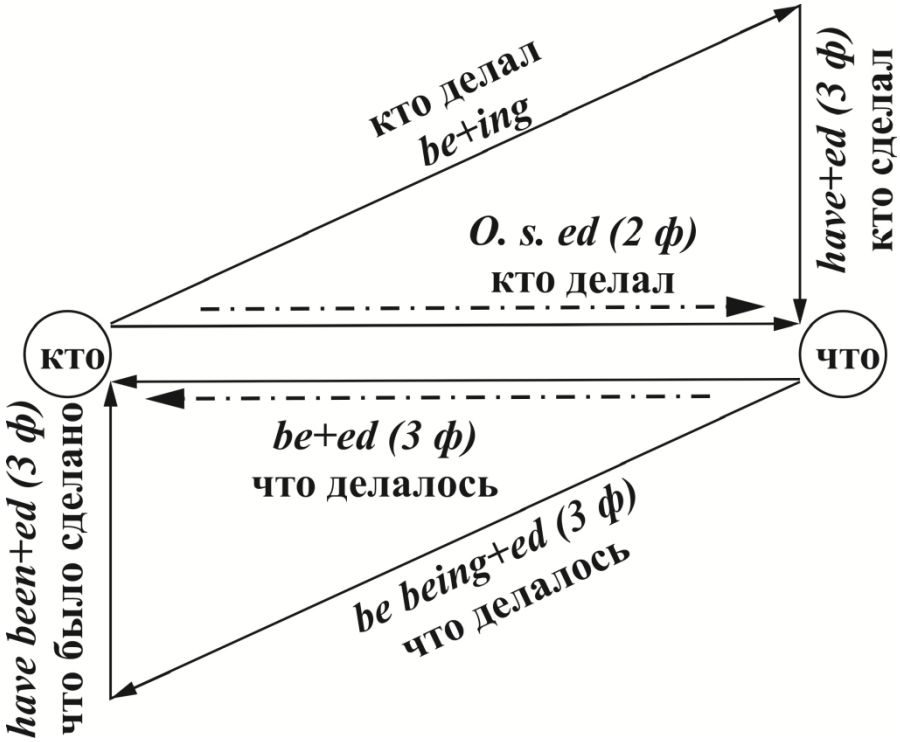
| ***Re-, dis-, over-, super-, semi-, inter-, un-, in-, im-, il-, de-, counter-*** |
|---|
| reproduction, overload, superman, semiconductor, international, unlimited, invisible, illegal, impossible, decode, counteraction, retell, disconnection, overproduction, semicircle, interplanetary, unstable, incorrect, demount |

## Exercise 9. Read and translate the following words.

Movement, economist, electronics, biology, physical, religious, variable, powerful, useful, noiseless, identify, lighten, unimportant, invisible, disconnect, organize, defreeze, reproduce, counterrevolution, supersensitive, dependence, independently, conversion, literature, equipment, disadvantage, peaceful, weightless, decode, elementary, conductivity, weightlessness, stimulate, nationalize.

# Lesson 3

## Tenses of the Active and Passive Voices




## Exercise 1. Put the right pronouns instead of numbers and translate into Russian.

***to decide (решать) – decided - decided***

1 had decided, 2 will decide, 3 will have decided, 4 decided, 5s are deciding, 6 has decided, 7 decides.

8 was decided, 9 will be decided, 10 is decided, 11 has been decided, 12 was being decided, 13 will have been decided, 14s were decided, 15s are being decided.

## Exercise 2. Put the correct pronouns instead of numbers and translate into Russian.

***to divide (делить) – divided - divided***

1 have divided, 2 will divide, 3 is dividing, 4 divided, 5 had divided, 6s were dividing, 7 will divide, 8 divides, 9 has divided, 10 will have divided.

11 will have been divided, 12s were divided, 13 is being divided, 14 will be divided, 15s are divided.

## Exercise 3. Put the right pronouns instead of numbers and translate into Russian.

***to write (писать) – wrote –written***

1 wrote, 2 was writing, 3 have written, 4 writes, 5 were writing, 6 will have written, 7 will write.

8 have been written, 9 will be written, 10 is being written.

## Exercise 4. Read and translate the following word-groups.

The century began, they are obtaining, the satellite was on its orbit, the observation has shown, the engineer is measuring, the student has written, the concept explains,
scientist was applying, physics is studying.

