Министерство образования и науки Российской Федерации

Федеральное государственное бюджетное образовательное
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«Томский государственный университет систем управления
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ENGLISH
FOR ENGINEERING FACULTIES

Учебное пособие

Рекомендовано Учебно-методическим объединением
по образованию в области лингвистики
Министерства образования и науки Российской Федерации
в качестве учебного пособия по английскому языку
для студентов инженерных факультетов

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Настоящее учебное пособие составлено в соответствии с требованиями ФГОС ВПО направлений и специальностей технического университета и содержанием программы по иностранному языку для технических вузов.

Пособие состоит из следующих разделов: Oral Speech Course (вузовские темы бытового и страноведческого характера); Reading Course (адаптированные научно-популярные тексты с коммуникативными упражнениями); Corrective Course (вводно-коррективный курс), Grammar Reference (грамматический справочник); Texts for Self-Study Training (тексты для самостоятельной работы); Additional Exercises (упражнения повышенной сложности для перевода); Appendices (краткие сведения по фонетике и таблицы основных способов словообразования).

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Contents

Преподавателям и студентам от авторов

Настоящее учебное пособие предназначено в качестве базового курса для студентов технических университетов и институтов, имеющих уровень владения английским языком в соответствии с программой средней школы, и составлен на основе требований федеральных государственных образовательных стандартов (ФГОС) для бакалавриата и специалитета. Оно может быть использовано для самостоятельного совершенствования знаний магистрами и аспирантами.

Основная цель учебного пособия – формирование у студентов общекультурных и профессиональных компетенций, необходимых для социального и профессионального взаимодействия.

При разработке учебного материала авторы учитывали необходимость повторения и обобщения 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 и второго курсов следующих факультетов технического университета: радиотехнического, радиоконструкторского, электронной техники, систем управления, вычислительных систем, моделирования систем, инновационных технологий и подобных им. Тексты пособия отобраны с учетом их информативности и соответствия последним достижениям науки и техники и представлены по принципу постепенного усложнения языкового материала и тематики.

Учебное пособие рассчитано на 144 часа (4 ЗЕТ) аудиторных занятий и 180 часов (5 ЗЕТ) самостоятельной работы.

Настоящее учебное пособие состоит из 6 частей:

1. Oral Speech Course (**Units 1-5)**
2. Reading Course (**Units 1-10**)
3. Corrective Course (Lessons 1-7)
4. Grammar Reference
5. Texts for Self-Study Training
6. Additional Exercises.

В конце пособия имеются Приложения (**Appendices**), которые включают в себя краткие сведения по фонетике и таблицы основных способов словообразования.

Раздел (**Oral Speech Course**) содержит обязательные темы бытового и страноведческого характера, рекомендуемые программой обучения иностранным языкам в неязыковом вузе.

Второй раздел (**Reading Course**) содержит адаптированные научно-популярные тексты и упражнения к ним.

Раздел **Grammar Reference** представляет собой грамматический справочник.

Тексты для самостоятельной работы даны в разделе **Texts for Self-Study Training.**

В разделе **Additional Exercises** представлены упражнения повышенной сложности для перевода.

Условные обозначения:

 – тексты для чтения

 – устные упражнения

 – письменные упражнения

Предъявление языкового материала в настоящем учебном пособии предполагает формирование и совершенствование следующих умений и навыков:

- устной и письменной речи, необходимых для социального и профессионального общения в рамках тематики, предусмотренной программой;
- грамматически корректного оформления высказывания;
- перевода научно-популярной литературы и литературы по специальности, аннотирования и реферирования текстовой информации;
- составления и осуществления монологических высказываний по профессиональной тематике (доклады, сообщения и др.);
- самостоятельной работы со специальной литературой на иностранном языке с целью получения профессиональной информации.

Изучение учебного материала рекомендуется начинать с вводно-коррективного курса (**Corrective Course**), основной целью которого является повторение языкового материала и компенсация недостатка умений и навыков языковой подготовки в соответствии со школьной программой.

Далее рекомендовано освоение уроков основных разделов: **Oral Speech Course (OSC)** и **Reading Course (RC)**, которые состоят из уроков-тем (Units).

Работа над языковым материалом каждого урока-темы начинается с введения лексики (*Read the following words and mind their pronunciation, Memorize the following words and expressions, Notes to the text*). В учебном пособии активизируется около 2500 слов и словосочетаний, которые относятся к наиболее частотной общенаучной и бытовой лексике. Новые слова вводятся в предложениях, а для их активизации предложены различные упражнения *(Match the following words and expressions with their Russian equivalents, Complete the following sentences with the expressions from the box, Choose the correct variant and complete the following sentences, Match the English terms with their Russian definitions, Give the Russian equivalents of the words in bold*). Особое внимание уделяется расширению потенциального словаря. В связи с этим в каждом разделе имеются упражнения на узнавание и верную интерпретацию интернациональных слов (*Read the following words and expressions and try to guess their meaning*). Неоднократное использование введенных и закрепленных слов в обоих разделах урока-темы обеспечивает повторяемость лексики, необходимую для овладения активным и пассивным словарем. В каждом разделе предусмотрена работа с грамматическим материалом. В основу отбора грамматического материала положены данные лингвостатистических исследований, выявляющие наиболее типичные для научно-технического стиля структуры. Студентам предоставляется возможность познакомиться со значением отобранных грамматических явлений, их формой и примерами употребления в разделе **Grammar Reference**. Данный раздел предназначен, прежде всего, студентам. Здесь имеется поурочный грамматический справочник, позволяющий студенту при необходимости самостоятельно изучить или повторить то или иное грамматическое явление.

В разделах **Oral Speech Course** и **Reading Course** представлено два основных текста: A и B. Перед каждым текстом имеется список активной лексики для запоминания и расширения словарного запаса. После текста студентам предлагаются задания обнаружить фрагменты текста определенного содержания. Как правило, эти отрывки являются наиболее насыщенными с точки зрения активизируемого языкового материала: лексики и грамматики. Для этого предполагается использовать поисковое чтение. Обнаруженные фрагменты

предназначены для практики в изучающем чтении, которое предусматривает полное и точное понимание текста. Средством проверки выступает устный или письменный перевод текста или фрагментов текста. Основным требованием к переводу является его адекватность оригиналу.

В каждом уроке-теме представлены коммуникативные упражнения, целью которых является формирование навыков устной и письменной речи *(Read the text again and answer the questions, Read the statements and decide if they are true (T) or false (F), Write the essay about a famous person)*. Для выполнения ряда упражнений предполагается работа в парах или небольших группах *(Ask and answer the following questions, then report your answers to the class, Talk to a partner and tell him/her about your native town, Topics for discussion)*.

Следует отметить, что на усмотрение преподавателя текст B и задания к нему могут быть рекомендованы для самостоятельной работы.

Предъявление учебного материала рекомендуется осуществлять следующим образом.

Unit 1 (OSC) Personal Life
Unit 1 (RC) Communication
Unit 2 (OSC) The Value of Education
Unit 2 (RC) Electronic Devices
Unit 3 (OSC) The Russian Federation
Unit 3 (RC) Recording Systems
Unit 4 (RC) Television
Unit 5 (RC) Integrated Circuits
Unit 6 (RC) Computers
Unit 7 (RC) The Internet
Unit 8 (RC) Information Security
Unit 4 (OSC) The United Kingdom
Unit 9 (RC) Optical Communication
Unit 10 (RC) Neutrino
Unit 5 (OSC) The Unites States of America.

Для организации самостоятельной работы студентов с целью закрепления умений и навыков, полученных на аудиторных занятиях, представлены тексты в разделе **Texts for Self-Study Training**, тематика которых разработана с учетом будущей квалификации дипломированного бакалавра, специалиста, магистра.

Л.Б. Кадулина, Л.Е. Лычковская,
Е.Р. Менгардт, О.И. Тараканова

ORAL SPEECH COURSE

Unit 1. PERSONAL LIFE

Text A *My Family*
Text B *Bill Gates*

Grammar: **articles, plurals, possessive case, the verb *to be*, the verb *to have (got)***

Text A

MY FAMILY

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

Student, university, radioelectronics, guitar, weekend, programmer, energetic, doctor, faculty, specialist, management, economics, Russian, France, April, October, system, engineer, computer, company, character, music, electrician, sphere, business, finance, pensioner, cousin, pilot.

1.2. Read the following words and mind their pronunciation.

introduce	[ˌɪntrə`djuːs]	ancient	[`eɪnʃ(ə)nt]
appearance	[ə`pɪərəns]	quite	[kwaɪt]
quiet	[kwaɪt]	event	[ɪ`vent]
guitar	[gɪ`tɑː]	character	[`kærəktə]
sphere	[sfɪə]	electrician	[ˌɪlek`trɪʃ(ə)n]
pensioner	[`penʃənə]	finance	[`faɪnæns]
architect	[`ɑːkɪtekt]	cousin	[`kʌz(ə)n]
enough	[ɪ`nʌf]		

Memorize the following words and expressions

for short	*для краткости; сокращённо*	**to get on (with)**	*ладить*
to be born	*родиться*	**to go in for sport**	*заниматься спортом*

to like (love) doing smth.	*любить делать что-л.*	**to have much in common**	*иметь много общего*
to be good (bad) at smth.	*преуспевать (не преуспевать) в чем-л.*	**to take part**	*принимать участие*
to be married to smb.	*быть женатым на ком-л., быть замужем за кем-л.*	**to do one's best**	*сделать всё от себя зависящее*
quite tall	*довольно высокий*	**to agree with smb., to smth.**	*соглашаться с кем-л. или с чем-л.*
well-built	*крепкий; хорошо сложённый*	**to prefer**	*предпочитать*
short	*невысокого роста*	**to be in poor health**	*болеть*
plump	*полный, пухлый*		

1.3. Read the text.

MY FAMILY

Hello! Let me introduce myself. My name is Alexander, Sasha for short. Alexander is my first name and Sokolov is my surname. I am Russian. I am nineteen. I was born on 5th April in Tomsk, an ancient Siberian town. Now I am a second-year student of Tomsk University of Control Systems and Radioelectronics. In four years' time I will become an engineer.

Now let me describe my appearance. I am quite tall and slim, with dark hair and brown eyes. I love playing the guitar and I think I am good at it. I am not married yet, but I have got a girlfriend. Her name is Irina. She is seventeen and she is a student too. She is not tall, quite fair and very pretty.

Our family is not very large. I have got a father, a mother a sister and a brother. We live in a new four rooms' flat. My father's name is Igor and he is forty-five years old. He is tall and well-built, with short black hair and grey eyes. He works for a computer company as a programmer. He likes his job and spends most of the time there. By character my father is a quiet man, while my mother is energetic and talkative. Her name is Olga. She is short and plump, with curly hair. She is quite good-looking. She is a teacher of music and plays the piano well. My mother always has a lot of work to do about the house and at school. She is a busy woman and we all help her. My

elder sister, Anna, is twenty-five years old. She is married. She is a doctor. Her husband, Nikolay, is an electrician. They have got two children: a daughter and a son. Their daughter, Diana, is four and their son, Oleg, is two.

My younger brother's name is Stas. Now he is a student at Moscow State University. He lives in a hostel not far from there. There are three more students in his room: one from Switzerland and two from France. They are from different countries but they get on well together. They study at the same faculty, the faculty of management and finance and have much in common. They are future specialists in the sphere of business and national economics. Stas goes in for sport a lot. He likes swimming so three times a week he goes to the swimming-pool. Stas is a member of the university swimming team and twice a year, in April and October, he takes part in the swimming competitions among the students of different faculties. Stas is a good student. He works hard and does his best to be a good specialist in economics and management.

Our family is very friendly. In the evenings we watch TV, read books and newspapers, listen to music or simply talk about the events of the day. Our parents do not always agree to what we say, but they listen to our opinion. We like spending our weekends out of town. We often go to the village where our grandparents live. They are pensioners now, but prefer to live in the country. My great-grandmother is still alive. She lives with my grandmother's family and is always glad to see us. She is in poor health and asks us to come and see her more often. I have also got a lot of relatives: uncles, aunts and cousins. We are happy when we are together.

1.4. Match the following words and expressions with their Russian equivalents.

1. to play the piano	a) хорошенькая
2. a second-year student	b) подруга (молодого человека)
3. in four years' time	c) учиться на одном факультете
4. talkative	d) симпатичный (-ая)
5. dark hair	e) карие глаза
6. brown eyes	f) темные волосы
7. a girlfriend	g) старшая сестра
8. pretty	h) разговорчивый, болтливый
9. well-built	i) дважды в год
10. a quiet man	j) поехать в деревню

11. good-looking	k) играть на фортепиано
12. short	l) кудрявые волосы
13. an elder sister	m) прабабушка
14. twice a year	n) студент второго курса
15. to study at the same faculty	o) через четыре года
16. to become an engineer	p) проводить выходные дни за городом
17. to spend weekends out of town	q) стать инженером
18. to go to the village	r) тихий человек
19. a great-grandmother	s) крепкий; хорошо сложённый
20. curly hair	t) невысокого роста

1.5 Read the text again and answer the questions.

1. What is Alexander's surname?
2. How old is he?
3. Where and when was he born?
4. What does he do? (What's his job?)
5. Has he got a girlfriend?
6. Is his family large?
7. How many people are there in his family?
8. What's his father like?
9. Is Igor tall or short?
10. Is Olga a busy woman?
11. Has Sasha got any sisters or brothers?
12. Is Anna married or single?
13. Is Stas a good student?
14. Has Alexander got many relatives?
15. Is his family friendly?

1.6. Work in pairs. Ask and answer the following questions, then report your answers to the class.

1. What is your name?
2. Where and when were you born?
3. How old are you?
4. What do you do? (What's your job?)
5. What's your address?
6. What's your phone number?

7. What are you like?
8. Are you married or single?
9. Have you got a large family?
10. Have you got any sisters or brothers?
11. How many relatives have you got? What are their names?

Text B

BILL GATES

Pretext exercises

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

Microsoft Corporation, leader, business, realize, potential, interest, programming, computers, version, microcomputer, company, philanthropy, philanthropic, initiative, global, career, architect, individual, golf.

1.8. Read the following words and mind their pronunciation.

attorney	[ə`tə:nɪ]	initiative	[ɪ`nɪʃətɪv]
philanthropy	[fɪ`lænθrəpɪ]	career	[kə`rɪə]
inequity	[ɪ`nekwətɪ]	percent	[pə`sent]

Memorize the following words and expressions

attorney	*адвокат*	**cost-effective**	*рентабельный*
regent	*член попечитель-ского совета*	**foundation**	*фонд*
exclusive	*престижный*	**inequity**	*несправедливость*
upbringing	*воспитание*	**to rank**	*занимать какое-л. место*
software	*программное обеспечение (ПО), «софт»*	**software architect**	*главный архитектор программного обеспечения*
to devote (one's) energy	*вкладывать энергию*	**shareholder**	*акционер*

1.9. Read the text.

BILL GATES

"We've really achieved the ideal of what I wanted Microsoft to become."

Bill Gates, June 2008

William (Bill) H. Gates III is a chairman of Microsoft Corporation, the worldwide leader in software, services that help people and businesses realize their full potential.

Gates was born on October 28, 1955 in Seattle, Washington, the USA. His father, William H. Gates II was a Seattle attorney and his mother, Mary Maxwell Gates was a school teacher, University of Washington regent, and chairwoman of *United Way International*. Gates and his two sisters attended the exclusive secondary "Lakeside School" and had a comfortable upbringing. There, he discovered his interest in software and began programming computers at age 13.

In 1973, Gates entered Harvard University as a freshman, where he developed a version of the programming language BASIC for the first microcomputer – the MITS Altair.

In his junior year, Gates left Harvard to devote his energies to Microsoft, a company he began in 1975 with his childhood friend Paul Allen. Under Gates's leadership, Microsoft has continually advanced and improved software technology, and made it easier, more cost-effective and more enjoyable for people using computers.

Philanthropy is very important to Gates. He and his wife, Melinda, started a foundation in 2000 to help reduce inequities in the United States and around the world. *The Bill & Melinda Gates Foundation* supports philanthropic initiatives in the areas of global health and learning, with the hope that in the 21st century, advances in these areas will be available for all people.

He is ranked among the world's wealthiest people and was the wealthiest from 1995 to 2009, excluding 2008, when he was ranked third, and 2010-2011, when he was ranked second behind Mexico's Carlos Slim Helú. During his career at Microsoft, Gates held the positions of CEO and chief software architect, and remains the largest individual shareholder with more

than 8 percent of the common stock. He is also an author and a co-author of several books.

Bill Gates lives near Lake Washington with his wife Melinda French Gates and their three children. Interests of Gates include reading, golf and playing bridge.

Notes to the text

United Way International	*благотворительная общественная организация, занимающаяся сбором средств на оказание гуманитарной помощи*
freshman	*студент первого курса (амер.)*
BASIC (Beginner's All-purpose Symbolic Instruction Code)	*один из первых простых языков компьютерного программирования Бейсик*
MITS Altair	*персональный компьютер Altair (фирмы Micro Instrumentation Telemetry Systems, 1975 г.)*
CEO (Chief Executive Officer)	*главный исполнительный директор*

1.10. Read the text again and answer the questions.

1. When and where was William (Bill) H. Gates born?
2. What were his parents?
3. When did Bill Gates begin programming?
4. What did Gates develop in 1973?
5. Did he graduate from Harvard University?
6. When was the company Microsoft formed?
7. What initiatives does *The Bill & Melinda Gates Foundation* support?
8. Which positions did Bill Gates hold during his career at Microsoft?
9. Who is the richest person in the world: William Henry Gates or Carlos Slim Helú?
10. What are the interests of Bill Gates?

1.11. Write the essay about a famous person.

GRAMMAR

Articles a (an) / the, Plurals, Possessive Case

1.12. Complete the following sentences with *a, an, the or– .*

1. I have got … English book.
2. This boy is … student of … group 3.
3. Is Mary from … Manchester or from … London?
4. Come to … blackboard and write … Exercise 2.
5. There is … picture on … page 20.
6. Open … door, please.
7. You have got … mistake in … word "correspondence".
8. … Amazon is … longest river in … world.
9. What is … capital of … Spain?
10. There were only … two people in … hall.
11. Elbrus is … highest mountain in … Caucasus.
12. Where is … Sahara Desert?

1.13. Write plural form of the following nouns.

A person – …, a businessman – …, a camera …, a life – …, an actress …, a photo – …, a country – …, a child – …, a tooth – …, a goose – …, a foot – …, a fish – …, a policewoman – …, a mouse – …, an aircraft – … , a wife – …, a sheep – …, a tomato – …, a nephew – … .

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

Model: the office of Mr. Green – Mr. Green's office

1. the success of my chief; 2. the room of managers; 3. the money of salesmen; 4. the advice of Miss Jane; 5. the proposal of our Director; 6. the phone number of their boss; 7. the opinion of his friends; 8. the fax of businessmen; 9. the problem of experts; 10. the business of Mr. Black.

The verb *to be*

1.15. 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. They are married. (–)
2. She is from Spain. (?)
3. I am a driver. (–)
4. Her boyfriend is from Germany. (?)
5. He is a teacher. (–)
6. They are from Australia. (–)
7. It is near the chair. (?)
8. You are Russian. (–)
9. His wife is German. (?)
10. I am a student. (?)
11. He is a pilot. (–)
12. We are from Italy. (?)
13. My name is John Winston. (?)
14. I am seventeen years old. (?)
15. Her name is Julia. (–)

1.16. Complete the dialogue using the cues, as in the model.

Model: – your / name?
– **What's your name?**
– Roberta Stone.