A new radio set was demonstrated, new results are being obtained, the methods have been developed, the question has been solved, the energy had been converted, the particle will be divided, the data will be tested.

## Exercise 5. Read and translate the following sentences.

***to catch (ловить) – caught – caught***

I. 1. We were catching. 2. I will be caught. 3. He has caught. 4. I am caught. 5. She is catching. 6. He will catch. 7. I was being caught. 8. She has been caught. 9. You will have caught. 10. They will be caught. 11. She caught. 12. He is catching.

***to teach (учить чему-л.) – taught – taught***

II. 1. He teaches. 2. I was taught. 3. She will be taught. 4. They had taught. 5. I will teach. 6. She is taught. 7. They have been taught. 8. He will have taught. 9. We taught. 10. He was being taught. 11. We were teaching. 12. She will have been taught. 13. They were taught. 14. He has taught. 15. They are teaching.

## Using tense forms

| $V_1$ | $V_2$ | $V_3$ | $V_{ing}$ |
|---|---|---|---|
| **ask** | **asked** | **asked** | **asking** |
| *спрашивать* | *спрашивал, спросил* | *спрошенный* | *спрашивающий* |
| | | | |
| **write** | **wrote** | **written** | **writing** |
| *писать* | *писал, написал* | *написанный* | *пишущий* |

| ***Active*** | ***Passive*** |
|---|---|
| ***Simple (Indefinite)*** | |
| **V**<br>**$V_{ed/2}$ делал** *(yesterday)*<br>**$V_{(s)}$ делаю(-ет)** *(every day)*<br>**will V будет делать** *(if...)* | **(will) be + $V_{ed/3}$**<br>**was (were) + $V_{ed/3}$ делалось**<br>**am (is, are)+ $V_{ed/3}$ делается**<br>**will be + $V_{ed/3}$ будет делаться** |
| ***Progressive (Continuous)*** | |
| **(will) *be* + $V_{ing}$** | ***be*** **+ being+ $V_{ed/3}$** |
| **was (were) + $V_{ing}$ делал** *(yesterday at 5)*<br>**am (is, are)+ $V_{ing}$ делаю (-ет)** *(now)*<br>**will be + $V_{ing}$ будет делать** *(tomorrow at 5)* | **was (were) + being + $V_{ed/3}$ делалось**<br>**am (is, are)+ being + $V_{ed/3}$ делается** |
| ***Perfect*** | |
| **(will) *have* + $V_{ed/3}$** | **(will) *have* been + $V_{ed/3}$** |
| **had + $V_{ed/3}$ сделал** *(by 5)*<br>**have (has) + $V_{ed/3}$ сделал** *(just/already)*<br>**will have + $V_{ed/3}$ сделает** *(by 5)* | **had + been + $V_{ed/3}$ было сделано**<br>**have (has) + been +$V_{ed/3}$ было сделано**<br>**will have + been + $V_{ed/3}$ будет сделано** |

***Words to be learnt***

| | | | |
|---|---|---|---|
| **to develop** | *развивать, разрабатывать* | **device** | *устройство, прибор* |
| **to obtain** | *получать* | **equipment** | *оборудование* |
| **to measure** | *измерять* | **research** | *исследование* |
| **to carry out** | *выполнять* | **advantage** | *преимущество* |
| **to solve** | *решать* | **article** | *статья* |
| **to overcome** | *преодолевать* | **observation** | *наблюдение* |
| **to amplify** | *усиливать* | **quality** | *качество* |
| **to improve** | *усовершенствовать* | **data** | *информация, данные* |
| **to repair** | *ремонтировать* | **wire** | *провод* |
| **to attach** | *присоединять* | **pressure** | *давление* |
| **to complete** | *заканчивать* | **output** | *продукция* |
| **to succeed** | *преуспевать* | **in order to** | *для того чтобы* |

## Exercise 6. Read and translate the following word-groups.

Scientists are developing, they were obtaining, the device was produced, a new radio set was demonstrated, the scientist was using, the student is measuring, she has read, the methods have been developed, the experiment has shown, the phenomenon was studied, the problem has been solved, physics is studying, the scientist discovered, the observation shows, the energy has been converted, the radio is broadcasting, the data will have been obtained, the new device will have been produced, the distance has been measured, the signal was amplified, the student used, the researcher invented.

## Exercise 7. Read and translate the following sentences.

1. While the experiment **was being carried out**, nobody **left** the laboratory.
2. A new type of computing equipment **is being produced** at our plant.
3. At present scientific work **is being done** mostly by large groups of researchers.

4. The solar battery **is converting** the energy of sun rays directly into electric energy.
5. The experiment **was being carried out** under low pressure.
6. Scientists and engineers **are developing** new types of electronic and devices.
7. We **were looking** for a more simple method but couldn't find it.
8. The engineers **will discuss** the advantages of this new system.
9. Many different devices **have been produced** in order to improve the quality of communication.
10. This question **has already been discussed** at the scientific conference.
11. By the end of the year various semiconductor devices **will have been produced**.
12. That equipment **had been repaired** before you came.
13. This text **has** just **been translated**.
14. Mendeleyev's periodic law **has been accepted** as a universal law of nature.
15. Scientists **are using** the energy of atom in various spheres of life.
16. The engineers **were attaching** the wires to the devices when I **came in**.
17. When we **listen** to a radio program we **use** the rays that **are called** radio waves.
18. The scientist **was solving** a new problem when we **visited** the laboratory last week.
19. My friend **is writing** an article for the newspaper.
20. The student **was carrying out** the experiment for twenty minutes.
21. Molecules in gas **are** constantly **moving**.
22. The electron **is circling** in an orbit around a nucleus.
23. He **understood** the text after he **had read** it again.
24. He **will have finished** his work by the end of the week.
25. The operator **will have recorded** the data before you come.
26. I **have not seen** him since he **graduated** from the university.
27. We **will have completed** our experiments by the next month.

28. Many difficulties **had been overcome** before the researcher succeeded in his work.
29. After the new device **had been tested** it **was installed** in our laboratory.
30. We **analyzed** the data that **have been obtained** by our investigators.

# APPENDIX B

# Microtexts for Reading

## Physics

Physics is the science studying various phenomena in nature. Its object is to determine exact relations between physical phenomena. Physics is divided very naturally into two great branches, experimental and theoretical. The task of the former is to make observations and carry out experiments. On the basis of the experimental facts theoretical physics is to formulate laws and predict the behaviour of natural phenomena. Every law is based on experiments. It was the study of natural phenomena that made it possible to formulate various laws. There are still a lot of problems to be solved. Scientists all over the world are doing their best to find answers to numerous unsolved problems.

## SMS History

SMS was created during the late 1980s to work with a digital technology called GSM (global system for mobile communications), which is the basis for most modern cell phones. The Norwegian engineers who were inventing it wanted a very simple messaging system that worked when users' mobile phones were turned off or out of signal range. Most sources agree that the first SMS message was sent in the UK in 1992.

As SMS was born in Europe, it's not surprising that it took a little longer to make its way to the United States. Even today it is much more popular in Europe. A July 2005 study found that 37 percent of U.S. mobile phone owners had sent or received at least one text message in the previous month.

## Everything under the sun at Google

What is Google? A search engine? A media conglomerate? Or an energy provider? The company has announced that it will provide $75 million to build 3,000 residential solar electricity systems across the US this week.

Under the plan, homeowners can install a $30,000 solar electricity systems with little or no money upfront. Google will own the panels and homeowners pay a monthly fee for the energy.

To get the project off the ground, Google is creating a fund with a San Francisco company called Clean Power Finance that local solar installers will be able to tap so they can offer financing plans to prospective buyers. This is the latest in a string of investments worth about $850 million that Google has made in renewable energy as part of its long-standing aim of reducing the environmental impact of the business. But it`s not all altruistic. As the owner of the panels, Google will get the benefit of federal and state renewable energy subsidies.

## Radio waves

Radio waves make up part of the electromagnetic spectrum. These waves are packets of energy with different wavelengths, similar to visible light waves, X-rays or Gamma rays, except longer.

The smallest radio waves are called microwaves. Shortwaves are not quite so small. There are also medium and long waves. Antennas designed to send and receive radio waves are usually similar in size to the wavelength they are to use. Many radio antennas (like those on cars) are made long because they receive signals of FM radio (a few meters, several feet) or AM radio (hundreds of meters, about a thousand feet).