1. you / from / London? … – No, I'm from Liverpool.
2. you / English? … – Yes, I am.
3. your / job? … – I'm an actress.
4. you / married? … – No, I'm single.
5. your / address? … – 35, South Street.

1.17. Complete the following sentences with the correct form of the verb *to be.*

1. He … a computer programmer.
   a) am b) were c) is
2. Her hobby … tennis.
   a) are b) were c) is
3. They … active members of our English club last year.
   a) will be b) were c) are
4. The weather … nice tomorrow.
   a) will be b) is c) was
5. I hope it … cold next Friday.
   a) isn't b) wasn't c) won't be
6. He … in Kiev in two days' time.
   a) is b) will be c) was
7. '… you at the University yesterday?' 'Yes, I … .'
   a) Was; was b) Was; am c) Were; was
8. … you busy now?
   a) Is b) Were c) Are
9. What country … you from?
   a) are b) was c) is
10. When I … a small child I … very noisy, but now I … not.
    a) were, was, am b) was, was, am c) was, was, was
11. Last year we ... at school, next year we ... the second year students.
    a) was, are b) were, are c) were, will be
12. Moscow ... the capital of Russia.
    a) was b) are c) is

1.18. Translate the following sentences into English.

1. Моя сестра – учительница.
2. Завтра я буду занят.
3. Где вы были вчера?
4. Она замужем.
5. Они из Лондона? – Нет, они из Оксфорда.
6. Когда она была молодой, она была очень хорошенькой.
7. Вы программист?
8. Джону десять лет.
9. Ее муж не итальянец, он немец.

10. Из какой вы страны?
11. Он был в университете вчера? – Нет, он был дома.
12. Я надеюсь, ты будешь свободен в следующую субботу.

The verb *to have (got)*

1.19. Complete the following sentences with the correct form of the verb *to have* (*got*).

1. My husband and I … sometimes … a lot of problems.
2. When I was younger, I … a lot of friends, but now I … any.
3. I think we … a new house next year.
4. They … a son and two daughters.
5. He … enough money five years ago, but now he … much.
6. When he was seventeen, he … a motorbike, but now he … an expensive car.
7. I am sure I … a modern computer in three years' time.
8. Our library ... a great number of books and magazines.
9. They ... industrial training in a month.
10. My brother … a good sense of humour.

1.20. Translate the following sentences into English.

1. Я уверен, что через два года у меня будет новый дом.
2. У нас много проблем.
3. Когда Питер был молодым, у него были темные волосы.
5. У тебя есть собака? – Нет, у меня кошка.
4. У него есть компьютер? – Да.
5. Я надеюсь, что в следующем месяце у меня будет хорошая работа.
6. У моего дяди есть новый автомобиль.

Unit 2. THE VALUE OF EDUCATION

Text A *Higher Education in Russia*
Text B *Tomsk State University of Control Systems and Radioelectronics*

Grammar: **Present Simple, Present Progressive, Future Simple, Past Simple, Present Perfect**

Text A

HIGHER EDUCATION IN RUSSIA

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

History, Russia, university, initiative, plan, revolution, to guarantee, soviet, constitution, examination, grant, result, the Russian Federation, democratic state, start, democratic reform, sphere, system, school, colleague, lyceum, gymnasium, mechanism, social, speciality, faculty, innovative business ideas and theories, region, nation, prestigious, specialist, person, baccalaureate, magistrate.

2.2. Read the following words and mind their pronunciation.

knowledge	[`nɔlɪʤ]	generation	[ˌʤenə`reɪʃən]
accordance	[ə`kɔːdəns]	importance	[ɪm`pɔːtəns]
speciality	[speʃɪ`ælɪtɪ]	sphere	[sfɪə]
examination	[ɪgˌzæmɪ`neɪʃn]	opportunity	[ˌɔpə`tjuːnətɪ]
foreign	[`fɔrɪn]	initiative	[ɪ`nɪʃətɪv]
powerful	[`pauəful]	entrance	[`entrəns]
prestigious	[pres`tɪʤəs]	guarantee	[ˌgærən`tiː]
colleague	[`kɔliːg]	lyceum	[laɪ`siːəm]
Region	[`riːʤn]	theory	[`θɪərɪ]
baccalaureate	[bækə`lɔrɪət]	magistrate	[`mæʤɪstrət]

Memorize the following words and expressions

higher education	*высшее образование*	**aim**	*цель*
on the initiative of smb.	*по инициативе кого-л.*	**humanities**	*гуманитарные предметы*
in accordance with smth.	*в соответствии с чем-л., согласно чему-л.*	**powerful**	*значительный, сильный, мощный*
secondary education	*среднее образование*	**social development**	*общественное развитие*
to pass entrance examinations	*сдать вступительные экзамены*	**school leaver**	*выпускник школы*
educational establishment	*образовательное учреждение*	**to enter the university**	*поступить в университет*
monthly grant	*ежемесячная стипендия*	**wide choice of smth.**	*большой выбор чего-либо*
to fail (in) an examination	*не выдержать экзамен*	**to graduate from the university**	*закончить университет*
to take place	*происходить, случаться, иметь место*	**well-paid job**	*хорошо оплачиваемая работа*
free of charge	*бесплатный*		

2.3. Read the text.

HIGHER EDUCATION IN RUSSIA

"Education is the passport to the future, for tomorrow belongs to those who prepare for it today".

Malkom X.

The history of higher education in Russia goes back to 1755 when the first University was founded on the initiative of M.V. Lomonosov and in accordance with his plan. Later, universities were opened in many other big cities of the country. After the revolution in 1917, education was guaranteed to Soviet citizens by the Constitution and was free of charge. Higher education was not the exception. Those who got the secondary education and passed entrance examinations to higher educational establishments received monthly grants if they had good results during the term and did not fail the examination at the end of each term. Course of study lasted five years.

In 1991, the Russian Federation, one of the biggest and the most powerful countries in the world, began to be developed as a democratic state. From the very start democratic reforms began to take place in many spheres of life as well as in the system of higher education. Its aim was to prepare the younger generation for independent life and work in new conditions. There have appeared a lot of private schools, colleges, lyceums, gymnasiums and different courses where students can study sciences and humanities as well as foreign languages.

Since the year 2010 the system of higher education in Russia has been greatly changing into the two-level one: the Baccalaureate (undergraduate studies) and the Magistrate (MA course).

Higher education in Russia is becoming a powerful mechanism for the social development of the country. The level of higher education has greatly changed. Nowadays school leavers have opportunities to enter any university in the city where they live as well as in any other cities in accordance with their future speciality. Universities offer the high level of knowledge and have a wide choice of departments and faculties. The universities provide the faculties for innovative business ideas and theories that shape the fortunes of cities, regions and even nations. It is becoming prestigious and important to graduate from the university and get a well-paid job both in Russia and in other countries of the world.

Higher education is of great importance not only in Russia but also all over the world and you have to do your best to be a good specialist and to follow the conditions and requirements of modern life. Nowadays a bright future of any person depends on higher education.

Notes to the text

Bachelor's degree	степень бакалавра (академическая степень или квалификация, присуждаемая лицам, освоившим соответствующие образовательные программы высшего образования)
Master's degree	степень магистра (академическая степень, квалификация, приобретаемая студентом после окончания магистратуры – ступени высшего профессионального образования, следующая после бакалавриата, позволяющая углубить специализацию по определенному профессиональному направлению)

2.4. Read the statements and decide if they are true (T) or false (F).

1. The first University in Russia was founded in accordance with the plan of M.V. Lomonosov.
2. It was guaranteed by the Constitution that any Soviet citizen could get higher education.
3. It was not necessary to have secondary education to become a university student.
4. The government of the Russian Federation started the reforms in the system of higher education in 1991.
5. Working in new conditions was one of the aims of reforming the system of higher education.
6. In accordance with the reforms everybody had to attend private schools.
7. The social development of the country depends on the level of higher education.
8. Nowadays the system of higher education in Russia is becoming a two-level one.
9. It does not matter for the fortunes of cities if you have education or not.
10. The Russian Federation is a country that provides young people with the opportunity of getting higher education.

2.5. Match the following words and expressions with their equivalents.

1) to graduate from the state university	a) иностранный язык
2) to find a well-paid job	b) получать стипендию
3) powerful energy	c) уехать из страны
4) the aim of my life	d) замечательные возможности
5) to enter the medical university	e) молодое поколение
6) a foreign language	f) закончить государственный университет
7) to receive a grant	g) в соответствии с программой
8) excellent opportunities	h) в течение семестра
9) to leave the country	i) большой выбор специальностей
10) to pass entrance examinations	j) поступить в медицинский университет
11) during the term	k) цель моей жизни
12) young generation	l) найти хорошо оплачиваемую работу
13) in accordance with the program	m) так же, как
14) a wide choice of specialties	n) по инициативе преподавателя
15) high level of knowledge	o) мощная энергия
16) to fail the examination in Physics	p) иметь большое значение
17) as well as	q) с самого начала
18) on the initiative of the teacher	r) не выдержать экзамен по физике
19) from the very start	s) высокий уровень знаний
20) to be of great importance	t) сдать вступительные экзамены

2.6. Complete the following sentences with the expressions from the box.

of great importance find a well-paid job fail the exams
in accordance with the plan a wide choice of specialities
educational establishments a high level of knowledge
excellent opportunities foreign languages entrance examinations

1. It doesn't matter where you live, but higher education is … everywhere.
2. At universities and colleges students get … and become good specialists in all the spheres of science and technology.
3. School leavers have … to enter the universities all over the country.
4. There are three … you have to pass. They are Physics, Mathematics and English.
5. There are a lot of … in Moscow but the State University is the most famous among them.
6. The students have several special subjects … .
7. Our university offers … . You may choose computer science, control systems, radioengineering, radioelectronics, *etc.*
8. There are a lot of vacancies but there is always a problem to … .
9. If you can't speak any … especially English, you will have some serious difficulties to get further education abroad.
10. You have to work hard and not to … if you want to get a monthly grant.

2.7. Choose ten of the expressions from exercise 2.5 and write sentences of your own.

Text B

TOMSK STATE UNIVERSITY OF CONTROL SYSTEMS AND RADIOELECTRONICS

Pretext exercises

2.8. Read the following words and try to guess their meaning.

Faculty, examination, computer, design, cooperate, speciality, distant, department, opportunity, radioelectronics, telecommunication, system, control, industrial, direction, radioengineering, modern, firm, company, professional, international, engineer, construction, production, humanitarian, economics, modeling.

2.9. Read the following words and mind their pronunciation.

higher	[`haɪə]	equip	[ɪ`kwɪp]
establishment	[ɪs`tæblɪʃmənt]	automated	[ˌɔːtə`meɪtɪd]
educational	[ˌedju`keɪʃnl]	device	[dɪ`vaɪs]
department	[dɪ`pɑːtmənt]	qualified	[`kwɔlɪfaɪd]
engineer	[ˌendʒɪ`nɪə]	scientific	[ˌsaɪən`tɪfɪk]
enterprise	[`entəpraɪz]	society	[sə`saɪətɪ]
direction	[dɪ`rekʃn]		

Memorize the following words and expressions

to found	*основывать*	**research field**	*сфера исследования*
automated control systems	*системы автоматизированного управления*	**exchange of smb. (smth.)**	*обмен чем-либо, кем-либо*
distant education	*дистанционное образование*	**leading university**	*ведущий университет*
to give an opportunity	*предоставлять возможность*	**scientific society**	*научное общество (объединение)*
native town	*родной город*	**industrial enterprise**	*промышленное предприятие (организация, фирма)*
highly qualified	*высококвалифицированный*	**sport facilities**	*спортивные сооружения*
in the field of smth.	*в области чего-либо*	**Leisure Center**	*Центр досуга (Центр внеучебной работы)*
to win a contest	*выиграть конкурс*	**high-quality training**	*высококачественное обучение*
since then	*с того момента (с тех пор)*	**in order to**	*для того чтобы*
to carry out	*выполнять (осуществлять)*		

2.10. Read the text.

TOMSK STATE UNIVERSITY OF CONTROL SYSTEMS AND RADIOELECTRONICS

Tomsk State University of Control Systems and Radioelectronics was founded in 1962. At the present time TUCSR is one of the leading higher educational establishments in Russia.

There are thirteen faculties at the university: the Radio-Design, Radio-Engineering, Electronic Engineering, Computer Systems, Automated Control Systems, Economic, Humanitarian, Law and the Innovation ones. There is also the faculty of System Modeling, the faculty of Part-time (evening) and Correspondence Education and the faculty of Additional Education (for post-graduates). In 1998, the Faculty of Distant Education was founded which is one of the biggest one and gives the opportunity to get higher education without leaving native towns and cities for more than 7,000 students all over Russia on nineteen specialties.

The university is staffed with highly qualified teachers. A lot of them are Doctors of Science. The teachers of the university train bachelors, specialists and magisters in more than fifty specialties in the field of radi-oengineering, nanotechnology, optics, programming, information security, radioelectronics, automated control systems, information technologies, economics, management, juridical sciences, social work, *etc*.

In 2006, TUCSR won the contest among the universities of higher professional education in accordance with the national project “Education” and since then the innovative program has been carried out in scientific and research fields of TUCSR.

The important directions in educational, scientific and research development of the university are the exchange of students and cooperation with the leading universities of the USA, Germany, France, China, Japan, the Netherlands, Great Britain and other countries.

The innovative form of educational process in TUCSR is the organization of students’ scientific societies where they are engaged in group research work and design as well as in getting additional knowledge and qualities of leaders. Such form of learning gives the start for further creative projects and for getting demanded and well-paid jobs in Russian and international industrial enterprises, firms and companies.

TUCSR was the first university in Russia that opened its own Business Incubator which is now the residence for many students and their tutors where they carry out theoretical and practical research, create different innovative projects for industrial enterprises in Russia as well as for some other countries.

The university has modern sport facilities such as a sport gym, a football pitch, a fitness center and others. The students can do any sports they like: playing volleyball, basketball, football, tennis, and chess. They can also do rowing, judo, boxing and aerobics as well as going skiing and swimming. At the University Leisure Center students can take up ball and modern dancing, solo and group singing, writing poems, playing and writing music.

In October 2012 TUCSR celebrated its fiftieth anniversary. No doubt that Tomsk State University of Control Systems and Radioelectronics is developing rapidly. The students of the university have all the opportunities for high-quality training and they try to do their best in order to become good specialists in the modern spheres of science, industry and technology.

2.11. Read the text again and answer the questions.

1. When was TUCSR founded?
2. How many faculties are there in TUCSR? What are their names?
3. When was the Faculty of Distant Education founded?
4. When did the university win the contest in accordance with the national program “Education”?
5. What faculty do you study at?
6. What is your future speciality?
7. Universities of what countries does TUCSR cooperate with?
8. What sports are popular in TUCSR?
9. What can students do in their free time?
10. Why is it important to do research work in TUCSR?

2.12. Imagine you are talking to a foreign student. What would you tell him about the university you are studying at?

GRAMMAR

Present Simple

2.13. Complete the following sentences with the correct form of the verb.

1. Steve never … about his success. (*talk*)
2. I always … the teachers' questions. (*answer*)
3. She sometimes … late for the first lecture. (*come*)
4. At the weekend David … a lot of free time. (*have*)
5. Kelly often … to her parents. (*phone*)
6. My friends never ... for a walk at night. (*go*)
7. She ... at six o'clock every morning. (*wake up*)
8. Ann and Kate ... playing tennis. (*like*)
9. I ... stamps. (*collect*)
10. Bob … to be an engineer. (*want*)

2.14. Make the following sentences negative.

Model: I **have** some free time on Saturday (*weekdays*).
I **don't have** any free time on weekdays.

1. Fred **has** a shower every morning (*evening*).
2. On Sundays my parents **go** to the countryside (*city park*).
3. Kelly **leaves** home at half past eight every day (*at half past nine*).
4. We **do** our home work on Sundays (*on Saturdays*).
5. She **does** morning exercises every morning (*at weekends*).
6. Bob **gets up** early on weekdays (*on Sunday*).
7. Every Friday they **play** football in the university gym (basketball).
8. Mary **visits** her parents on summer holidays (*on winter holydays*).
9. Jane **knows** how to ski (*to skate*).
10. Our volleyball team always **wins** the competitions (*football team*).

2.15. Put the questions to the underlined words.

Model: My group-mate knows **physics** very well. (*What subject*)
What subject does your group-mate know very well?

1. The students have laboratory works **every week.** (*How often*)
2. Ann likes **classical music**. (*What music*)
3. They get to the university **by bus**. (*How*)
4. Henry leaves home for the university **at 8.30**. (*What time)*
5. The students of my group have lunch **at the university cafeteria**. (*Where*)
6. **Lucy and Helen** work a lot. (*Who*)
7. Our group has **three lectures** on Friday. (*How many*)
8. On Monday my lessons finish **at three p.m.** (*When*)
9. I meet **my group-mates** every morning in the hall. (*Who*)
10. Angela comes **from Italy**. (*Where*)

2.16. Answer the following questions.

1. Where do you come from?
2. Where do your parents live?
3. Do you play any sports?
4. Does your mother work at weekends?
5. What time do your lessons start?
6. Where do you have lunch?
7. What time do you wake up?
8. When do you do your homework?
9. Dou you have laboratory works every week?
10. Which university subject do you like?
11. What do you do at weekends?
12. How often do you go to the gym?
13. Does your best friend have a car?
14. When do you have session exams?
15. Why do you want to be an engineer?

Present Progressive

2.17. Complete the following sentences with the correct form of the verb *to be.*

1. He … working hard at his French.
2. We … having lectures at the moment.
3. I … waiting for my mother near her office.

4. They … visiting the university museum now.
5. David … having an important meeting on Wednesday.
6. My group-mates … preparing for the test in Computer Science.
7. She … planning to get the second education.
8. Jack … doing his best to pass session exams with excellent marks.
9. This term the students … taking part in our project.
10. I … working hard to get good results.

2.18. Complete the following sentences with the correct form of the verb.

1. Henry … now. He … his room. (*not sleep; clean*)
2. My friends … lunch at the university cafeteria. (*have*)
3. Steve … at the office today. He … for the report at home. (*not work; prepare*)
4. At the moment I … to find a well-paid job. (*try*)
5. My parents … from Italy next Saturday. (*come back*)
6. His friends … tennis in the sport club. They … exercises at the university gym. (*not play; do*)
7. She … about the results of her test in Maths. (*think*)
8. We … to the news. We … (watch) an interesting film. (*not listen; watch*)
9. Is Chris at home? - No, he isn't. He … in the countryside. (*relax*)
10. They … English. They … French. (*not speak; speak*)

2.19. Put the questions to the underlined words.

Model: Tom is living **in the hostel** at the moment. (*Where*)
Where is Tom living at the moment**?**

1. He is having a wonderful time **in Egypt.** (Where)
2. I am planning to finish **my project** by the end of the week? (*What*)
3. We are taking books **from the library**. (*Where*)
4. Alex is wearing **a very smart suit** today. (*What*)
5. **She** is trying to find a good job now. (*Who*)
6. They are having two English lessons **this week.** (*When*)
7. Ann is talking on the phone **with her mother**. (*Who*)
8. My friends are having **three exams** this term. (*How many exams*)
9. Right now we are writing **a difficult test.** (*What*)
10. Those people are speaking **English**. (*What language)*

2.20. Answer the following questions.

1. Are you preparing for the test now?
2. Is your mother working at the moment?
3. What is your best friend doing?
4. Are your group-mates having English now?
5. What are you doing next weekend?
6. What are you doing at the moment?
7. Is your father reading a newspaper now?
8. Is anybody listening to you now?
9. Are your parents planning to spend a holiday in Thailand?
10. What are you wearing at the moment?