Manmade radio waves have been used for a long time for communication, and to 'see' objects. Radar uses radio waves to 'see' distant objects. Radios also use these waves to send and receive information. Natural radio waves were first discovered in the 1930s by Karl Guthe Jansky. Radio waves are widely being used now. Broadcasting and communications satellites and mobile phones and many computers communicate by radio waves.

## Wireless

Originally, radio technology was called 'wireless telegraphy', which was shortened to 'wireless'. Wireless is an old-fashioned term for a radio transceiver or for a radio receiver. Now the term is used to describe modern wireless connections such as those in cellular networks and wireless broadband Internet. In modern usage, wireless is a method of communication that uses low-powered radio waves to transmit data between devices. The term refers to communication without cables or

cords, chiefly using radio frequency and infrared waves. High powered transmission sources usually require government licenses to broadcast on a specific wavelength. This broadcast platform which has historically carried voice and music, has grown into a large industry, with many thousands of broadcasts around the world. Low-powered radio waves are often unregulated. Wireless is now increasingly being used by unregulated computer users. Software and hardware developers are creating smaller computer networks which form special wireless network, with protocols such as WiFi and ZigBee.

## Transistors

Transistors are devices that control the movement of electrons. They can both switch or amplify electronic signals.

One of the first computers, the famous ENIAC (Electronic Numerical Integrator and Calculator) weighed 30 tons and contained more than 17,000 vacuum tubes. In 1954, George Teal created the first silicon transistor. Soon after, manufacturers developed methods for mass-producing silicon transistors, which were cheaper and more reliable.

Silicon transistors helped computers make great numbers of calculations in a short time. The simple task switch operation of transistors enables your computer to complete very complex tasks.

The transistors are a part of an integrated circuit (also known as a microchip), in which many transistors work together to help the computer complete calculations. These circuits, usually called just “chips” contain billions of very small transistors.

## Cell Phone Parts

The electronic components of a cell phone include the battery, display screen, keypad, memory chip, and parts of the circuit board.

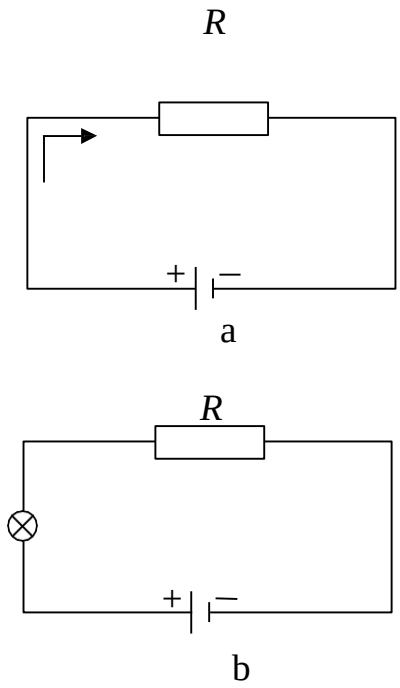
The brain of the cell phone is the CPU. It tells the different parts of the phone how and when to perform tasks.

The display screen and keypad are used for multiple tasks, including typing in phone numbers, text messaging, and in some phones, taking photos. When the screen and keyboard are used for photography functions, the display screen acts more like a TV screen and the keypad becomes the shutter-release button.

The memory card can either be installed as a chip on the mother board or it can be a separate card that can be removed. The memory chip stores information for the phone's operating system and the contact list directory.

The battery provides the energy required to power the phone. Cell phones generally use rechargeable batteries. One of the most popular batteries for cell phones these days is the lithium-ion battery. Lithium-ion batteries have no memory effect and they hold their charge better than most other battery types.

## Electric Circuit




This is a circuit. It consists of voltage source, a resistor and a conductor. A voltage source supplies current. A resistor reduces current. A conductor connects the elements of the circuit.

Compare circuit 'a' with circuit 'b'. What is the difference between them? Current passes through circuit 'a' while no current passes through circuit 'b'. Circuit 'b' has an open. No current through circuit 'b' results from an open. An open and a short are troubles in a circuit. A trouble in a circuit may result in no current in it.