Present Simple – Present Progressive

2.21. Choose the correct variant.

1. We often *borrow / are borrowing* English films from the video club.
2. 'What's that music?' 'My brother *listen / is listening* to his new CD of gothic music.'
3. British people *are eating / eat* a lot of Indian food.
4. Don't make noise. My room-mates *sleep / are sleeping* after a hard day at the university.
5. 'Is John in?' 'No, he isn't. He *is helping / helps* in the Greenfield café. He usually *works / is working* there in summer.'
6. *Do you wear / Are you wearing* a uniform at your school?
7. Mary *isn't playing / doesn't play* tennis very well today.
8. Look at Alex in this photo. He *wears / is wearing* a very smart suit.
9. I don't need an umbrella. It *doesn't rain / isn't raining* at the moment.
10. A lot of British students *go / are going* to Spain on holidays.

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

Model: – Martin … (*not / usually / drive*) to work.
– Martin **does not usually drive** to work.
– I … (*have / lunch*) with my parents at the moment.
– I **am having lunch** with my parents at the moment.

1. 'Where is Andrew?' 'I … (*not / know*).'

2. Sally is tired. She … (*want*) to go home now.
3. What time … (*you / do*) your homework?
4. Mark … (*prepare*) for Physics test in the laboratory at the moment.
5. 'What's the weather like today?' 'It … (*snow*) again.'
6. Look! Those people … (*speak*) French. They are probably from France.
7. How often … (*you / read*) fashion magazines?
8. What is funny? What … (*they / laugh*) at?
9. Rick is a good student. Every Saturday he … (*go*) to the library.
10. 'What game … (*those students / play*)?' 'They are playing baseball.'

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

1. I **am leaving** tomorrow to spend Christmas with Mary's family.
2. The doctor **is feeling** her pulse.
3. We **are having** a party next Saturday. Would you like to come?
4. Listen! Ann **is singing** in the next room.
5. Kate, we **are going** to the town center. Are you coming with us?
6. I **am not going** away for my holidays next month because I haven't got enough money.
7. 'What **are** you **doing**?' 'I **am writing** a letter to my sister.'
8. Look! The bus **is coming**.
9. 'Where are Jack and Sally?' 'I don't know. I think they **are buying** a new house.'
10. 'When **are** you **meeting** your parents?' 'They **are coming** tomorrow morning.'

Future Simple

2.24. Choose the correct variant.

1. If Mark … the boat, we … fishing.
   a) repair; will go b) will repair; go c) repairs; will go
2. When you … home, I … you the letter.
   a) come; will read b) comes; will read c) will come; read
3. If she … me, I … her the news.
   a) will call; tell b) calls; will tell c) will call; will tell
4. When Barbara … the door, we … Happy Birthday.
   a) open; will sing b) will open; sing c) opens; will sing

5. Don't hurry him now, he … up as soon as he … ready.
   a) will get; is b) gets; will be c) get; will be
6. Don't go out yet. Wait until the rain … .
   a) will stop b) stop c) stops

Past Simple

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

Model: – Thomas … a new computer two days ago. (*buy*)
– Thomas **bought** a new computer two days ago.

1. I … an e-mail to Mary and she … me back immediately. (*send; write*)
2. Last summer Terry … to France. (*travel*)
3. My father … the university twenty years ago. (*graduate from*)
4. I always drive to work but yesterday I … a bus. (*take*)
5. We … a great show last night. (*see*)
6. Henry … late yesterday so he … Geometry. (*be; miss*)
7. Yesterday Sue … a package from Tom. (*receive*)
8. Three years ago I … swimming with my friends. (*go*)
9. When I … in Italy, I … in a luxury hotel. (*be; stay*)
10. Kelly … her project a week ago. (*finish*)

2.26. Make the following sentences negative, as in the model.

Model: – She **answered** the first question. (*the second question*)
– She **didn't answer** the second question.

1. Peter **had** dinner with Dorothy. (*Fiona*)
2. We **knew** her address. (*phone number*)
3. I **bought** some flowers. (*chocolates*)
4. They **spoke** Spanish. (*English*)
5. Lora **wrote** a letter to Jeremy. (*Chris*)
6. Fred **felt** well last night. (*yesterday morning*)
7. Our group **travelled** to London. (*Oxford*)
8. I **visited** my parents on Friday. (*on Sunday*)
9. You **saw** Mr. Little at the university. (*Mrs. Swanack*)
10. Jack **sent** an e-mail to his brother. (*sister*)

2.27. Write the correct question for the following sentences, as in the model.

Model: – I watched TV **last night**. *(When)*
– **When did** you **watch** TV?

1. Joe went to bed **at 10.30** yesterday evening. *(What time*)
2. **I** had a nice holiday in Rome. (*Who*)
3. Susan bought **a fashion magazine** yesterday. (*What*)
4. **It wasn't warm in the room** so the teacher closed the window. (*Why*)
5. Helen received **grant** for her research work two weeks ago. (*What*)
6. Lora played tennis **with her group-mates** an hour ago. (*Who*)
7. I took a shower **because the weather was hot**. (*Why*)
8. The computer cost **two thousand dollars**. (*How much*)
9. The lecture began at 9.00 o'clock **yesterday**. (*When*)
10. She took **an interesting book** from the library. (*What*)

2.28. Answer the following questions.

1. When did you enter the university?
2. What time did you get up today?
3. Did you study English at school?
4. Where did you go last summer?
5. How many lessons did you have yesterday?
6. Did you visit you parents last weekend?
7. How did you get to the university yesterday?
8. Why did you enter the university?
9. Who did you go to the cinema with?
10. Did you have breakfast today?

Present Perfect

2.29. Complete the following sentences with the present perfect form of the verb, as in the model.

Model: – I … this film twice this month. (*see*)
– I **have seen** this film twice this month.

1. I … Professor McKinley but I … a lot of him. (*not meet; hear*)
2. 'Do your parents know what university you are going to enter?' 'Yes, I … them.' (*tell*)

3. Steve is taking part in the conference next week. He … a very interesting report. (*prepare*)
4. Mary likes this film very much. She … it twice this month. (*see*)
5. Look! Somebody … the books in the room. (*leave*)
6. Bill is on holiday. He … to Italy with his family. (*go*)
7. I … to her three times this week but I … the answer yet. (*e-mail; not receive*)
8. Henry … a great success in the sphere of telecommunications. (*achieve*)
9. 'Can I have this newspaper?' 'Yes, of course. I … it.' (*read*)
10. Since 1998 our company … a lot of progress, so we have no problems with the clients. (*make*)

Past Simple – Present Perfect

2.30. Choose the correct variant.

1. *Have you seen / Did you see* Sally yesterday?
2. We *spent / have spent* a month in Paris two years ago.
3. My favorite book is 'War and Peace'. I *read / have read* it three times.
4. *Have you read / Did you read* my report yet?
5. Sarah *came / has come* from work half an hour ago.
6. Ann graduated from the law school in 2005 but she *hasn't worked / didn't work* as a lawyer yet.
7. James has been writing books since 1995 and he *has published / published* three books so far.
8. When I was younger, I *didn't know / haven't known* how to use a computer.
9. *Has Andrew ever thought* / *Did Andrew ever think* about changing his job?
10. Henry feels proud because he *has passed / passed* the exam.

Revising Tenses

2.31. Choose the right variant and complete the following sentences.

1. My friend … the university last year.
   a) have entered b) entered c) has entered
2. A programmer … instructions and data to the computer.
   a) give b) giving c) gives

3. I …this question over when I … him.
   a) will talk; meet b) will talk; met c) will talk; will meet
4. I … already … my report.
   a) had made b) has made c) have made
5. 'Have you done your homework yet?' 'No, I … it now.'
   a) do b) doing c) am doing
6. I … my Diploma Project now.
   a) write b) wrote c) am writing
7. As a rule he … tests well.
   a) is writing b) write c) writes
8. I can't go out because I … the experiment.
   a) haven't finished b) hadn't finished c) didn't finish

1.32. Read and translate the following sentences paying attention to the tenses.

1. The students of our group **will meet** us in the laboratory.
2. The monitor **told** the first-year students to come to the laboratory.
3. He **doesn't understand** this grammar rule.
4. He **has not made** any mistakes.
5. Tomorrow our teacher **will give** us a new task.
6. Students **watched** the process with great attention.
7. At present mankind **is making** considerable investments to eliminate air pollution.
8. The dean **will send** the students to a big plant in summer.
9. He **taught** us to use the lab equipment.
10. **Do** you **know** the answer to this question?
11. Practice **accompanies** theory.
12. **Did** the librarian **give** you all the necessary books?

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 expressions and try to guess their meaning.

Russian Federation, million, kilometers, Europe, Asia, the Atlantic ocean, territory, the Altai, the Urals, the Caucasus, the Volga, the Ob, the Yenisei, the Lena, steppe, taiga, tundra, the Baikal, climate, arctic, continental, subtropical, mineral resources, gas, constitutional republic, the President, political system, the Federal Assembly, the Duma, the Speaker, the Prime Minister, system, constitutional, federal, Moscow, political center, national symbols, international cooperation, nation.

3.2. Read the following words and mind their pronunciation.

surface	[`sə:fis]	constitutional	[ˌkɔnstɪ`tju:ʃənəl]
situate	[`sɪtjueɪt]	legislative	[`leʤɪslətɪv]
eastern	[`i:stən]	executive	[ig`zekjutɪv]
northern	[`nɔ:ðən]	government	[`gʌvənmənt]
ocean	[`əuʃən]	judicial	[ʤu:`dɪʃəl]
south	[sauθ]	court	[kɔ:t]
mountain	[`mauntɪn]	comprise	[kəm`praɪz]
numerous	[`nju:mərəs]	supreme	[su:`pri:m]
highland	[`haɪlənd]	assembly	[ə`semblɪ]
influence	[`ɪnfluəns]	scientific	[ˌsaɪən`tɪfɪk]
resource	[rɪ`zɔ:s, rɪ`sɔ:s]	official	[ə`fɪʃəl]
ore	[ɔ:]	symbol	[`sɪmbəl]

Memorize the following words and expressions

total area	*общая площадь*	**to influence smth.**	*оказывать влияние, влиять*
to occupy	*охватывать, занимать*	**mineral resources**	*минеральные ресурсы*
to border on	*граничить с*	**especially**	*особенно, главным образом*
vast	*обширный, огромный,*	**to head**	*возглавлять*
plain	*равнина*	**legislative power**	*законодательная ветвь власти*
numerous	*многочисленный*	**executive branch**	*исполнительная ветвь власти*
to be rich in smth.	*быть богатым чем-л.*	**official language**	*официальный язык*
different (from)	*различный, разный, отличный (от)*	**banner**	*знамя*
moderate climate	*умеренный климат*		

3.3. Read the text.

THE RUSSIAN FEDERATION

The Russian Federation is the largest country in the world. Its total area is over 17 million square kilometers and it occupies about 1/6 of the Earth surface. The population of Russia is about 150 million people. The country is situated in Eastern Europe, Northern and Central Asia. The land is washed by 12 seas, most of which are the seas of three oceans: the Arctic, the Atlantic and the Pacific one. In the south and in the west the country borders on fourteen countries. The great part of the territory of Russia is vast plains with high mountains and long rivers. The highest mountains of our land are the Altai, the Urals and the Caucasus. The Volga and the Ural are the longest rivers in the European part of the country. The longest rivers in the Asian part are the Ob, the Yenisei and the Lena. Russia has also got numerous forests and steppes, taiga and tundra, highlands and deserts. The country is rich in various lakes, the deepest of which is the Baikal.

As Russia is a very large country, the climate conditions are rather different: from arctic and moderate to continental and subtropical. The Arctic Ocean influences the weather on a great territory of the country. In some parts of the country winter lasts as long as six months. The Russian Federation is one of the richest in mineral resources countries in the world especially in natural gas, oil, coal, different ores, ferrous and non-ferrous metals.

The Russian Federation is a constitutional republic headed by the President. The political system consists of three branches of power:

– the legislative branch which consists of the Federal Assembly that is divided into two houses – the Upper House, that is the Federation Council, and the Lower House, the Duma. Each house is headed by the Speaker.

– the executive branch is the government with the Prime Minister at the head.

– the judicial branch which consists of the system of Courts comprising the Constitutional Court, the Supreme Court and federal courts.

The President controls only the executive branch – the government, but not the Supreme Court and Federal Assembly.

The capital of Russia is Moscow, the largest political, scientific, cultural and industrial center as well as one of the most beautiful cities of the world. Russian is the official language of the state. The national symbols of the Russian Federation are a white-blue-red banner and a double-headed eagle.

The foreign policy of Russia is that of international cooperation, peace and friendship with all nations and countries.

Notes to the text

Federal Assembly	*Федеральное Собрание*
the Upper House	*верхняя палата*
the Lower House	*нижняя палата*
the Federation Council	*Совет Федерации*
the Constitutional Court	*Конституционный Суд*
the Supreme Court	*Верховный Суд*

3.4. Complete the following sentences with the expressions from the box.

total area borders on is rich in consists of is washed by international cooperation the official language is situated is headed by a constitutional republic cultural and industrial centre

1. France … Germany.
2. The Russian Federation is … and it … the President.
3. They speak Portuguese in Brazil. It's … of the country.
4. Canada is a very big country. Its … is about eleven million square kilometers.
5. The western part of the country … numerous plains and forests.
6. Brazil … oil, gas and coal.
7. The island … the Pacific Ocean.
8. Tomsk … on the bank of the river Tom.
9. My native town is a … of Siberia.
10. The most important direction of the foreign policy is that of … .

3.5. Read the text again and answer the questions.

1. What is the total area of the Russian Federation?
2. How many countries does Russia border on? What are they?
3. What climate conditions are there in Russia?
4. What lake is the deepest in Russia?
5. Can you name the longest rivers of the country?
6. Who is the Russian Federation headed by?
7. Which mineral resources is Russia rich in?
8. How many branches of power does the country consist of?
9. What are the national symbols of the Russian Federation?
10. What are the main directions of the international cooperation of Russia with other countries and nations?

Text B

TOMSK

Pretext exercises

3.7. Read the words and expressions and try to guess their meaning.

Siberian town, tsar, commercial centre, gubernia, administrative center, intensive, history, medicine, Technological Institute, Asian, Polytechnic University, pedagogical, medical, institute, revolution, territory, center, the Urals, college, architecture, academy, cultural centre, Drama Theatre, concert, monument, memorial.

3.8. Read the following words and mind their pronunciation.

Siberian	[saɪ`bɪərɪən]	situate	[`sɪtjueɪt]
commercial	[kə`mə:ʃəl]	emperor	[`empərə]
cereal	[`sɪərɪəl]	medicine	[`medɪsɪn]
Asian	[`eɪʃən]		

3.9. Read the text.

TOMSK

Tomsk is an old Siberian town which is situated on the bank of the river Tom, in West Siberia. Tomsk was founded in 1604 by Tsar Boris Godunov. At the beginning of the 18th century, Tomsk became a commercial centre of Siberia. It supplied cereals, fish, salt, fat, copper, wax and leather to the neighbour gubernias. In 1804, Tomsk became an administrative center of the Gubernia. The growth of the town was especially booming in the 30s of the 19th century when gold was found and its intensive mining started in the Tomsk Gubernia. In 1888, Emperor Alexander III opened the first University in Siberia. In its early history the University had only the department of medicine. The year 1900 saw the opening of the first Technological Institute in the Asian part of Russia (now the Polytechnic University). And a few years later the Pedagogical, Medical and Civil Engineering Institutes were founded.

After the revolution of 1917, Tomsk became the part of the Siberian Territory and later of the West-Siberian Territory.

Tomsk is one of the biggest educational and scientific centers in Russia to the east of the Urals. About 60,000 students (local residents and newcomers from different parts of Russia) study at technical schools, colleges and universities. There are more than 9 higher educational establishments in Tomsk. The most prominent of them are State University, Polytechnic University, Siberian Medical University, Teachers' Training University, University of Control Systems and Radioelectronics, University of Architecture and Civil Engineering and Agricultural Academy. A lot of scientific institutions of Tomsk are engaged in research work; more than 20 of them are parts of the universities.

Now Tomsk is known as a cultural centre of Siberia. There are several theatres, such as the Drama Theatre, "Intim" Theatre, Puppet Theatre, Young Spectators' Theatre, concert halls and museums. Tomsk is proud of its wooden architecture. There are also a lot of monuments to some famous people. The memorial of Glory devoted to the people who perished during the Great Patriotic War is situated in Lagerny Garden.

Tomsk has been changing a lot recently. The authorities of the town are trying to do their best to make it more beautiful and modern.

Notes to the text

cereals	*зерновые культуры*
booming	*процветающий*
to be engaged in	*заниматься*

3.10. Read the statements and decide if they are true (T) or false (F).

1. Tomsk is an old Siberian town which is situated on the bank of the river Tom, in East Siberia.
2. Tomsk was founded at the beginning of the 16th century.
3. In 1804, Tomsk became an administrative center of Russia.
4. The first University in Tomsk was founded in 1888.
5. After the revolution of 1917, Tomsk became the part of the Novosibirsk Oblast.
6. Tomsk is the oldest educational and scientific center in Russia to the east of the Urals.
7. More than 60,000 students study at technical schools, colleges and universities.

8. The most prominent of higher educational establishments are State University, Polytechnic University, Siberian Medical University, Teachers' Training University, University of Control Systems and Radioelectronics, University of Architecture and Civil Engineering as well as Agricultural Academy.
9. There are lots of scientific institutions in Tomsk.
10. Now Tomsk is known as a cultural centre of Siberia.

3.11. Read the text again and answer the questions.

1. When was Tomsk founded?
2. Where is Tomsk situated?
3. Who opened the first university in Siberia?
4. Which department was the first one at Tomsk University?
5. Why was the growth of the town especially booming in the 30s of the 19th century?
6. How many higher educational establishments are there in Tomsk?
7. What are the most prominent universities in Tomsk?
8. Why is Tomsk known as a cultural centre of Siberia?
9. Is Tomsk a town of science? Why? Why not?
10. Do you like Tomsk? Why/ Why not?

3.12. Talk to a partner and tell him/her about your native town.

GRAMMAR

Present Simple Passive – Past Simple Passive

3.13. Complete the following sentences. Use the correct passive Present Simple or Past Simple form of the verb.

Model: The computer **was repaired** last week. (*repair*)

1. French … … in France and Canada. (*speak*)
2. Philosophy … … on the first course in most universities of Russia. (*study*)
3. Tomsk … … in the south-west of Siberia. (*situate*)

4. TUCSR … … in 1962. (*found*)
5. The boutique 'Fashion Show' … … five years ago. (*open*)
6. The Russian President … … every four years. (*elect*)
7. Paper … … by the Chinese. (*invent*)
8. The new laboratory … … with modern computers. (*equip*)
9. 'Eugenie Onegin' … … by A. Pushkin. (*write*)
10. The modern museum … … last year. (*build*)

3.14. Rewrite the following sentences in passive, as in the model.

Model: – They **play** football in many countries.
– Football **is played** in many countries.

– The Europeans **discovered** Australia in the 17th century.
– Australia **was discovered** by the Europeans in the 17th century.

1. My mother usually **wakes** me **up** at 7 o'clock.
2. They **grow** rice in Vietnam.
3. The reporter **wrote** a very interesting article.
4. Millions of tourists **visit** Moscow every year.
5. We **took** a lot of photographs when we went to Italy.
6. They **built** the Central museum in 1928.
7. Somebody **left** the books on the table.
8. The manager **asked** me a lot of questions yesterday.
9. They **show** American programs on British television.
10. The Italians **make** Italian ice-cream with coconut milk.

3.15. Write the questions for the sentences. Use the passive form.

Model: 'Fiat' was started **in 1899**. (*When*)
When was 'Fiat' started?

1. The agreement was signed **in the White House**. (*Where*)
2. The flowers are delivered **every day** by the flower company. (*How often*)
3. Our office was painted in **grey and white**. (*What colors*)
4. **'Yesterday'** was written by John Lennon and Paul McCartney. (*What*)
5. The first university in Tomsk was founded in **1888**. (*When*)
6. **Thirty-five** books were written by my father. (*How many*)
7. Macdonald's hamburgers are sold **in many countries**. (*Where*)
8. The bill for electricity was paid **last week**. (*When*)

9. **The Day of St. Valentine** is celebrated on 14th February. (*What holiday*)
10. The Olympic Games are held **every four years**. (*How often*)

3.16. Choose the correct variant.

1. Millions of cars … from Japan every year.
   a) are exported b) export c) exported
2. When … the radio invented?
   a) was b) is c) did
3. The post … twice a day.
   a) were delivered b) is delivered c) delivered
4. How many languages … in Canada?
   a) is spoken b) was spoken c) are spoken
5. A lot of mistakes … in the text.
   a) were made b) is made c) made
6. Hockey … in winter.
   a) were played b) is played c) are played
7. Glass … from sand.
   a) makes b) made c) is made
8. This room …last month.
   a) is painted b) was painted c) painted
9. A lot of houses … in our town every year.
   a) were built b) are built c) built
10. Coffee … from Brazil.
    a) imported b) were imported c) is imported

3.17. Translate the following sentences.

1. Moscow was built in the very middle of Russia and is situated on six hills.
2. The President of Russia is elected every four years.
3. The information was processed by a computer.
4. Nothing is done without my help.
5. Who was the radio invented by?
6. A lot of mistakes in tests are usually done by students who miss lectures and practical lessons.
7. This project is done by all the students of our group.
8. The last Olympic Games were held in Sochi.
9. More than a hundred articles were published by the head of our department.

10. The telephone was left in the classroom and nobody has asked about it so far.
11. A lot of political programs are shown on Russian television.
12. Coca Cola is sold in Russia as well as all over the world.
13. The important agreement for computer equipment was signed with our company.
14. A lot of money is spent by the students for food and entertainments.
15. Football is the most popular sport at our university. It is played by students and teachers.
16. The article was written in English. Can you help me translate it?
17. A lot of flowers and presents were sent for my parents' wedding anniversary.
18. How many cars are imported from Japan?
19. When was our town founded and who was it founded by?
20. Mathematics is studied during the whole course at the university because it is very important for every special subject.

Unit 4. THE UNITED KINGDOM

Text A *The United Kingdom*
Text B *Higher Education in Great Britain*

Grammar: **revising verbals**

Text A

THE UNITED KINGDOM

Pretext exercises

4.1. Read the following words and try to guess their meaning.

United, total, leader, population, capital, major, command, business, commerce, principle, focus, liberalization, regulation, economy, concentrate, industry, international, global, calendar, production, textile, private, public, product, constitutional, monarchy, parliamentary, cultural, military.

4.2. Read the following words and mind their pronunciation.

kingdom	[`kɪŋdəm]	originate	[ə`rɪʤɪ.neɪt]
square	[skwɛə]	success	[sək`ses]
constituent	[kən`stɪtjuənt]	renown	[rɪ`naun]
business	[`bɪznəs]	influence	[`ɪnfluəns]
majority	[mə`ʤɔrətɪ]	privately	[`praɪvɪtlɪ]
shipbuilding	[`ʃɪp.bɪldɪŋ]	parliamentary	[.pɑːlə`mentərɪ]
monarchy	[`mɔnəkɪ]	government	[`gave(n)mənt]
textile	[`tekstaɪl]	Birmingham	[`bəːmɪŋəm]
Edinburgh	[`edɪnbərə]	Wimbledon	[`wɪmbldəm]

Memorize the following words and expressions

total area	*общая площадь*	**to reign**	*иметь власть, править, царствовать*
constituent	*составляющий часть (целого)*	**with the support of smb.**	*при поддержке кого-либо*
initially	*первоначально*	**tourist destination**	*достопримечательность*
shipbuilding	*кораблестроение*	**Stock Exchange**	*фондовая биржа*
coal mining	*добыча угля*	**to originate**	*возникать*
steel production	*производство стали*	**rowing**	*гребля*
to be ranked as smth.	*котироваться (расцениваться) как что-либо (в качестве чего-либо)*		

4.3. Read the text.

THE UNITED KINGDOM

The United Kingdom is situated in the north-west of Europe. It consists of Great Britain (England, Scotland, and Wales) and Northern Ireland. The total area of the United Kingdom is 242,000 square kilometers. The population of the United Kingdom is more than 60 million people. The four capitals of the United Kingdom's constituent countries are London (England), Edinburgh (Scotland), Cardiff (Wales) and Belfast (Northern Ireland).

The Anglo-Saxon model focuses on the principles of liberalization, the free market, and low taxation and regulation. The United Kingdom is the fifth largest economy in the world and the second largest in Europe after Germany. The British started the Industrial Revolution initially concentrated on heavy industries such as shipbuilding, coal mining, steel production, and textiles. Tourism is very important to the British economy. With over 27 million tourists a year, the United Kingdom is ranked as the sixth major tourist destination in the world.

The United Kingdom is a parliamentary monarchy with a monarch as the Head of the State. The monarch reigns with the support of the Parliament. The Parliament of Great Britain consists of two Houses: the House of Lords and the House of Commons.

London is the capital of the country. There are four main districts in London: the West End, the East End, the City and the Westminster. The City is a business and financial center of London. There are a lot of banks and offices there. Stock Exchange is situated in the City.

London is famous for its great history. There are many places of interest there: the Tower, Big Ben, Trafalgar Square, Buckingham Palace, Houses of Parliament, British Museum, etc.

A number of major sports originated in the United Kingdom, including football, rugby, cricket, tennis and golf. The most popular sport in the UK is football. The UK has proved its success in the international sporting arena in rowing. Rugby is a national sport. The game of tennis first originated from the UK's second city of Birmingham between 1859 and 1865. The Wimbledon Championships are international tennis events held in Wimbledon in south London every summer and are regarded as the most prestigious event of the global tennis calendar.

Great Britain is famous for its culture. Many well-known writers, poets, artists, scientists lived and worked there. They are Shakespeare, Dickens, Darvin, Newton, *etc*.

Notes to the text

the House of Lords	*Палата лордов (верхняя палата британского парламента)*
the House of Commons	*Палата общин (нижняя палата британского парламента)*
the West End	*Уэст-Энд (западная, аристократическая часть Лондона)*
The East End	*Ист-Энд (восточная часть Лондона, в прошлом – рабочие кварталы)*
the Westminster	*Вестминстер, Уэстминстер (исторический район Лондона, где расположен Вестминстерский дворец, в котором заседает Парламент Великобритании)*

Trafalgar Square	*Трафальгарская площадь*
the Tower (of London)	*Лондонский Тауэр (крепость, возведённая на северном берегу реки Темза)*
Big Ben	*Биг Бен, Большой Бен (часы на здании английского парламента)*
Buckingham Palace	*Букингемский дворец (лондонская королевская резиденция)*
Houses of Parliament	*здание парламента (место заседаний британского парламента)*
Wimbledon Championships	*Уимблдонский турнир (соревнования по теннису)*

4.4. Read the statements and decide if they are true (T) or false (F).

1. The north-west of Europe is a place for the United Kingdom.
2. There are three countries that the United Kingdom consists of UK is an absolute monarchy.
3. There are two Houses in the Parliament: the House of Commons and the Senate.
4. The City is a cultural and scientific center of London.
5. The most popular sport in the UK is tennis.
6. The monarch of the UK is supported by the Parliament.
7. Prime minister is the Head of the UK.

4.5. Complete the following sentences with the expressions from the box.

parliamentary monarchy	**tourist destination**	**is headed by**
the most popular	**the most prestigious event**	

1. ... sport in the UK is football.
2. The UK is a ... … with the Queen as the head of the state.
3. The Parliament … the Prime Minister.
4. The Wimbledon Championships is regarded as … of the global tennis calendar.
5. The United Kingdom is ranked as the sixth major ... in the world.

4.6. Read the text again and answer the questions.

1. What is the geographical position of the United Kingdom?
2. What is the population of the country?
3. What are the main industries of Great Britain?
4. What is the capital of the UK?
5. How many districts are there in London? What are they?
6. What is the City?
7. Who is the UK headed by?
8. What main places of interest are there in London?
9. What sports originated in the UK?
10. What famous people of the United Kingdom do you know?

Text B

HIGHER EDUCATION IN GREAT BRITAIN

Pretext exercises

4.7. Read the following words and try to guess their meaning.

Institution, investment, private, personal, local, lecture, seminar, final, examinations, philosophy, privilege, prestige, dominate, academically, federation, physical, rugby, central, laboratory, organize, tutor, medicine, business, basic.

4.8. Read the following words and mind their pronunciation.

adult	[`ædʌlt] [ə`dʌlt]	undergraduate	[ˌʌndə`grædjuət]
society	[sə`saɪətɪ]	tutorial	[tjuː`tɔːrɪəl]
exception	[ɪk`sepʃən]	essay	[`eseɪ]
private	[`praɪvɪt]	acquire	[ə`kwaɪə]
authority	[ɔː`θɔrɪtɪ]	particular	[pə`tɪkjulə]

Memorize the following words and expressions

benefit	*выгода, польза, преимущество*	**residential rooms**	*жилые комнаты (помещения)*
society	*общество, общественность*	**tutorial system**	*университетская система обучения путем прикрепления студентов к отдельным консультантам*
private institution	*частный, негосударственный*	**academic merit**	*заслуга в учебе (достоинство)*
to pay fees	*вносить плату, оплачивать*	**mainly**	*главным образом, преимущественно, в основном*
living costs	*стоимость проживания*	**in this respect**	*в этом отношении*
expenses	*расходы, затраты*	**to tend to smth.**	*склоняться (иметь тенденцию) к чему-либо*
contribution to smth.	*вклад во что-либо*	**to be keen to do smth.**	*стремиться к чему-либо*
to dominate smth.	*доминировать, занимать господствующее положение*	**eminent**	*высокопоставленный, известный, знаменитый*
to be regarded as smth. (smb.)	*считать кем-либо, чем-либо*	**to scatter**	*размещать*
to assign	*назначать, определять*	**mostly**	*главным образом, по большей части*
compulsory	*обязательный (для всех), принудительный*	**attendance**	*посещаемость, посещение*
apart from	*помимо, кроме*	**individual tuition**	*индивидуальное обучение*
essay	*эссе, очерк, набросок*	**particular**	*индивидуальный, отдельный*
chapel	*часовня, молельня*		

4.9. Read the text.

HIGHER EDUCATION IN GREAT BRITAIN

The aim of education in general is to develop the full the talents of both children and adults for their own benefit and that of society as a whole. It is a large-scale investment in the future. Higher education is not an exception. When higher education is being spoken about the University education is generally meant. All British universities are private institutions. Students have to pay fees and living costs, but every student may obtain a personal grant from local authorities. If the parents do not earn much money, their children will receive a full grant which will cover all the expenses. Students studying for the first degrees are known as undergraduates. New undergraduates in some universities are called freshers. They have lectures and regular seminars. After three or four years the students take their finals or final exams. Those who pass examinations successfully are given the Bachelors degree: the Bachelor of Arts or the Bachelor of Science. The first postgraduate degree is Master of Arts, Master of Science. Doctor of Philosophy is the highest degree. It is given for some original research work which is an important contribution to arts and science.

The most oldest and famous universities in Britain are Oxford and Cambridge which dominated the British education for seven hundred years. Oxford and Cambridge (sometimes referred to as Oxbridge) are regarded as being academically superior to other universities and as giving special privilege and prestige.

Oxford University is a federation of twenty-three colleges for men and five for women. Each college has a physical existence in the shape of a dining-hall, chapel, and residential rooms. It is governed by its Fellows commonly called “dons”, of whom there are usually about twenty or thirty. The dons are also responsible for teaching the students of the college through the tutorial system. The Fellows elect the Head of the college.

The colleges vary very much in size and buildings. Colleges choose their own students, and a student only becomes a member of the University by having been accepted by a college. Students are chosen mainly on academic merit, but the policy of colleges in this respect varies from college to college.

Part of the teaching is by means of lectures and any student may attend any university lecture. At the beginning of each term (there are three terms in the Oxford academic year) a list is published showing all the lectures being

given during the term within each faculty, and every student can choose which lectures he will attend, though his own college tutor will advise him which lectures seem likely to be more useful. Attendance at lectures is not compulsory, and no records of attendance are kept.

Apart from lectures, teaching is by means of the "tutorial" system, which is a system of individual tuition organized by the colleges. Each Fellow in a college is a tutor in his own subject to the undergraduates who are studying it. 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 don in his own college or in another college when he is studying some particular topic which is outside the special interest of his own tutor.

Higher-educational institutions in Britain include not only universities and colleges but also various professional schools that provide preparation in such fields as law, theology, medicine, business, music, and art. Higher education also includes teacher-training schools, junior colleges, and institutes of technology. They don't give degrees to their students, they give only diplomas. The course of study there is usually shorter than at colleges. It lasts three or four years. Whereas at the universities students study five or even more years. The basic entrance requirement for most higher educational institutions is the completion of secondary education, and the usual entrance age is about 18 years.

4.10. Read the statements and decide if they are true (T) or false (F).

1. All the universities in Britain are free.
2. In some universities students studying for first degrees are called freshers.
3. Doctor of Philosophy is the degree given for an important contribution to arts and science.
4. The colleges of Oxford are governed by the Queen of the country.
5. After getting undergraduate education one becomes the Bachelor of Arts or the Bachelor of Science.
6. Each undergraduate has his/her own tutor.
7. There are two terms in the Oxford academic year.
8. Students of Oxford can attend all the lectures seemed to be useful to them.
9. There are no records of attendance in the colleges of Oxford.

10. All the universities of Great Britain are regarded as being academically superior to other universities in the world and as giving special privilege and prestige.

4.11. Match the following words and expressions with their equivalents.

1. basic requirements	a) журнал посещаемости
2. higher-educational institutions	b) в течение семестра
3. university entrance age	c) выбирать главу (главного) чего-либо
4. outside the interest	d) основные требования
5. records of attendance	e) включать (в себя) что-либо
6. aim of education	f) состоять из чего-либо
7. part of teaching	g) отличаться по размеру
8. during the term	h) учреждения высшего образования
9. to consist of smth.	i) несколько лет спустя
10. to include smth.	j) вне интереса (неинтерсно)
11. central area of the town	k) часть обучения
12. to vary in size	l) получение среднего образования
13. completion of secondary education	m) возраст для поступления в университет
14. to elect the head of smth.	n) центральная часть (район) города
15. a few years later	o) цель образования

4.12. Read the text again and answer the questions.

1. What is the aim of education in Great Britain?
2. Are the British Universities free of charge?
3. Do all the students receive a grant?
4. What academic degrees are there in British system of higher education?
5. In what way are Oxford and Cambridge Universities different from all the other universities of the UK?
6. What are the methods of teaching in British universities?
7. What is the tutorial system of education?
8. In what way are the professional schools different from universities?
9. Who can enter the higher-educational institutions?
10. Would you like to study at British universities? Why? Why not?

GRAMMAR

Revising Verbals

4.13. Complete the following sentences with the right forms, as in the model.

Model: **Having given** a promise he couldn't fail us. (*дав; **to give** – давать*)

1. … all his exams he decided to have a great party. (*сдав; **to pass** сдавать)*
2. Don't forget to stick a stamp when … the letter. *(отправляя; **to send** – отправлять)*
3. … at the airport we went to the check-in office. *(прибыв; **to arrive** – прибывать)*
4. … the children in the park, she remembered her childhood. *(наблюдая**; to watch** – наблюдать)*
5. He did it, not … of the result. *(думая; **to think** – думать)*
6. … of the window she saw an unknown man. *(выглянув; **to look out** – выглядывать)*
7. He was thinking about her … in the park. *(гуляя; **to walk** – гулять)*
8. I like the flowers … in the garden. *(растущие; **to grow** – расти)*

4.14. Complete the sentences, as in the model.

Model: **Having arrived** in London we went to Trafalgar square. (*to arrive*)

1. While … his car he was thinking about the result. (*to paint*)
2. It was dark so we had to stop several times … home. (*drive*)
3. … enough money he bought the desired book. (*to save*)
4. … a wallet in the street I wondered what I could do with it. (*to find*)
5. I spent the rest of the day … a few problems. (*to solve*)
6. The actress … the children fairy-tales is famous all over the country. (*to tell*)
7. … a cup of coffee she felt much better. (*to drink*)
8. … girl was hungry and tired. *(to cry)*

4.15. Choose the correct variant.

1. It seems to be a very … story.
   a) interesting b) interested
2. I can see a lot of people … at the bank.
   a) standing b) having stood
3. He stood for a moment ….
   a) frightened b) frightening
4. The largest painting was the last work … by the artist.
   a) Doing b) done
5. You will probably find your sister ….
   a) growing b) grown
6. Everyone finds the circus ….
   a) exciting b) excited
7. She will pass all her exams successfully ….
   a) hardworking b) being hardworking
8. Things … in the open air market can't be of good quality.
   a) bought b) are being bought

4.16. Answer the questions using the gerund with a preposition *by*, as in the model.

Model: How can you make your mother happy? *(to have good results on exams)*
I can make my mother happy **by having good results on exams**.