## Diodes

We can define electronics as the study of conduction of electricity in a vacuum, in gases and in semiconductors. The conduction of electricity in a vacuum, for example occurs in vacuum tubes. Though in some vacuum tubes current flows from one element to the other through a gas.

Every vacuum tube diode has a cathode with a heater and a plate. When the circuit is completed (*замкнута*) the cathode emits electrons. Negative voltage on the cathode repels the electrons. Positive voltage on the plate attracts the electrons. The current flows through the tube. If a

negative voltage is applied to the plate current does not flow. Thus, a diode permits current to flow in only one direction.

A semiconductor diode also conducts current in one direction, but the physical principles, which permit it to do this, are different. Diodes are used as rectifiers of alternating voltages, as detectors of radio signals, as switching devices, *etc*.

## Semiconductors

Semiconductors are solids whose resistivity lies between those of electrical conductors and insulators. Semiconductors are used in computers, in radio and TV receivers, and in other electronic products.

Semiconductor devices perform many control functions. They may be used as rectifiers, amplifiers, detectors, oscillators and switching elements. Some characteristics, which make the semiconductors such as attractive member of the electronics family, are as follows:

- Semiconductors are small and light in weight.
- Semiconductors are solids. There is therefore little chance that element will vibrate. Element vibration in vacuum tubes was the cause of microphonics.
- Semiconductors require little power and radiate less heat than tubes. They do not need warm up time and operate as soon as power is applied.
- Semiconductors do not undergo the chemical deterioration which occurs in tube cathodes. The deterioration of tube cathodes eventually results in unacceptable tube performance. (***зд****. плохая работа электронной лампы*).

Silicon is the material of which most semiconductor devices are presently constructed.

## Resistors

A resistor is a circuit element designed to insert resistance in the circuit. A resistor may be of low value or of high value.

Resistors in electronic circuits are made in a variety of sizes and shapes.[1] They are generally classed as fixed, adjustable or variable, depending upon their construction and use.

The resistance value of small fixed resistors is sometimes indicated by a code colour.

Resistors required to carry a comparatively high current[3] and dissipate high power[4] are usually of the wire-wound ceramic type.

## Radioactivity

Radioactivity is invisible and inaudible, and we cannot feel it until we get too much of it and become ill. But in our nuclear age we have a very important tool, the Geiger counter, which is used for detecting radioactivity. It was invented by Hans Geiger, a German physicist, and has the ability to register cosmic rays as well as gamma-rays. Geiger counters are used for all kinds of purposes – light ones for uranium prospecting, built-in types for atomic power stations and research establishments; counters with warning signals for factory workers who deal with radioactive materials and whose hands and clothes must be checked and so on.

## Rays

The kind of ray that mankind has known for the longest time is light. It helps us to see the objects that surround us, when the objects reflect the light into our eyes. As our eyes can detect light, we call it a visible ray. The other rays are invisible.

We find three types of invisible rays in use in our homes. When we listen to a radio program, we are using the rays that are called radio waves. When we cook a meal on an electric cooker, we are using infrared rays, sometimes called heat waves. When we sit under sun-tan lamp, we are using ultraviolet rays.

We meet the other three types of rays outside the home. Inside the hospital we will find X-rays that are used for taking pictures of the insides of our body. At airports everywhere we will find microwaves that are used with radar equipment to detect planes in the air or guide them to land. Also in hospitals we find gamma rays used as invisible bullets to kill cancer cells.

These seven types of rays are all electromagnetic waves. But they are different from each other in their frequency and their wavelength. The distance that the wave moves during the time that it takes for one

complete cycle of vibration is called the wavelength. The frequency is the number of cycles in a second. Notice that radio waves are the longest of the electromagnetic waves and have the lowest frequency.

## Means of Communication

Electrical communication over a great distance was first demonstrated in 1844 by Samuel Morse, who sent a dot-dash message along a single wire between Baltimore and Washington. In later years it was demonstrated that the human voice could be electrically transmitted along wires.

A transatlantic telegraph cable was completed and the first radio telegraph message was sent across the Atlantic in 1901. Transatlantic telephone calls finally became popular with the opening of the high quality 36-channel cable in 1956. Six years later the first active experimental communication satellite relayed the first live television pictures between the US and Europe.