1. How can you make enough money to buy a car? *(to win the lot tery)*
2. How can you lose your weight? *(to join the gym)*
3. How can you find out if they are at home? *(to phone them)*
4. How can you keep fit? *(to do morning exercises)*
5. How can you avoid car accidents? *(to drive carefully)*

4.17. Use the right infinitive form (active or passive), as in the model.

Model 1: I'd like **to go** home early today. (*go*)
Model 2: He expected **to be met** by Helen at the station. (*to meet*)

1. Your watch will … by Tuesday. (*to repair*)
2. She must … her homework every day. (*to do*)
3. She hopes … for the student club. (*to choose*)

4. It's important … to people. (*to listen*)
5. Try … the letter in the morning. (*to post*)
6. They are going … married next Friday. (*to get*)
7. I want … the manager. (*to see*)
8. I prefer … by everybody. (*to listen*)
9. I went to the chemist's … some medicines. (*to buy*)
10. The boy wanted … for taking part in the competition. (*to re ward*)
11. He was so happy … the first prize for his project. (*to receive*)
12. He wanted his son … at a public school. (*to educate*)
13. He is too young … the president. (*to be*)
14. She hoped … by everybody. (*to admire*)
15. We asked the driver … us a lift. (*to give*)
16. Alex is fortunate … a scholarship. (*to give*)

4.18. Point out the infinitive functions.

1. He is not the person to fail the exams.
   a) subject b) attribute c) adverbial modifier
2. Not to be late for the lectures was impossible.
   a) subject b) attribute c) adverbial modifier
3. I have a lot of time to finish my report.
   a) subject b) attribute c) adverbial modifier
4. Italy is the best place to relax from work.
   a) subject b) attribute c) adverbial modifier
5. He was talking for an hour without stopping to have some rest.
   a) subject b) attribute c) adverbial modifier
6. To refuse the invitation was impolite.
   a) subject b) attribute c) adverbial modifier
7. It takes me 10 minutes to get to the university.
   a) subject b) attribute c) adverbial modifier
8. What a wonderful place to have a picnic!
   a) subject b) attribute c) adverbial modifier
9. I don't believe it. It's too good to be the truth.
   a) subject b) attribute c) adverbial modifier
10. To have a party in the garden is a wonderful idea.
    a) subject b) attribute c) adverbial modifier

4.19. Choose the best translation, as in the model.

Model: Я рад, что мне рассказали эту историю.
a) I am glad to have been told that story.
b) I am glad to tell that story.

1. Он будет счастлив посетить известную художественную га лерею.
   a) He will be happy to have visited the famous Art Gallery.
   b) He will be happy to visit the famous Art Gallery.
2. Кажется, он знает французский не очень хорошо.
   a) He seems to have known French not very well.
   b) He seems to know French not very well.
3. Я очень рада, что сумела помочь Вам.
   a) I am glad to have helped you.
   b) I am glad to help you.
4. Я слишком устал, чтобы продолжать разговор.
   a) I am too tired to continue the conversation.
   b) I was too tired to continue the conversation.
5. Он первым написал статью.
   a) He was the first to have written the article.
   b) He is the first to write the article.
6. Я хочу пойти туда завтра.
   a) I want go there tomorrow.
   b) I want to go there tomorrow.
7. Я знаю его недостаточно хорошо, чтобы просить его о помощи.
   a) I don't know him well enough to ask him for help.
   b) I don't know him well enough to be asked for help.
8. Я уверен, что он первым придет на встречу.
   a) I am sure he was the first to come to the meeting.
   b) I am sure he will be the first to come to the meeting.
9. Сумма, которая должна быть уплачена, включает стоимость доставки.
   a) The amount to be paid includes the cost of delivery.
   b) The amount to pay includes the cost of delivery.
10. Наш план – поехать летом в Италию.
    a) Our plan is to have gone to Italy in summer.
    b) Our plan is to go to Italy in summer.

Unit 5. THE UNITED STATES OF AMERICA

Text A *The United States of America*
Text B *Higher Education in the USA*

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.

Constitutional, federal, republic, federal, kilometers, population, cartographer, officially, declaration, fundamentally, structured, democracy, congress, senate, to declare, military, administer, policy, to interpret, conservative, private, institution, individual.

5.2. Read the following words and mind their pronunciation.

hemisphere	[`hemɪsfɪə]	executive	[ɪg`zekjutɪv]
entirely	[ɪn`taɪəlɪ]	court	[kɔ:t]
legislative	[`ledʒɪslətɪv]	embassy	[`embəsɪ]
judiciary	[dʒu:`dɪʃɪərɪ]	spectacular	[spek`tækjələ]

Memorize the following words and expressions

in the western hemisphere	*в западном полушарии*	**approval**	*одобрение*
to coin	*создавать (новые слова, выражения)*	**to overturn**	*отменять*
independence	*независимость*	**to deem**	*считать, полагать*

to adopt	*принимать, усваивать, выбирать*	**embassy**	*посольство*
representative	*представительный*	**to attend school**	*ходить в школу (посещать школьные занятия)*
legislative power	*законодательная власть*	**to allow**	*позволять, разрешать, допускать*
executive power	*исполнительная власть*	**to enroll**	*зачислять*
judiciary power	*судебная (юридическая) власть*	**homeschooled**	*обучающиеся дома*
to approve	*одобрять, утверждать*	**liberal arts college**	*гуманитарный колледж*
treaty	*договор, переговоры*	**community college**	*местный, «общинный» колледж (готовит специалистов средней квалификации для работы на территории местного сообщества)*
the power of the purse	*власть денег*	**open admission**	*свободный прием в учебное заведение (амер.)*
legislative bill	*законопроект*	**pastime**	*приятное времяпрепровождение, развлечение, забава*
to appoint	*назначать, утверждать*	**spectacular sport**	*зрелищный спорт*
officer	*чиновник, должностное лицо; служащий*	**to eclipse**	*затмевать, заслонять*
to enforce a law	*вводить в действие (приводить в исполнение) закон*		

5.3. Read the text.

THE UNITED STATES OF AMERICA

The United States of America is a federal constitutional republic that comprises fifty states and a federal district. The country is situated almost entirely in the western hemisphere. They border on Canada in the north and Mexico in the south. The total area of the country is 9.83 million square kilometers with over 300 million people. The United States is the third largest country by total area, and the third largest country by land area and by population.

The term *Americas* was coined in the early 16th century after Amerigo Vespucci, an Italian explorer and cartographer. The full name of the country was first used officially in the Declaration of Independence, which was adopted on July 4, 1776. The United States is a constitutional republic, which is fundamentally structured as a representative democracy. Federal government is composed of three branches: legislative, executive and judiciary.

- A legislative branch is represented by the Congress, which consists of the Senate and the House of Representatives. The Congress makes federal law, declares war, approves treaties, has the power of the purse, and has the rarely used power of impeachment.
- An executive branch is represented by the president who can veto legislative bills before they become law, and appoints the Cabinet and other officers, who enforce federal laws and policies.
- A judiciary branch consists of the Supreme Court and lower federal courts, whose judges are appointed by the president with Senate approval, interpret laws and can overturn laws they deem unconstitutional.

The president serves a four-year term and may be elected no more than twice. Since the general election of 1856, the two dominant parties have been the Democratic Party (liberal), founded in 1824 and the Republican Party (conservative), founded in 1854.

The United States has vast economic, political, and military influence on a global scale. Almost all countries have embassies in Washington, D.C.

Washington is the capital of the country. It is not a large city; its population is about 500.000 people. In Washington there is the White House where the President lives and works and the Capitol where the Congress of the United States sits.

American public education is operated by state and local government. Children are obliged to attend school from the age of six or seven until they turn eighteen. Some states allow students to leave school at sixteen or seventeen. About 12 percent of children are enrolled in private schools. Just over 2 percent of children are homeschooled. The United States has many competitive private and public institutions of higher education There are also many smaller universities and liberal arts colleges, and local community colleges of varying quality with open admission policies.

Since the late 19th century, baseball has been regarded as the national pastime; football, basketball, and ice hockey are the country's three other leading professional team sports. Football is now the most popular and the most spectacular sport in the United States. Boxing and horse racing were once the most watched individual sports, but they have been eclipsed by golf and auto racing.

The United States of America has always been the leading in all the spheres of life and technology.

The flag of the United States is called "stars and stripes". There are fifty stars on the blue background and thirteen stripes. The number of the stars corresponds to the number of the states. And thirteen stripes mean the number of the first original states.

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)*
The Supreme	*верховный суд (высшая судебная инстанция США)*
The Capitol	*Капитолий (местопребывание Конгресса США на Капитолийском холме в Вашингтоне)*
Washington D.C.	*столица США (официальное название – округ Колумбия; самостоятельная территория, не входящая ни в один из штатов)*

5.4. 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. There is hardly a country which has its own embassy in the USA.
3. The US is the largest country in the world.
4. The Congress of the United States consists of the Senate and the House of Commons.
5. The Democratic and Republican Parties are two dominant parties in the US policy.
6. There are fifteen stars on the US flag.
7. Washington is one of the largest cities of the country.
8. New-York is the capital of the country.
9. The President of the country is elected every five years.
10. Football is the most popular sport in the United States.

5.5. Read the text again and answer the questions.

1. Who is the President of the USA at the moment?
2. Which countries does the USA border on?
3. Is English an official language of the USA?
4. How many branches is Federal government composed of?
5. What are the most popular sports in the USA?
6. Is horse racing the most spectacular sport in the USA?
7. How many political parties are there in the USA? When were they founded?
8. What types of schools are there in the USA?
9. Who operates American public education?
10. What famous people lived and worked in the USA?
11. What does the Congress of the USA consist of?
12. How is the flag of the US called? Why?

Text B

HIGHER EDUCATION IN THE USA

Pretext exercises

5.6. Read the following words and try to guess their meaning.

Progress, nation, public, private, institutions, diploma, arithmetic, automatic, basic, type, academic, college, local, course, career, examination, activity, standard, prestige, concentrate, philosophy, professor, faculty, instructor, assistant.

5.7. Read the following words and mind their pronunciation.

private	[`praɪvɪt]	chorus	[kɔːrəs]
curriculum	[kə`rɪkjələm]	designate	[`dezɪgneɪt]
scholastic	[skə`læstɪk]		

Memorize the following words and expressions

swift	*стремительный, быстрый*	**to accumulate**	*набирать, накапливать*
to graduate school	*оканчивать школу (амер.)*	**extra-curricular activity**	*внеучебная деятельность*
secondary education	*среднее образование*	**to take into consideration**	*принимать во внимание (к сведению)*
elementary school	*начальная школа*	**undergraduate education**	*(неполное) высшее образование*
completion	*завершение, окончание*	**bachelor's degree**	*степень бакалавра*
compulsory	*обязательный, принудительный*	**post-graduate education**	*послеуниверситетское образование (магистратура)*

grade	*класс (год обучения в школе)*	**to follow the course**	*проходить обучение по какому-либо курсу (программе)*
admission	*прием, принятие*	**arts**	*гуманитарные науки*
academic curriculum	*курс обучения, учебный план*	**sciences**	*естественные науки*
vocational education	*профессиональное образование*	**emphasis**	*акцент, ударение*
high school diploma	*диплом об окончании средней школы*	**executive head**	*административный руководитель*
to award	*присуждать, награждать, присваивать*	**to designate**	*назначать, номинировать*
to admit	*допускать, принимать*	**academic rank**	*учебное звание (чин)*
rigid	*строгий, суровый*	**instructor**	*преподаватель, учитель*
scholastic	*учебный (преподавательский)*	**assistant professor**	*доцент*
requirements	*требования, условия*		

5.8. Read the text.

HIGHER EDUCATION IN THE USA

"Our progress as a nation can be no swifter than our progress in education."

J. Kennedy

In the United States, education is offered at all levels from kindergarten to graduate school by both public and private institutions. Elementary and secondary education involves 12 years of schooling, the successful completion of which leads to a high school diploma. Education is free and compulsory in all states, from the age of 6 till 16 (or 18).

Children move on to high school or secondary school in the ninth grade, where they continue until the twelfth grade. Admission to the American high school is automatic on completion of the elementary school. There are two basic types of high schools: one with a more academic curriculum, preparing students for admission to college, and the other offering primarily vocational education.

In order to receive the high school diploma necessary in most states to get into college, students must accumulate a minimum number of credits, which are awarded for the successful completion of each course. Students hoping to be admitted to the more famous universities such as Harvard, Princeton, and Yale, have rigid scholastic requirements for entrance, including an examination. Extra-curricular activity (such as playing for one of the school's sports teams, working on the school newspaper, or singing in a chorus) is also very important in the American school system and is taken into consideration by colleges and employers.

There are about 3,000 colleges and universities, both private and public, in the United States. They all offer their own choice of studies, setting their own admission standards and deciding which students meet those standards. The greater the prestige of the university, the higher the credits and grades required.

The terms college and university are often used interchangeably, as college is used to refer to all undergraduate education and the four-year undergraduate programme, leading to a Bachelor's Degree. Universities tend to be larger than colleges and also have graduate schools where students can receive post-graduate education.

During the first two years students usually follow general courses in the arts or sciences and then choose a major (the subject or area of studies in which they concentrate). Credits (with grades) are awarded for the successful completion of each course. It usually takes four years to meet the requirements for a Bachelor of Arts or Bachelor of Science degree. A Master of Arts or Master of Science degree may be obtained in one or two additional years. The highest academic degree is the Doctor of Philosophy. It may take any number of years to complete the original research work necessary to obtain this degree.

The executive head of a college or a university is usually called the president. The various colleges or schools which take up a university are headed by deans. Within a school or college there may be departments according to subject matter fields, each of which may be headed by

a professor who is designated as department head or chairman. Other members of the faculty hold academic ranks, such as instructor, assistant professor, associate professor, and professor.

Notes to the text

Bachelor of Arts	*бакалавр искусств, ученая степень в области гуманитарных наук*
Bachelor of Science	*бакалавр наук, ученая степень в области технических наук*
Master of Arts (M.A.)	*магистр гуманитарных наук*
Master of Science (M.S.)	*магистр технических наук*
Doctor of Philosophy (PhD)	*докторская степень, общая для всех областей, знаний, высшая академическая квалификация*

5.9. Read the following statements and decide if they are true (T) or false (F).

1. One has to pay in order to study at American public schools.
2. There are twelve grades in American schools.
3. The US is the largest country in the world.
4. At a high school students can get vocational education.
5. When completing each course at a college students get credits.
6. Extra-curricular activities are taken into consideration when entering the university.
7. You can obtain a bachelor's degree at American colleges as well as at universities.
8. Bachelors have to study one or two additional years to obtain a Master of Science degree.
9. It is necessary to complete original research work to be the Doctor of Philosophy.
10. The executive head of a college or a university is a guidance counselor.

5.10. Read the text again and answer the questions.

1. What age do children start the education in the USA?
2. What types of high schools are there in the USA?
3. Do you have to get the high school diploma to enter a college?

4. Is the education in the USA free?
5. What is the difference between a college and a university?
6. Can you obtain a Master degree at a college?
7. Who are college departments headed by?
8. How many years do you have to study to get a Master Degree?
9. What do Russian and American universities have in common?
10. Would you like to get education in the USA? Why? Why not?

GRAMMAR

Revising Verbal Constructions

5.11. Choose the best translation.

1. Я не возражаю, если вы переведете другую статью.
   a) I don't mind your translating another article.
   b) I don't mind translating another article.
2. Она расстроилась, так как ее брат не сдал экзамены.
   a) She felt upset her brother's having failed exams.
   b) She felt upset having failed her brother's exams.
3. Я помню, что мечтал полететь в космос.
   a) I remember my dreaming to fly into space.
   b) I remember me to dream to fly into space.
4. Мы с нетерпением ждем, когда родители переедут.
   a) We look forward our parents moving the house.
   b) We look forward to moving the house.
5. Мне нравится, когда все студенты участвуют в эксперименте.
   a) I like all the students take part in experiment.
   b) I like taking part in experiment with all the students.

5.12. Change the following sentences paying attention to gerund construction, as in the model.

Model: – He plays the guitar very well. We enjoy it.
– We enjoy **his playing** the guitar.

1. They asked her to wait for an hour. I didn't mind it.
2. He earns a lot of money working extra hours. His parents are happy of it.
3. They go to Spain for holidays. We are sorry about it.
4. George has given us his camera. We are thankful for it.
5. They play music at night very loudly. The neighbours complain about it.
6. He complains at the results of exams. She feels angry.
7. Peter usually wins the swimming competition. I am always informed about it.
8. She came late. I was very surprised.
9. They didn't sign the contract. I don't see the reason for it.
10. They say you argue with the boss. I don't remember it.

5.13. Choose the best translation.

1. They said to have made wrong decision.
   а) Считают, что они приняли неверное решение.
   б) Решение, принятое ими**,** было неправильным.
2. You are sure to become a good specialist in radioengineering.
   а) Вы обязательно станете хорошим специалистом в радиотехнике.
   б) Вы уверены, что станете хорошим специалистом в радиотехнике.
3. Your article is considered to be the best in this scientific magazine.
   а) Ваша статья – лучшая в этом научном журнале.
   б) Считают, что ваша статья – лучшая в этом научном журнале.
4. The experiment is supposed to be finished in January.
   а) Предполагают, что эксперимент будет закончен в январе.
   б) Эксперимент обязательно будет закончен в январе.
5. The results of the elections are expected to be announced tomorrow.
   а) Результаты выборов будут объявлены завтра.
   б) Ожидают, что результаты выборов будут объявлены завтра.

READING COURSE

Unit 1. COMMUNICATION

Text A *History of Communication Systems*
Text B *History of Radio*

Grammar: **functions of the verbs *to be, to have*, *to do*; multifunctional words *it, one, that*; adjectives and adverbs: degrees of comparison**

Text A

HISTORY OF COMMUNICATION SYSTEMS

Pretext exercises

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

Signal, visual telegraphy, communication system, operator, interval, kilometer, commercial, electrical telegraph, transatlantic, to demonstrate, Internet, Nobel Prize, mechanical, device, disk, television, problem, teletype, calculator, computer, protocol.

1.2. Read the following words and mind their pronunciation.

visual	[`vɪʒuəl]	Guinea	[`gɪnɪ]
telegraphy	[tə`legrəfɪ]	interval	[`ɪntəvəl]
major	[`meɪʤə]	commercial	[kə`mə:ʃəl]
cathode	[`kæsəud]	silhouette	[ˌsɪlu`et]
result	[rɪ`zʌlt]	centralized	[`sentrəlaɪzd]
control	[kən`trəul]		

Memorize the following words and expressions

skilled	*квалифицированный, опытный*	**to rely upon, to depend on**	***зд.*** *базироваться на*
telephone exchange	*телефонная станция*	**cathode ray tube (CRT)**	*электронно (катодно)-лучевая трубка (ЭЛТ)*
conventional	*обычный, традиционный*	**computed result**	*вычисленный результат*
major city	*крупный город*	**packet switching**	*коммутация пакетов, пакетная коммутация*
to share	*разделять (что-л. с кем-л.); использовать совместно*	**centralized mainframe**	*центральная ЭВМ*

1.3. Read the text.

HISTORY OF COMMUNICATION SYSTEMS

The history of telecommunication is an important part of the larger history of communication. Early communications included smoke signals and drums. Drums were used by natives in Africa, New Guinea and South America, and smoke signals in North America and China.

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

The first commercial electrical telegraph was constructed in England by Sir Charles Wheatstone and Sir William Fothergill Cooke. The first successful transatlantic telegraph cable was completed on the 27th of July, 1866, allowing transatlantic telecommunication for the first time.

The conventional telephone was invented by Alexander Bell in 1876. The first commercial telephone services were set-up in 1878 and 1879 on both sides of the Atlantic in the cities of New Haven and London. The

technology grew quickly; intercity lines and telephone exchanges were built in every major city of the United States by the mid-1880s.

In December 1901, Guglielmo Marconi established wireless communication between Britain and the United States; he received the Nobel Prize for physics in 1909 (which he shared with Karl Braun).

On the 25th of March, 1925, Scottish inventor John Logie Baird publicly demonstrated the transmission of moving silhouette pictures at the London department store Selfridges. Baird's first devices relied upon the Nipkow disk and thus became known as the mechanical television.

However, most of the 20th century televisions depended upon the cathode ray tube invented by Karl Braun. John Logie Baird switched from mechanical television and became a pioneer of colour television using cathode-ray tubes.

In September 1940, George Stibitz was able to transmit problems using teletype to his Complex Number Calculator in New York and to receive the computed results back at Dartmouth College in New Hampshire. In the 1960s, researchers started investigating packet switching – a technology that would allow chunks of data to be sent to different computers without first passing through a centralized mainframe. In September 1981, RFC 791 introduced the Internet Protocol v4 (IPv4) and RFC 793 introduced the Transmission Control Protocol (TCP) – thus creating the TCP/IP protocol that much of the Internet relies upon today.

Internet access became widespread late in the century, using the old telephone and television networks.

Notes to the text

to suffer (from)	*иметь недостатки*
to abandon	*закрывать; ликвидировать*
Nipkow disk	*диск Нипкова*
chunk	*большое количество*
Complex Number Calculator	*компьютер, умеющий выполнять вычисления над комплексными числами*
Internet Protocol = IP	*протокол Интернет, протокол IP*
RFC (Request for Comments)	*запрос на комментарий «предлагается к обсуждению»*
Transmission Control Protocol	*протокол управления передачей*

1.4. Choose the correct variant and complete the following sentences.

1. The first commercial electrical telegraph was constructed by …
   a) George Stibitz.
   b) Guglielmo Marconi.
   c) Sir Charles Wheatstone and Sir William Fothergill Cooke.
2. The conventional telephone was invented by …
   a) John Logie Baird in 1845.
   b) Alexander Bell in 1876.
   c) George Stibitz in 1940.
3. In December 1901, Guglielmo Marconi …
   a) established wireless communication between Britain and the United States.
   b) became a pioneer of colour television.
   c) invented the conventional telephone.
4. On the 25th of March, 1925, Scottish inventor John Logie Baird …
   a) started to investigate packet switching.
   b) publicly demonstrated the transmission of moving silhouette pictures.
   c) constructed the first commercial electrical telegraph.

1.5 Read the text again and answer the questions.

1. What did early telecommunications include?
2. Who were drums and smoke signals used by?
3. When was the first visual telegraphy (or semaphore) system built?
4. Why was the last commercial line abandoned?
5. Where was the first commercial electrical telegraph constructed?
6. Where were the first commercial telephone services set-up?
7. What became known as the mechanical television?
8. Who was a pioneer of colour television?
9. When did researchers start investigating packet switching?
10. When was Transmission Control Protocol introduced?

Text B

HISTORY OF RADIO

Pretext exercises

1.6. Read the following words and try to guess their meaning.

Physicist, phenomenon, stress, reality, concept, theory, battery, apparatus, centre, radius, technique, idea, genius, experiment, radio, system, telegraph, communication, telephone, radiation.

1.7. Read the following words and mind their pronunciation.

discharge	[dɪs`ʧɑːʤ]	genius	[`ʤiːnɪəs]
medium	[`miːdɪəm]	ether	[`iːθə]
circuit	[`səːkɪt]	diaphragm	[`daɪəfræm]
contemporary	[kən`tempərərɪ]	circumference	[sə`kʌmfərəns]

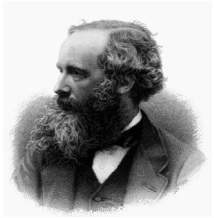
Memorize the following words and expressions

to invent	*изобретать*	**circuit**	*цепь, схема, контур*
to use	*использовать*	**to contain**	*содержать, вмещать*
to discover	*открывать*	**to receive**	*получать, принимать*
to charge	*заряжать*	**to detect**	*обнаруживать*
to discharge	*разряжать*	**to transmit**	*передавать*
to oscillate	*колебаться*	**to measure**	*измерять*
to reduce	*уменьшать*	**wire**	*провод*
to call	*называть*	**wireless**	*беспроводный*
velocity	*скорость*	**to mean**	*значить, означать*
to equal	*равнять(ся)*	**means**	*средство, способ*
wave	*волна*	**to propagate**	*распространять(ся)*
wavelength	*длина волны*	**branch**	*отрасль, область*

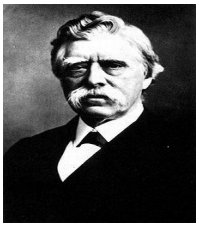
1.8. Read the text.

HISTORY OF RADIO

Within the history of radio, several people were involved in the invention of radio and there were many key inventions in what became the modern system of wireless. Radio development began as "wireless telegraphy". Radio was developed along with two other key inventions, the telegraph and the telephone. During the early development of wireless technology and long after its wide use people disputed who invented the radio. The matter was important for economic, political and nationalistic reasons.



The history of radio begins perhaps with Joseph Henry, an American physicist, who discovered in 1842 that electrical discharges were oscillating. Then a step forward was taken by James Maxwell, a Scottish physicist and one of the great mathematical geniuses of the 19th century. By means of mathematical reasoning Maxwell showed that all electrical and magnetic phenomena could be reduced to stresses and motions in the medium, which he called the ether. Today we know that this electrical medium does not exist in reality. Yet this concept helped greatly, and allowed Maxwell to put forward his theory that the velocity of electric waves in air should be equal to the velocity of light waves. Both of them were the same kind of waves and differed only in wave length.



In 1878, David Hughes, an American physicist, made another important discovery in the history of radio. He found that a loose contact in a circuit containing a battery and a telephone receiver would give rise to sounds in the receiver which corresponded to the sounds that hit the diaphragm of the mouthpiece. Hughes contemporaries claimed that the detected effects were due to electromagnetic induction. The scientist used his apparatus to transmit over a few hundred yards, using a transmitter and a receiver.

Next we must turn to Heinrich Hertz, the famous German physicist, who was the first to create, detect and measure electromagnetic waves. He experimentally confirmed Maxwell's theory. However, Hertz did not devise a system for actual general use nor describe the application of the technology. He only demonstrated that radio radiation had all the properties of waves (now called electromagnetic

radiation). His setup for a source and detector of radio waves (then called Hertzian waves) contained a primitive radio system capable of transmitting and receiving radio waves through free space. Hertz could detect radio waves about 20 meters from the transmitter in his laboratory. He did not try to transmit further because he wanted to prove electromagnetic theory, not to develop wireless communication.

In 1895, Russian scientist A.S. Popov demonstrated the first radio receiver which he called "an apparatus for the detection and registration of electric oscillations". He became the inventor of the radio, and May 7 is celebrated each year as 'Radio Day' in the Russian Federation.

The word "radio" comes from the Latin word "radius" – a straight line drawn 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 through space and reception by receiving stations. The radio technique has become closely associated with many other branches of science and engineering.

Notes to the text

in what became	*в том, что стало*
to take a step forward	*сделать шаг вперед*
by means of mathematical reasoning	*при помощи математических рассуждений*
could be reduced to	*можно свести к*
give rise to	*способствовать*
to put forward	*выдвигать*
was the first to create	*первым создал*

1.9. Fill in the blanks with the following words or word groups. Translate the sentences.

called	**measure**	**light**	**means**	**receiver**	
transmitting station	**radio waves**	**oscillations**	**invention**	**charge**	

1. Electric waves and … waves are different in wavelength.
2. Sounds in the … corresponded to the sounds in the transmitter.
3. Telephone, telegraph, radio are the … of communication.

4. It was a primitive radio system that could transmit and receive … through free space.
5. A.S. Popov … his device "an apparatus for detection of electric …".
6. The … of radio is very important for all mankind.
7. Radio waves are radiated by the … .
8. We could … the velocity of electromagnetic waves.
9. Electrons have a negative … .

1.10. Read the following statements and decide if they are true (T) or false (F).

1. Only few people were involved in the invention of radio.
2. Radio was developed along with telephone and telegraph.
3. Hertz put forward the theory of the ether.
4. Electrical waves and light waves have different wave length.
5. Hertz tried to develop wireless communication.
6. Popov invented the first radio receiver.
7. The term "radio" means the detection and registration of electric oscillations.

1.11. Read the text again and answer the questions.

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

1.12. Translate the following sentences from Russian into English.

1. В давние времена люди использовали для связи дымовые сигналы и барабаны.
2. А. Бэлл изобрел телефон в 1876 году.
3. Скорость электрических волн равна скорости световых волн.
4. Электрические и световые волны имеют разную длину волны.

5. Ученый использовал прибор для передачи информации на большие расстояния.
6. Г. Герц смог обнаружить радио волны на расстоянии около 20 метров от передатчика в своей лаборатории.
7. А.С. Попов продемонстрировал первый радиоприемник в 1895 году.
8. Он назвал свой прибор аппаратом для обнаружения и регистрации электрических колебаний.
9. Существуют разные средства связи: телефон, телеграф, радио и т. д.
10. Термин «радио» означает излучение волн передающей станцией, их распространение в пространстве и прием принимающей станцией.

1.13. Topics for discussion.

1. Early means of communication.
2. The importance of communication in our life.
3. First important discoveries in the field of radio.
4. The role of radio in modern society.

GRAMMAR

Functions of the verbs *to be, to have, to do*

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

1. Radio **is** the transmission of signals, by means of electromagnetic waves with frequencies below those of visible light.
2. PCs **are** now coming in different shapes, sizes and prices.
3. We **are** to translate technical literature in the second year.
4. Bluetooth **is** used to connect and exchange information between devices such as mobile phones, laptops, personal computers, printers, digital cameras, *etc*.
5. GSM **is** a worldwide standard for mobile phones.
6. Monitoring your home and transmitting images via the Web **are** only a couple of the things you can do with your Webcam.

7. Our aim **is** to accomplish this task as soon as possible.
8. The Internet **is** a revolution in communications.
9. This device **was** designed by our engineers last year.
10. The new system **is** to be integrated in all the branches of the chain.
11. Two data signals **are** to be transmitted over two channels.
12. The team **was** given satellite phones.

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

1. This mobile phone **has** a battery life of eight hours.
2. Wireless technologies, broadband internet and satellite systems **have** transformed the telecommunications industry.
3. I often **have** to create documents and presentations when I'm away from the office.
4. The price of telecoms services **has** fallen, on average, by around 30% in the past decade.
1. This mobile device **has** GPS so you'll be able to find your clients easily.
2. The scientist **had** to stop the experiment.
7. As many GSM network operators **have** roaming agreements with foreign operators, users can often continue to use their mobile phones when they travel to other countries.
8. Mobile phones **have** provided wireless connectivity for voice calls and text messages.
9. He **had** to work hard to complete his investigation in time.
10. Televisions **have** received broadcast content principally via cable, satellite and radio frequency transmission.
11. Thin and light laptops and ultra-portable designs are the best options when you **have** to travel with your laptop.
12. We have got a lot of problems with our new device.

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

1. Automatic systems **have** many advantages.
2. The scientist **will have** to improve the quality of this machine.
3. The information **has been based** on the data received from a computer.

4. In the application of electronic instruments the engineer must **have** knowledge of their characteristics.
5. They **were** to complete their research last year.
6. Electronics **is being used** more and more in many fields of our life.
7. The electron **is** a negative particle of electricity.
8. They **have passed** the examination in electrical engineering.
9. Gamma rays **have** no electric charge.
10. The new method **is used** to investigate these phenomena.
11. The scientists **had** to stop their experiment.
12. We **are** to do this work just now.
13. The new theory **was** to be used for analyzing the experimental data.
14. The measuring device **was tested** by the group of researchers.
15. The data obtained by our students **are** in the table.
16. Final results **will be presented** at the conference.
17. The nucleus of the atom **is** in its centre.
18. We **are** to translate technical literature in the course of study.
19. Technical progress **is** now impossible without high-quality materials.
20. It **is** the only positive solution.

1.17. Fill in the blanks with correct forms of the verbs *to be, to have* and *there + to be* construction.

1. The results of the experiment … very important for our further work.
2. There … no chemical plant in out city last year.
3. Cosmic television … a great future.
4. Our planet … powerful sources of energy.
5. You will … go to the library to get this book.
6. The electron … a negative particle of electricity.
7. The temperature … five degrees below zero yesterday.
8. My friends … mostly students.
9. They … many new subjects next term.
10. The electron … almost the same mass as the proton.
11. There … an interesting lecture next week.
12. Our University … 50 years old.
13. There … many modern laboratories in their institute.
14. In 5 years they … engineers.
15. He will … do this work by the end of the week.

1.18. Read and translate the following sentences. Pay attention to the functions of the verb *to do*.

1. He **will do** the work himself.
2. Where **does** he study?
3. Lasers **do** possess many wonderful properties.
4. Semiconductors pass electric current more easily than insulators **do**.
5. I **don't** understand the action of this device.
6. Energy is defined as ability **to do** work.
7. The scientist **did** obtain new properties with the substance.

Multifunctional words *it, one, that*

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

1. **One** of the problems has been solved with the help of the electronics in space communications.
2. The new devices have a number of advantages over the old **ones**.
3. **One** must have a very good knowledge of general engineering subjects to become a good engineer.
4. It allows **one** to solve this problem.
5. **One** cannot translate such an article without a dictionary in the first year.
6. I know only **one** solution of this problem.
7. He knew that no **one** could help him.
8. Our old laboratory equipment was much worse than the new **one**.
9. We translated many texts, but there is **one** more text to translate.
10. Last summer I read many English articles, and my friend read some German **ones**.
11. **One** must study a lot to become an engineer.
12. A given problem can have more than **one** algorithm for its solution.

1.20. Replace the words in bold by corresponding substitutes *one (ones), that (those).*

1. **The day** on Mars is a little longer than … on the Earth.
2. Most countries use **units** of the metric system and not … of the imperial system.
3. This control **system** is more efficient than … described in that journal.

4. There are many technical **journals** in our study; the most interesting … are on that shelf.
5. The experimental **technique** was similar to … described previously.
6. You should use a new **method**, not the old … .

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

1. Electronics is a young science. **It** belongs to the twentieth century.
2. **It** is the most interesting article on this subject.
3. **It** was he who informed us about the results of their work.
4. The experiment was very difficult but I have done **it**!
5. **It** is expected that software will be cheaper.
6. You have written a test. I've checked **it**.
7. What is this? **It** is a new computer.
8. **It** is necessary to test these devices.
9. **It** is this question that we are interested in.
10. **It** is possible that the problem will be solved.
11. A material which allows electricity to flow through **it** is called a conductor.
12. Our students study strength of materials. **It** is a very difficult subject.
13. Mathematics is studied at all technological institutes because every engineer must know **it** well.
14. **It** was in the 20th century that electronic computers appeared.

1.22. Read the following sentences and translate them. Pay attention to the functions of the words *one (ones), it, that (those).*

1. Computers are devices **that** are capable of rapid and accurate calculations.
2. **It** took 5 years to develop the machine.
3. A given problem can have more than **one** algorithm for **its** solution.
4. The experimental technique was similar to **that** described previously.
5. **It** is necessary to protect the human eye when laser beams are being used.

6. Circuits **that** can perform this logical operation and similar **ones** have been built and tested.
7. The atoms and molecules **that** make up all the forms of matter are in constant motion.
8. **It** is the computer **that** makes a machine a robot.
9. The new devices have a number of advantages over the old **ones**.
10. **It** was Einstein who provided a new conception of time, space and gravitation.
11. **One** must always be careful when working with this machine.
12. I know only **one** solution of this problem.
13. **It** is the program that ensures the execution of all the operations assigned to the computer.
14. In future power stations will use the principle of direct conversion of solar energy into electric **one**.
15. Due to radioactive elements **one** can measure the thickness of various materials.
16. **That** higher education in the country is accessible to all is known to everybody.
17. **It** is known **that** the knowledge of general engineering subjects is the basis for the study of special subjects.
18. **It** is the computer **that** has completely changed our life.
19. Engineering is one of the most important professions; **it** is the **one that** is taught at technical universities.
20. **One** must pass all the exams well to enter the university.
21. The program for the first-year students differs from **that** for the third-year students.
22. **It** has become evident **that** ecological problems can be solved only on the global level.
23. **It** is the development of robots **that** will solve some very complex problems of industry.
24. The use of the new equipment made **it** possible to minimize the number of workers.

Adjectives and adverbs: degrees of comparison

1.23. Form comparative and superlative degrees of the following adjectives and adverbs.

Fast, bad, quick, hard, little, many, heavy, quickly, good, few, badly, much, progressive, early, well, far, high, difficult.

1.24. Put the adjectives and adverbs into comparative or superlative degrees.

1. Moscow University is … University on Europe. (*large*)
2. Strength of materials is … than chemistry. (*difficult*)
3. It is … to study at the institute than at school. (*interesting*)
4. My friend works … at his English than I. (*hard*)
5. The University is one of the … buildings in Moscow. (*old*)
6. Our group studies … than theirs. (*well*)
7. The new transistor is … than the old one. (*powerful*)
8. The program for the first-year students is … than for the third-year students. (*difficult*)
9. There are … technical articles in this journal. (*interesting*)
10. He has … qualification of all the applicants. (*high*)
11. She was not satisfied with the results because they were … in her class. (*bad*)
12. My friend is … student in our group. (*good*)
13. I know physics … than my friend does. (*badly*)
14. It took them … time to get to the University because they went by bus. (*little*)
15. You should study … to get … qualification in your speciality. (*hard, high*)

1.25. 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 as difficult as mathematics?
7. Do you study well?
8. Who is the youngest in your family?
9. Is your father older than your mother?
10. Are the conditions for living in a hostel good? Why?
11. Is to study at the University hard? Why?

1.26. Translate the following sentences.

1. The bigger the cities are, the greater the pollution.
2. The more computers and robots are used in industry, the quicker the technological progress will be.
3. The more automobiles appear in the streets, the worse the air in the cities is.
4. The more effective is the technology, the quicker is the development of the country.
5. The quicker we join our efforts in protecting the environment, the quicker the ecological problems are solved.
6. The higher your expectations, the greater will be your disappointment.
7. The higher the temperature, the lower the pressure, less time is required.

Unit 2. ELECTRONIC DEVICES

Text A *The Age of Electronics*
Text B *Transistor*

Grammar: tenses of the active voice

Text A

THE AGE OF ELECTRONICS

Pretext exercises

2.1. Read the following words and try to guess their meaning.

Electron, revolution, technology, practice, electricity, transistor, result, action, television, distance, information, communication, vacuum, electrode, to classify, diode.

2.2. Read the following words and mind their pronunciation.

result	[rɪ`zʌlt]	electrode	[ɪ`lektrəud]
electron	[ɪ`lektrɔn]	diode	[`daɪəud]
equipment	[ɪ`kwɪpmənt]	valve	[vælv]
purpose	[`pə:pəs]	control	[kən`trəul]
approximately	[ə`prɔksɪmətlɪ]	inferior	[ɪn`fɪərɪə]
positively	[`pɔzətɪvlɪ]	require	[rɪ`kwaɪə]

Memorize the following words and expressions

device	*устройство, прибор*	**plate**	*пластина, плата, анод*
radio tube	*электронная лампа; электронный прибор*	**grid**	*сетка, решетка*
equipment	*оборудование*	**valve**	*электронная лампа*
to flow	*проходить, протекать (о токе)*	**frequency**	*частота*
copper	*медь*	**amplifier**	*усилитель*

to conduct	*проводить (ток)*	**to require**	*требовать*
conductor	*проводник*	**current**	*электрический ток*
to pass	*проходить (о токе), пропускать (ток)*	**to destroy**	*разрушать*
junction	*соединение, переход*	**set**	*прибор, устройство*
solid-state	*полупроводниковый*	**to measure**	*измерять*
vacuum tube	*электронная лампа*	**pulse circuit**	*импульсная схема*
to consist of	*состоять из*	**to equip**	*оборудовать*
filament	*нить накала, катод*	**power**	*сила, мощность*
to emit	*излучать, испускать*	**to generate**	*вырабатывать*

2.3. Read the text.

THE AGE OF ELECTRONICS

Electronics is the science or practice of using electricity in devices similar to transistors and radio tubes so as to get results not possible with ordinary electrical equipment. Here the electricity always flows in the copper wire or other metal conductors. When electricity passes through space as occurs within a tube or through the junction as in a transistor, such action is called electronic. Thus, if a device passes its stream of electrons through internal space or through the junction, the device is called electronic.