Today a lot of communication satellites are in synchronous orbits over the Atlantic, Pacific and Indian oceans. They send telephone, television, telegraph and other signals to the ground stations all over the world.

### 🎧 Communication Process Model Captioned

**Exercise 1. Watch the video and answer the following questions.**

1. How does the communication start?
2. What influences the idea?
3. What should be done before the idea is transmitted to another person?
4. How is the encoded idea called?
5. What happens with the message next?
6. What does the receiver do with the message?
7. What is decoding?
8. What is the feedback?
9. How can the messages be sent?
10. What are 3 ways of giving someone a present?
11. What prevents the messages to be transmitted?

**Exercise 2. Fill in the blanks with the following words. Translate the sentences.**

| channel | before | interpreted | barriers | feedback | idea |
|---|---|---|---|---|---|

1. Communication starts with the … that is influenced by knowledge, culture, feeling, etc.
2. The idea should be encoded … the transmission to somebody else.
3. The receiver's reply to the sender is called … .
4. The messages can be sent through the … ( by paper, cellphones face-to-face).
5. The messages are … by filtering the new information through people's feelings, values, past experiences.
6. There are different types of communication … that prevent people from understanding each other properly.

# APPENDIX C

## How to Give a Successful Presentation?

An essential task at the pre-preparatory stage is to ask yourself the following questions:
– What is the purpose of my presentation?
– What are the main points that I would like to get across?
Start getting ready for your presentation a few weeks before you are due to speak.
Collect the materials on which you would like to base your presentation.
Make a careful selection from the collected materials.

***Here are some tips for the learner to start the presentation process:***

- Make the first plan of the presentation (you can modify it later).
- Remember to give your presentation a logical structure:
  **Introduction** – tell the audience what you're going to say
  **Main Body** – say it, developing the above mentioned issue(s).
  **Conclusions** – sum up what you've just said
- Make the first draft of your presentation. Read it carefully. If any of the information is not related to the topic, remove it.
- If there are issues which you cannot express in a precise or clear way, it is probably because you do not really understand them yourself. So it is better not to talk about them.
- Never read from your notes. You should know the material you want to present well enough not to need your notes. If you don't, perhaps you're not ready to give your presentation.
- Keep to the time! Do not exceed the time limit. It is better to shorten the presentation by two minutes than to extend it by two minutes.
- Follow the plan of your presentation! Do not digress! Usually digressions take more time than we think. Successful presenters have "spontaneous digressions" well thought over and well planned.
- Leave time for questions from the audience. Questions may help you to get your message across better.

***Some final tips concerning your manner of presentation:***

- Speak clearly.
- Make pauses in places which you consider critical for your presentation; this emphasizes the importance of the information you wish to convey to the audience.
- Try to control your body language; avoid excessive gesticulation.
- Maintain eye contact with your listeners but do not focus on one person.
- Don't turn your back to the audience if you want to show something on the screen and don't 'talk to the screen' either.
- Don't stand in the light of a projector covering the screen.
- Don't forget to thank the audience for their attention and encourage them to ask questions. If you are not sure about the answer of if you simply do not know it, don't be afraid to admit that, but suggest the source in which the answer can be found.

The sentences and phrases below follow the logical progression of a well-balanced presentation. This is a list of phrases to help you make a professional presentation in English.

Good presenters always use language (sometimes single words, sometimes phrases) which shows where they are in their presentation. These 'signposts' make it easier for the audience to:

- follow the structure of the presentation
- understand the speaker more easily
- get an idea of the length and content of the presentation.

| **Welcoming** | |
|---|---|
| Good morning (afternoon, evening) everyone. I'd like to welcome you all here.<br>Thank you all very much for coming today. | – Доброе утро / Добрый *день / вечер.* Я хотел(а) бы поприветствовать вас всех здесь.<br>– Спасибо, что пришли (на презентацию). |
| **Introducing yourself** | |
| Let me introduce myself;<br>my name is …<br>and I am ... . | – Позвольте представиться, меня зовут … и я … |