Without electronics there might be no radio, television, sound pictures or long-distance telephone calls. Most of these familiar equipments serve to carry or to give information; so from the very beginning communication was a main purpose of electronics.

The science of electronics now deals almost exclusively with transistors or other solid-state devices. However, until approximately 1955 vacuum tubes were the principle building blocks of electronic circuits. A vacuum tube consists of several metal electrodes of various shapes all packaged inside a glass or metal envelope which is highly evacuated. A red hot electrode (filament or cathode) emits electrons which are attracted to a positively charged electrode called the plate or anode. The electrons pass through the spaces in a metallic grid electrode on their way to the plate, and the voltage

on the grid controls how many electrons reach the plate. Vacuum tubes are classified according to the number of electrodes. A diode is a valve with two electrodes. A triode has three electrodes: a filament, a plate and a control grid, and so on.

Vacuum tubes are still widely used in oscilloscopes, high power high frequency radio transmitters and in some special low noise amplifiers. As a general rule, they are inferior to modern solid-state devices in many ways. Vacuum tubes are much larger. They require considerably more electric power to operate. However, they can handle high voltages and high powers at high frequencies somewhat more easily than solid-state devices. They are also capable of withstanding temporary overloads in voltage or current which would destroy a solid-state device and then returning to normal operation.

In 1948, American scientists Bardeen, Brattain and Shockley invented the first transistor. At present transistors are widely used in amplifies, receivers, transmitters, oscillators, TV sets, measuring instruments, pulse circuits, computers and many other types of radio equipment. The invention of transistors and solid-state devices led to acceleration in the growth of electronics. Transistors are made from parts which do not wear out. They waste very little power. They require no heating to generate their free electrons. This means that equipment made with transistors is more efficient, lighter than comparable valve equipment.

Notes to the text

internal	*внутренний*
envelope	*оболочка*
according to	*согласно чему-л.*
to handle	*оперировать*
temporary	*временный*

2.4. Fill in the blanks with the following words.

emits copper plate conductor electronic gain communication number triode negative

1. In electric devices current flows in the … .
2. … devices pass the electric current through vacuum.
3. In the early years electronic equipment was used for … .
4. Filament … electrons.

5. Vacuum tubes are classified according to the … of electrodes.
6. Filament and … are the main electrodes of the diode.
7. Electron has a … charge.
8. The function of the … is amplification.
9. The stream of electrons passes through the … wire.
10. The ratio of the output signal to the input signal is called the … .

2.5. Read the following statements and decide if they are true (T) or false (F).

1. The discovery of electron didn't influence physical science.
2. It is possible to get the same results with ordinary electrical equipment as with transistors and radio tubes.
3. The device is called electronic if the stream of electrons passes through an electric copper wire.
4. The aim of electronics was to improve communication.
5. Vacuum tubes are classified according to the number of electrodes.
6. Vacuum tubes are much less than solid-state devices.
7. Parts of transistors wear out very quickly.
8. Equipment made with transistors weighs much more in comparison with valve equipment.
9. Transistors waste very much power.
10. A filament, a plate and a control grid are parts of a diode.
11. Electronics doesn't serve to carry information.

2.6. Read the text again and answer the questions.

1. What is electronics?
2. How are vacuum tubes classified?
3. What device is called electronic?
4. What is a semiconductor?
5. When was the first transistor invented?
6. What led to the acceleration in the growth of electronics?
7. What was the main purpose of electronics?
8. What are the advantages of transistors?
9. What are the advantages of vacuum tubes?
10. Where are vacuum tubes still widely used?
11. What led to a revolution in physical science?
12. Who invented the first transistor?

Text B

TRANSISTOR

Pretext exercises

2.7. Read the following words and try to guess their meaning.

Key element, electronics, process, discrete, component, control function, design, terminal, reproduction, operation, digital, intensity, vibration, limitation, mobility.

2.8. Read the following words and mind their pronunciation.

reliability	[rɪˌlaɪəˋbɪlɪətɪ]	application	[ˌæplɪˋkeɪʃn]
majority	[məˋʤɔrətɪ]	manufacturing	[ˌmænjəˋfæʧərɪŋ]
determine	[dɪˋtəːmɪn]	ruggedness	[ˋrʌgɪdnəs]
vibration	[vaɪˋbreɪʃn]	intensity	[ɪnˋtənsətɪ]
predecessor	[ˋpriːdɪˌsəsə]	frequency	[ˋfriːkwənsɪ]

2.9. Translate the following attribute groups.

1. Control function
2. Equivalent mechanical control function
3. Sound reproduction
4. Signal processing
5. Modern transistor audio amplifier
6. High power application
7. Highly automated manufacturing process
8. Battery-powered application
9. High frequency operation
10. Over-the-air television broadcasting
11. Electron mobility
12. Atmospheric nuclear explosion

Memorize the following words and expressions

to achieve	*достигать, добираться*	**cathode heater**	*нагреватель катода*
capacitor	*конденсатор, емкость*	**switch**	*переключатель, выключатель*
terminal	*клемма, зажим*	**dissipation**	*рассеяние*

gain	*коэффициент усиления*	**efficiency**	*эффективность, коэффициент полезного действия*
signal processing	*обработка сигнала*	**reliability**	*надежность*
to determine	*определять*	**due to**	*вследствие, из-за*
application	*применение,приложение; прибор, устройство*		

2.10. Read the text.

TRANSISTOR

The transistor is the key element in practically all modern electronics and one of the greatest inventions of the 20th century. Its importance in today's society rests on its ability to be mass produced using a highly automated process (semiconductor device fabrication) that achieves astonishingly low per-transistor costs.

Although several companies each produce over a billion individually-packaged (known as discrete) transistors every year, the vast majority of transistors now produced are in integrated circuits (IC) along with diodes, resistors, capacitors and other electronic components, to produce complete electronic circuits.

The essential usefulness of a transistor comes from its ability to use a small signal applied between one pair of its terminals to control a much larger signal at another pair of terminals. This property is called gain. A transistor can control its output in proportion to the input signal, that is, act as an amplifier. From mobile phones to televisions, vast numbers of products include amplifiers for sound reproduction, radio transmission, and signal processing. Modern transistor audio amplifiers of up to a few hundred watts are common and relatively inexpensive.

Or, the transistor can be used to turn current on and off in a circuit as an electrically controlled switch, where the amount of current is determined by other circuit elements. Transistors are commonly used as electronic switches, for both high power applications and low power applications.

Prior to the development of transistors, vacuum tubes (valves) were the main active components in electronic equipment. The key advantages that

have allowed transistors to replace vacuum tubes in most applications are:

- Small size and minimal weight, allowing the development of miniaturized electronic devices.
- Highly automated manufacturing process, resulting in low per-unit cost.
- Lower possible operating voltages, making transistors suitable for small, battery-powered applications.
- No warm-up period for cathode heaters required after power application.
- Lower power dissipation and generally greater energy efficiency.
- Higher reliability and greater physical ruggedness.
- Extremely long life. Some transistorized devices have been in service for more than 30 years.
- Insensitivity to mechanical shock and vibration.

There are also some limitations in using transistors. Silicon transistors do not operate at voltages higher than above 1000 volts. In contrast, electron tubes have been developed that can be operated at tens of thousands of volts. High power, high frequency operation is better achieved in electron tubes due to improved electron mobility in a vacuum. Silicon transistors are much more sensitive than electronic tubes to an electromagnetic pulse, such as generated by an atmospheric nuclear explosion.

Notes to the text

along with	*вместе с, наряду с*
prior to	*до*
ruggedness	***зд.*** *прочность*

2.11. Read the following statements and decide if they are true (T) or false (F).

1. The transistor is one of the greatest achievements of the 19th century.
2. An IC, that is, a transistor with diodes, resistors, capacitors and other electronic components is known as discrete transistor.
3. Modern transistor audio amplifiers are relatively expensive.
4. The advantages of transistors over vacuum tubes are their big size and maximum weight.
5. A transistor is very stable to mechanical shock and vibration.
6. There are not any limitations in using transistors.
7. Silicon transistors are much less sensitive than electronic tubes to an electromagnetic pulse.

2.12. Complete the following sentences with the expressions from the box.

electronic tubes	low cost	IC	gain	Electron mobility	mass-produced

1. … is higher in a vacuum.
2. Silicon transistors are much more sensitive than … to an electromagnetic pulse.
3. Transistors can be easily … using a highly automated process.
4. Very … of mass production is the main reason of transistor's importance in today's society.
5. Diodes, resistors, transistors along with other electronic components form … .
6. The ratio of the output signal to the input signal is called … .

2.13. Read the text again and answer the questions.

1. What is one of the greatest inventions of the 20th century?
2. Why is the transistor important in modern electronics?
3. How are most transistors produced now?
4. What properties have made a transistor a widespread device?
5. What devices have been replaced in controlling appliances and machinery?
6. What is the "gain"?
7. How powerful are modern transistor audio amplifiers?
8. How is the transistor used as a switch?
9. What are the key advantages of transistors?
10. Are there any disadvantages in using transistors? What are they?

2.14. Translate the following sentences from Russian into English.

1. В электрических приборах ток протекает в металлическом проводнике.
2. С самого начала связь была главной целью электроники.
3. Электронные лампы классифицируются по числу электродов.
4. Триод состоит из анода, катода и управляющей сетки.
5. Главная функция триода – усиление.
6. Электроны испускаются отрицательно заряженным катодом.
7. Анод имеет положительный заряд.
8. Управляющая сетка расположена между анодом и катодом.

9. Электронные лампы работают лучше с высоким напряжением и на высоких частотах.
10. Транзисторы меньше, легче, потребляют меньше энергии, чем электронные лампы.
11. Транзисторы можно использовать для включения и выключения тока в цепи.
12. Транзисторные приборы заменили ламповые приборы, так как они имеют много преимуществ.

GRAMMAR

Tenses of the Active Voice

2.15. Choose the right English equivalent to the Russian verb.

1. Какую статью вы *сейчас* **переводите**?
   a) translate b) is translating c) are translating
2. *Вчера в 8 часов* я **переводил** статью.
   a) translated b) had translated c) was translating
3. Сколько статей вы *уже* **перевели**?
   a) have translated b) translated c) had translated
4. Он *часто* **переводит** статьи.
   a) is translating b) translates c) translate
5. *Завтра в 7 часов* вечера я **буду переводить** статью.
   a) will translate b) will have translated c) will be translating
6. Я буду **переводить** эту статью, *когда у меня будет свободное время*.
   a) will translate b) will be translating c) will have translated
7. Что ты делал *вчера*? – **Переводил** одну статью.
   a) translated b) was translating c) have translated
8. Я уже **перевел** половину статьи *до того, как вы пришли*.
   a) had translated b) have translated c) translated
9. Обещаю **перевести** эту статью *к понедельнику*.
   a) will translate b) will be translating c) will have translated

2.16. Translate the following sentences from Russian into English.

to take / to pass *an exam – сдавать экзамен*

1. Я сдаю экзамены каждый семестр.
2. Я сдавал экзамен вчера.
3. Я буду сдавать экзамен завтра.
4. Я сдаю экзамен, не звони мне.
5. Я сдавал экзамен вчера в 10 часов утра.
6. Я буду сдавать экзамен завтра в 10 часов утра.
7. Я только что сдал экзамен.

2.17. Put the verbs in brackets into the appropriate forms.

1. I usually … the experiment results. (*compare*)
2. They … text two tomorrow. (*translate*)
3. I … this article by 5 o'clock yesterday. (*read*)
4. This student … well at the last lesson. (*answer*)
5. The teacher … the new grammar rule at the last lesson. (*ask*)
6. He … you a copy of his paper by next Monday. (*send*)
7. When I came home, my sister … her report. (*prepare*)
8. What … you … tomorrow at 11 o'clock? (*do*)
9. I … just … with your group leader. (*meet*)
10. Who… he … yesterday afternoon? (*talk to*)
11. We … a test tomorrow morning. (*write*)
12. I … your letter by the end of the week. (*answer*)
13. Where is the teacher? He … a new material. (*explain*)
14. I … the article yesterday at 5 o'clock. (*translate*)
15. I … my diploma work by last week. (*finish*)
16. She … her notes for the exams now. (*revise*)
17. We … the job candidates tomorrow morning. (*interview*)
18. The students … already … credit tests. (*pass*)
19. The scientists … the solution of a problem yesterday evening (*analyze*).
20. Don't come to my place! I … . (*work*)

2.18. Read and translate the following sentences paying attention to the tenses.

1. We usually take measurements with great accuracy.
2. The solar energy is converting the energy of the sun rays directly into electric energy.
3. He noticed that the machine was making a noise which sounded like human voices in conversation.
4. Industry has adapted electronic equipment to its own needs.
5. Diode consists of the filament that emits electrons and the plate that attracts electrons.
6. The voltage on the grid controls how many electrons reach the plate.
7. The discovery of this scientist did not receive due attention.
8. The invention of transistors has led to acceleration in the growth of electronics.
9. A brief review of transistor advantages will provide the answers to many questions.
10. Solid-state devices require less power than vacuum tubes.
11. The importance of this research has grown especially in connection with space research.
12. These devices will give mankind invaluable assistance in different fields of life.

Unit 3. RECORDING SYSTEMS

Text A *Audio Recording Systems*
Text B *Digital Audio Player*
Grammar: **passive voice; revising tenses**

Text A

AUDIO RECORDING SYSTEMS

Pretext exercises

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

Theory, phonograph, model, principle, telegraph messages, experiment, machine, poem, to modify, patent, gramophone, vinyl disk, metal, magnetic, minute, compact disc (CD) system, laser optical mechanism, specially, digital-to-analogue converter (DAC), electronic signal, CD player.

3.2. Read the following words and mind their pronunciation.

fidelity	[fɪ`delɪtɪ]	surface	[`sə:fɪs]
deteriorate	[dɪ`tɪərɪəreɪt]	concern	[kən`sə:n]
eliminate	[ɪ`lɪmɪneɪt]	modify	[`mɔdɪfaɪ]

Text A

AUDIO RECORDING SYSTEMS

Memorize the following words and expressions

to produce	*производить*	**recording capacity**	*длительность записи*
to manufacture	*производить, изготовлять*	**laser beam**	*лазерный луч*
record ***(n)***	*запись, пластинка*	**surface**	*поверхность*
to record ***(v)***	*записывать*	**sound quality**	*качество звука*

needle	*игла*	**to eliminate**	*устранять, исключать*
to reproduce	*воспроизводить*	**to revolve**	*вращаться*
to modify	*видоизменять*	**speed**	*скорость*
considerably	*значительно*	**to reflect**	*отражать*
hi-fi (high fidelity)	*высокая точность воспроизведения*	**to feed**	*питать, подавать*
field	*поле, область*	**to convert**	*преобразовывать*

3.3. Read the text.

AUDIO RECORDING SYSTEMS

Charles Cros, a French scientist, produced a theory concerning a phonograph, but he didn't manufacture a working model. It was Thomas Edison who produced a working model. Edison understood the principle of recording and reproducing sound in 1877 as a byproduct of his efforts to "play back" recorded telegraph messages and to transmit them by telephone.

Edison made a lot of experiments and invented a machine which consisted of two diaphragms on either side of a drum of tinfoil. Each diaphragm was attached to a needle which rested on the foil. Edison turned the drum by hand and read a poem into one of the diaphragms – the recording unit – which then cut a pattern into the tinfoil. Then Edison put the reproducing needle at the start of the newly-cut groove and started turning the drum again. He heard his own voice repeating the poem: the needle following the groove in the foil reproduced the sounds that the other diaphragm had recorded.

Alexander Graham Bell and his two associates took Edison's tinfoil phonograph and modified it considerably to make it produce sound from wax instead of tinfoil. They began their work at Bell's Volta Laboratory in Washington, D.C., in 1879 and continued until they were granted basic patents in 1886 for recording in wax.

For a long time hi-fi recordings have been produced on vinyl gramophone records. Records use an analogue recording system, which stores patterns by cutting a continuous groove in a vinyl disk. The sound can be reproduced by spinning the record and using the movement of a metal needle in the groove to produce varying magnetic fields. A typical LP (long-playing record) has a recording capacity of about 45 minutes.

A digital recording system, known as a compact disc (CD) system, was introduced in 1982. This uses a laser optical mechanism in which a laser beam reads marks on the surface of a specially prepared perspex disk. It gives near-perfect reproduction of sound and the sound quality does not deteriorate with use. Some of the problems associated with vinyl records are eliminated such as "crackle" caused by dust and static, and "jumping", due to scratches on the recording surface.

To play back the recording, the disk is made to revolve at a constant speed and a laser beam is directed at its surface. The varying reflection of the laser beam is fed into a digital-to-analogue converter (DAC). This produces the electronic signals, which are amplified to drive a loudspeaker.

In 1989, sales of compact disks (CDs) exceeded sales of long-play albums (LPs) for the first time. By 1990, CD sales were more than double those of LPs. Cheaper CD players and the introduction of mid-price and budget-price discs have been partly responsible for the increase in CD sales.

Notes to the text

to concern	*касаться, иметь отношение*
byproduct	*побочный продукт*
effort	*усилие*
diaphragm	***зд.*** *мембрана*
tinfoil ***(n)***	*станиоль, оловянная фольга*
to tinfoil ***(v)***	*покрывать оловянной фольгой*
to rest on	*располагаться на*
pattern	*рисунок*
groove	*желобок, канавка, выемка*
associate	*помощник, коллега*
to spin	*крутиться*
perspex	*плексиглас*
to deteriorate	*ухудшать, портить(ся)*
crackle	*треск, потрескивание*
scratch	*царапина*
to exceed	*превышать*
budget-price	*низкая (сниженная, невысокая) цена*

3.4. Read the following sentences and decide if they are true (T) of false (F).

1. It was Alexander Bell who produced the first working model of a phonograph.
2. A phonograph was manufactured in 1887.
3. Only one of two diaphragms had a needle.
4. Bell produced sound from wax instead of tinfoil.
5. The reproducing needle recorded the sounds of Edison's voice.
6. A compact disc system was introduced in 1980s.
7. A laser optical mechanism gives near-perfect reproduction of sound.
8. The quality of sound in CDs greatly deteriorates with use.
9. Crackle is not caused by dust and static.
10. Scratches on the recording surface contribute to "jumping".
11. By 1990 sales of CDs exceeded sales of LPs.
12. Cheapness of CDs is responsible for the increase in sales.