| **Introducing your presentation** | |
|---|---|
| The purpose of my *presentation / talk* today is to ….<br>In my presentation today I'll be *talking about ... / reviewing...*<br>I'm going to talk about …<br>Firstly, …, after that I'll …, and finally I'll … . | – Цель моей презентации …<br>– В моей презентации я буду *говорить о / делать обзор …*<br>– Я буду говорить о …<br>– Во-первых, я … , далее …, и наконец я … . |
| **Explaining that there will be time for questions at the end** | |
| If *you have any questions / there are any questions* you'd like to ask, please leave them until the end, when I'll do my best to answer them.<br>Please, feel free to interrupt at any time if you'd like to ask a question. But if you don't mind, I'll deal with questions at the end of my talk. | – Если у вас появятся вопросы, которые вы хотели бы задать, пожалуйста, задайте их в конце презентации, я буду рад(а) ответить на них.<br>– Вы можете прервать меня в любую минуту, если хотите задать вопрос. Но если не возражаете, я отвечу на вопросы в конце своего выступления. |
| **Starting the presentation** | |
| To *begin / start* with … .<br>Let's *start / begin* by looking at … .<br>I'd like to begin by .<br>Let's begin.<br>OK, let's get started. | – Начнём с того, что … .<br>– Начнём с просмотра …<br>– Я хотел(а) бы начать с …<br>– Давайте начнем.<br>– Хорошо, давайте приступим. |
| **Choosing a section of the presentation** | |
| So, that's an overview of ... . | – Итак, перейдем к заключению … |
| **Beginning a new section of the presentation** | |
| Now let's move on … .<br>Moving on to the next part, I'd like to … . | – А сейчас перейдем к … .<br>– Рассматривая следующий вопрос, мне бы хотелось … . |

| **Referring to visuals** | |
|---|---|
| I'd like you to take a look at this *chart / table / figure* , which shows … | Я хотел(а) бы, чтобы вы взглянули на *эту схему, график, диаграмма, схема, таблица, чертёж / таблицу / этот рисунок,* которая (-ый) показывает … |
| If you look at this graph, you'll see ... | Если вы посмотрите на этот график, то увидите… |
| The figures in this table show ... | Цифры в этой таблице показывают… |
| As you can see from this pie chart … | Как вы можете видеть на этой секторной диаграмме… |
| Just have a look at this chart for a moment. | Взгляните на эту диаграмму. |
| **Dealing with difficult questions** | |
| I'll come back to that question later in my presentation. | – Если можно, я вернусь к этому вопросу чуть позже. |
| If you don't mind, I'll deal with questions at the end of my talk. | – Если вы не возражаете, я отвечу на вопросы в конце выступления. |
| **Concluding and summarising the presentation** | |
| Well, that brings us to the end of the final section. Now, I'd like to summarise by … .<br>To sum up then, let me … | – Наконец, мы подходим к последней части презентации. Мне бы хотелось подвести итог …<br>Подводя итог, позвольте мне… |
| **Inviting questions** | |
| That brings the presentation to an end. | – Презентация закончена. |
| If *anyone has any questions / there are any questions, I'll be pleased / I'll do my best* to answer them. | – Если у кого-либо есть вопросы, я *буду рад / постараюсь* ответить на них. |
| Now I'm ready to answer your questions. | А сейчас я готов(а) ответить на ваши вопросы. |

| | |
|---|---|
| If there are no (more) questions, thank you for your interest. | Если вопросов (больше) нет, спасибо за проявленный интерес. |
| **Referring to a previous point made** | |
| As I mentioned earlier … . | – Как отмечалось раньше … . |
| **Answering questions** | |
| Sorry, could you say that again, please?<br>If I've understood your question correctly, you would like me to …<br>I'm sorry. I didn't hear you. Would you mind repeating your question? | Извините, не могли бы вы сказать это еще раз?<br>Если я правильно понял(а) ваш вопрос, вы хотели бы, чтобы я…?<br><br>Извините, я не расслышал(а). Не могли бы повторить ваш вопрос? |
| **Finishing and thanking** | |
| Thank you for your attention.<br>Finally, I'd like *to finish / to end* by thanking you (all) *for your attention / for coming today.* | – Спасибо за внимание.<br>– По окончании презентации я хочу поблагодарить всех *за внимание / за то, что вы пришли на презентацию.* |

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Учебное издание

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ENGLISH FOR ENGINEERING STUDENTS

Учебное пособие

Подписано в печать 23.09.2020. Формат 60×84/16.
Усл. печ. л. 17,21. Тираж 100. Заказ 203.

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