3.5. Read the text again and answer the questions.

1. What is Thomas Edison famous for?
2. What is a phonograph?
3. How did Edison record the sound?
4. How did he reproduce the sound?
5. How did Bell modify tinfoil phonograph?
6. How is the sound reproduced on vinyl records?
7. What is a recording capacity of LP record?
8. What is a digital recording system?
9. Does the sound quality of CD deteriorate with use?
10. What are the problems with vinyl records?
11. What is DAC?
12. What is the reason for the increase in CD sales?

Text B

DIGITAL AUDIO PLAYER

Pretext exercises

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

Digital audio player, electronic device, primary function, audio file, portable CD player, commercial production, personal computer, mobile phone, music, MP3 player, digital format, flash memory, processor, analogue sound signal, battery, display screen, device, track, USB, website, TV episodes, microphone, user, risk.

3.7. Read the following words and mind their pronunciation.

miniature	[`mɪnɪtʃə]	install	[ɪn`stɔ:l]
damage	[`dæmɪʤ]	announce	[ə`nauns]
environment	[ɪn`vaɪrənmənt]	commercial	[kə`mə:ʃ(ə)l]
tinnitus	[`tɪnɪtəs]	sequence	[`si:kwəns]
permanent	[`pə:mənənt]	associate	[ə`səuʃɪeɪt]

3.8. Match the words in column A and B to make the expressions.

1. remote	a. supply
2. integrated	b. wave
3. power	c. current
4. alternating	d. line
5. radio	e. timer
6. alarm	f. clock
7. washing	g. control
8. clock	h. circuit
9. assembly	i. diode
10. germanium	j. machine

Memorize the following words and expressions

consumer	*потребитель, покупатель*	**storage**	*хранение*
portable	*переносной, портативный*	**embedded processor**	*встроенный процессор*

support	*поддержка*	**codec**	*кодер, декодер, алгоритмы уплотнения, разуплотнения данных*
to announce	*объявлять*	**to power**	*питать*
to install	*устанавливать*	**jack**	*гнездо, розетка, пружинный переключатель*
to spread	*распространять(ся)*	**to range**	*находиться в диапазоне*
handset	*телефонная трубка, мобильная трубка*	**to provide**	*обеспечивать, снабжать, давать*
stand-alone	*автономный*	**suitable**	*подходящий*
digital sampling	*цифровая выборка, дискретизация*	**volume control**	*регулировка громкости*
sequence	*последовательность*	**to result in**	*вести к чему-либо*
to store	*сохранять*		

3.9. Read the text.

DIGITAL AUDIO PLAYER

A digital audio player, or DAP, usually referred to as an MP3 player, is a consumer electronic device that has the primary function of storing, organizing and playing audio files. Some DAPs are also referred to as portable media players as they have image-viewing and/or video-playing support.

The immediate predecessor in the market place of the digital audio player was the portable CD player. Kane Kramer designed one of the earliest digital audio players which was capable of approximately 3.5 minutes of audio playback but it didn't enter commercial production. The world's first company to announce a portable MP3 player and the attendant system for uploading MP3 audio content to a personal computer and then downloading it onto a personal MP3 player was Audio Highway in 1996.

The next company on the MP3 player scene was South Korea-based Saehan Information Systems which began selling its "MPMan" player in the middle of 1998. In 2001 the first MP3 players were installed into mobile phones in

South Korea and the first artist to sell songs as MP3 file downloads directly to mobile phones was Ricky Martin. The innovation spread rapidly and by 2005, more than half of all music sold in South Korea was sold directly to mobile phones. The idea spread across the globe and by 2005 all five major handset makers, Nokia, Motorola, Samsung, LG and SonyEricsson had released musicphones. By 2006, more MP3 players were sold in musicphones than all stand-alone MP3 players put together. The rapid rise of the musicphone was a primary reason for developing iPhone. Today more than half of all mobile phones in the world have an MP3 player.

Digital sampling is used to convert an audio wave to a sequence of binary numbers that can be stored in a digital format, such as MP3. Common features of all MP3 players are a memory storage device, such as flash memory or a miniature hard disk drive, an embedded processor and an audio codec microchip to convert the compressed file into an analogue sound signal.

Most DAPs are powered by rechargeable batteries, some of which are not user-replaceable. They have a 3.5 mm stereo jack; music can be listened to with headphones, or played via an external amplifier. Nearly every DAP consists of some kind of display screen and a set of controls with which the user can browse through the library of music contained in the device, select a track, and play it back. The controls can range from the simple buttons as are found on most typical CD players for skipping through tracks or stopping/starting playback to full touch-screen controls. One of the more common methods of control is some type of the scroll wheel with associated buttons.

Content is placed on DAPs typically through a process called “syncing”, by connecting the device to a personal computer, typically via USB, and running any special software that is often provided with the DAP on an enclosed CD-ROM, or downloaded from the manufacturer’s website. The music, or other content such as TV episodes or movies, is added to the software to create a “library”. The library is then “synced” to the DAP via the software. Many players have a built-in microphone which allows recording. Usually recording quality is poor, suitable for speech but not music.

The risk of hearing damage from digital audio players depends on both sound level and listening time. The listening habits of most users are unlikely to cause hearing loss, but some people are putting their hearing at risk, because they set the volume control very high or listen to music at high

levels for many hours per day. Such listening habits may result in temporary or permanent hearing loss, tinnitus, and difficulties understanding speech in noisy environments.

Notes to the text

to refer to as	*называться*
attendant	*сопутствующий*
to skip	*перепрыгивать, перескакивать*
hearing damage	*нарушение слуха*
to put at risk	*рисковать*
tinnitus	*шум в ушах*

3.10. Choose the correct variant and complete the following sentences.

1. The first person who designed the earliest digital audio player was
   a) Ricky Martin
   b) Kane Kramer
   c) A.Bell
2. By 2006 most MP3 players were sold as
   a) stand-alone
   b) musicphones
   c) iPhones
3. The most serious hearing damage caused by audio players is:
   a) hearing loss
   b) difficulties understanding speech in noisy environments
   c) tinnitus
4. DAP is connected to a personal computer via
   a) CD-ROM
   b) USB
   c) cable
5. Most DAPs are powered by
   a) external amplifiers
   b) jack
   c) rechargeable batteries

3.11. Match the English terms with their Russian definitions.

1. Digital sampling	a. цифровой аудиоплеер
2. CD-ROM	b. цифровая выборка, дискретизация
3. USB	c. компакт диск, доступный только для чтения
4. DAP	d. универсальная последовательная шина

3.12. Read the following sentences and say whether they are true (T) or false (F).

1. The primary function of DAPs is video recording files.
2. The first company to release MP3 player was South Korean Saehan Information Systems.
3. The first artist to use a mobile phone was Ricky Martin.
4. All mobile phones today have MP3 players.
5. Buttons are used to ship through tracks or stopping/starting playback.
6. Every MP3 player is powered by replaceable rechargeable batteries.
7. Software for DAP is always downloaded from the manufacturer's website.
8. Library of content is provided by the manufacturer.
9. Sound level of MP3 does not damage hearing at all.
10. Tinnitus is caused by bad listening habits.

3.13. Read the text again and answer the questions.

1. What is the primary function of MP3 player?
2. Why are some DAPs called portable media players?
3. What device was the immediate predecessor of the digital audio player?
4. How long was playback of Kane Kramer's player?
5. What was the first company to announce a portable MP3 player?
6. Who was the first artist to sell songs as MP3 player file downloads to mobile phones?
7. What was the primary reason for developing iPhone?
8. What is "digital sampling" used for?
9. What are the common features of MP3 players?
10. What is the most common method of control in DAPs?
11. How is special software for DAP provided?

12. How is the library created?
13. What does the risk of hearing damage depend on?
14. What can you do to choose necessary track to listen to?

3.14. Translate the following sentences from Russian into English.

1. Томас Эдисон создал рабочую модель фонографа.
2. Он использовал принцип записи и воспроизведения звука.
3. Игла двигалась по дорожке на фольге и записывала звуки.
4. Цифровая оптическая система использует лазерный оптический механизм.
5. Качество звука в CD не ухудшается при использовании.
6. Информация, записанная на CD, является цифровой и считывается лазером.
7. CD похож на виниловую пластинку.
8. Первые MP3 плейеры были установлены в мобильные телефоны в 2001 году.
9. Многие плейеры имеют встроенный микрофон.
10. Кнопки используются для просмотра библиотеки, выбора дорожки и воспроизведения звука.
11. Если вы слушаете громкую музыку в течение долгого времени, у вас могут быть проблемы со слухом.

GRAMMAR

Passive Voice

3.15. Read and translate the following sentences paying attention to the tenses.

1. Crystal valves **were known** long before the invention of vacuum tubes.
2. They **were all made** from materials which we now classify as semiconductors.
3. Vacuum tubes **are still widely used.**
4. Electrons **are attached** to a positively charged electrode.
5. Vacuum tubes **are classified** according to the number of electrodes.

6. The action of these devices **was not understood.**
7. These semiconductor devices **were used** as rectifiers.
8. An interesting research **had been done** before they got the better results.
9. The applicants with the best scores **are selected** for an interview.
10. The speed with which arithmetic operations **are performed is affected** by a number of factors.
11. Many materials now commonly used **were not** even **thought of** thirty years ago.
12. Some important issues **have not** yet **been resolved.**
13. High frequency operation **is** better **achieved** in electronic tubes.
14. This invention **was** much **written about** at that time.
15. A lecture **was attended** by a great number of students.
16. The lecture **will be followed by** a discussion.
17. Final examinations **are taken** at the end of the course.
18. A new production plan **will be discussed** at the meeting.
19. A few illustrative examples **have** just **been given**.
20. An analysis of the data **will have been made** by next Monday.

3.16. Put a verb in brackets into the appropriate form.

1. A sequence of binary numbers can … in a digital format.(*store*)
2. Digital audio players (DAPs) … by rechargeable batteries. (*power*)
3. Recording … also … in many players that have a built-in microphone. (*allow*)
4. Hearing loss can … both by sound level or listening time. (cause)
5. In 2001 the first MP3 players … into mobile phones in South Korea. (*install*)
6. In 2005 half of all music sold in Korea … directly to mobile phones. (*sell*)
7. Unfortunately before we make the experiment, their work … (*publish*).
8. The title of the article … . (*change*)
9. The results … by the presence of impurities. (*affect*)
10. This problem can … from several points of view. (*approach*)
11. These parts … of steel throughout. (*make*)
12. These requirements must … . (*meet*)
13. The intellect … into action. (involve)
14. Resistors … with coloured bands to ease the problem of making such small components. (*code*)

15. The values … above. (*show*)
16. The tuner … to the detector. (*connect*)
17. Microprocessors … now … to control many household items such as automatic washing machines, dishwashers, sewing machines and food processors. (*use*)
18. Electronic timers … in digital clocks, water heaters, electric cookers and microwave ovens. (*find*)

Revising Tenses

3.17. Choose the correct variant and translate the following sentences.

1. The experiment … by testing the end product.
   a) will be followed b) will follow c) will have followed
2. The transistor can … to turn current on and off in a circuit.
   a) are used b) use c) be used
3. Vacuum tubes … as the main active components in electronic equipment.
   a) were used b) was used c) are used
4. They … the project by the end of March.
   a) will have realized b) will have been realized c) will realize
5. Our country … great success in space research.
   a) has been achieved b) has achieved c) will be achieved
6. The students … their laboratory work now.
   a) have done b) are doing c) are being done
7. The work … by the end of the month.
   a) will finish b) will have been finished c) will be finishing
8. Programming languages initially … by people in universities or in the government.
   a) were created b) had created c) has been created
9. Most computer crimes … by accident.
   a) discover b) is discovered c) are discovered
10. Public interest in the electric vehicle … higher by now.
    a) become b) became c) has become

3.18. Put the verbs in brackets into the appropriate forms, active or passive.

1. The discovery of electron … to a revolution in electrical science. (*lead*)
2. Electronics … to appearance of television, sound pictures and long-distance calls. (*contribute*)
3. Until 1955 vacuum tubes … the principle building blocks of electronic circuits. (*be*).
4. Vacuum tubes … still widely … in oscilloscopes. (*use*)
5. Crystal valves … long before the invention of vacuum tubes. (*know*)
6. In 1948 American scientists … the first transistor. (*invent*)
7. Solid-state devices … the growth of electronics. (*accelerate*)
8. Transistors … from parts which do not wear out. (*make*)
9. Transistors … very little power. (*waste*)
10. The students … a problem they had to solve. (*give*)
11. The laboratories our students work in … with the best equipment. (*provide*)
12. The substance … in detail by the engineer in two months' time. (*study*)
13. The facts you … about illustrate the use of generators. (*tell*)
14. The translation … yet. (*finish*). It … by the end of the month. (*finish*)
15. This question … yesterday. (*discuss*)
16. The electronic industry … several types of microcomputers. (*produce*)
17. The air in many cities … by traffic and industry. (*pollute*)
18. Our technological advances … to deal with the most difficult problems. (*allow*)
19. Who … the electric lamp? (*invent*)
20. The consumption of electricity … every ten years. (*double*)
21. An audio codec microchip … the compressed file into an analogue sound signal. (*convert*)
22. Axioms … no proof but theorems do. (*require*)
23. Several factors … the quality of broadcast signal. (*affect*)
24. Last summer we … a plant producing washing machines. (*visit*)

Unit 4. TELEVISION

Text A *Television*
Text B *Robots*

Grammar: attribute group, complex sentences

Text A

TELEVISION

Pretext exercises

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

Product, action, production, magazine, system, satellite, cable, communication, channel, show, display, calculator, code, detailed, visual, format, stage, manufacturer.

4.2. Read the following words and mind their pronunciation.

fair	[fɛə]	occur	[ə`kə:]
satellite	[`sætəlaɪt]	artificial	[ˌɑ:tɪ`fɪʃəl]
rural	[`ruərəl]	convenient	[kən`vi:nɪənt]
colour	[kʌlə]	announce	[ə`nauns]
digital	[`dɪʤɪtəl]	liquid	[`lɪkwɪd]
automatically	[ˌɔ:tə`mætɪkəlɪ]	major	[`meɪʤə]
occupy	[`ɔkjupaɪ]	brightness	[`braɪtnəs]
assembly	[ə`semblɪ]	simultaneously	[ˌsɪməl`teɪnɪəslɪ]
influence	[`ɪnfluəns]		

4.3. Translate the following groups of words into English.

Система автоматического управления, ток проводимости, генератор с отрицательной сеткой, звуковой сигнал промежуточной частоты, импульсный генератор, генератор кода времени, малошумящий усилитель, пучок заряженных частиц, камера цветного телевизора,

автоматическая регулировка частоты, прибор с отрицательным сопротивлением, частота излучения лазера, лазер с обратной связью, генератор с цифровым управлением.

Memorize the following words and expressions

set	*прибор, устройство*	**to occupy**	*занимать*
assembly line	*сборочная линия, линия сборки, сборочный конвейер*	**to define**	*определять*
to appear	*появляться*	**definition**	*определение*
to disappear	*исчезать*	**high-definition TV**	*телевидение высокой четкости*
to solve	*решать*	**to manufacture**	*производить, создавать*
to replace	*заменять, замещать*	**to increase**	*увеличивать, повышать*
digital	*цифровой*	**to decrease**	*понижать, уменьшать*
bright	*яркий*	**ratio**	*отношение, коэффициент*
colour	*цветной*	**flat**	*плоский*
to switch	*переключать*	**light**	*свет; легкий*

4.4. Read the text.

TELEVISION

The television set is evidently the most important and popular electronic product of all time. All homes in developed countries have one or more TV sets and in many countries there are considerably more TV sets than telephones.

But in 1939 at the World's Fair in New York a tiny nine-by-twelve inch box was the centre of attention for hundreds of people. They were the first to see a television set in action. Compared to today's TV shows of underwater and outer-space research, those first black-white pictures were not very good. The pictures were only transmitted from one side of the Fair territory to the other. But in 1939 they were of historical importance.

When World War II broke out electronic factories that began the TV production stopped making them and started making war materials instead. When the war was over, TV sets began coming off factory assembly lines. By 1958 there were millions of them.

At present TV communication is provided with the help of a system of artificial earth satellites so that people living in different parts of the country and all over the world and in different time zones are able to watch the central TV programs at the most convenient hours.

Nowadays many countries also have cable TV, a system using wires for the transmission of television programs. Cable television first appeared in 1949 as a means of transmitting TV signals to rural and mountain areas far from big cities. Cable television's next big step forward was made by the middle 1980s. Scientists announced that many technical problems had been solved and in the future it would be possible via satellite and cable TV to use more channels on a TV set at every home in the world.

A few years ago it became evident that the next major advance for TV would be digital television. In a digital system the usual continuous signal is replaced by a digital code containing detailed information on brightness, colour, etc. A digital TV set hangs on the wall like a picture. Essentially, it is a minicomputer with a visual display. Once a week you put the programs you like into the memory, and the TV set will automatically switch on the desired channel at the right time. You can watch several programs simultaneously on miniscreens and then produce one of them in full format. Also, the TV set can automatically video-record the programs when you are absent or occupied.

By the end of 1980s television has moved to a new and the most important stage in its development since the appearance of colour television. Technically it is called high-definition television (HDTV) or Hi-Vision. This is the much higher resolution television of the 21st century. The new system increases the screen's width-to-height ratio (16:9). The result is a picture several times sharper than in the existing TV sets. Besides, recent developments in plasma display technology make HDTV commercially practicable. The plasma display makes it possible to produce a large, bright, colour, flat TV screen so thin and light that it can also be hung on a wall like a framed picture. The engineering problem that has existed almost since the first days of television may be solved now.

4.5. Match the words to make an expression.

1. bright	a. code
2. move	b. TV
3. digital	c. line
4. flat	d. ratio
5. to increase	e. color
6. assembly	f. pulse
7. light	g. directly
8. high definition	h. display

4.6. Match the following words with their definitions.

1. to replace	a) having a very light and strong color
2. set	b) not natural or real, created by people
3. light	c) to be used instead of smth.
4. definition	d) block, unit
5. artificial	e) to be busy
6. bright	f) electromagnetic radiation that is visible to the human eye
7. screen	g) clarity of visual presentation
8. to be occupied	h) the surface on which the image appears

4.7. Read the following statements and decide if they are true (T) or false (F).

1. The first black-and-white pictures were not of very high quality.
2. The TV production during World War II was of great importance.
3. Today people living in central parts of the country can watch only central TV programs.
4. A cable TV system uses wires for the transmission of television programs.
5. Digital TV is replaced by cable television.
6. It will be possible to watch several programs at the same time.
7. Hi-Vision is a new video system that makes a traditional picture.

4.8. Read the text again and answer the questions.

1. When did the first TV set appear?
2. Were people interested in the new invention? Why?
3. What distance were the first pictures transmitted?
4. Why was the TV production stopped in 1940?

5. What is the role of the artificial earth satellite?
6. What is cable television?
7. What is the functioning of digital television based on?
8. Have you ever video-recorded the TV program?
9. What is the importance of HDTV?

Text B

ROBOTS

Pretext exercises

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

History, machine, musical instruments, industrial robots, manipulator, control system, programme, mechanical, operation, type, elementary, tactile, reaction, distance, object, information, automobile, mechanical supermen, components, cement, electronic parts, chip, automatic accuracy, video camera, space projects, nuclear reactor stations, product.

4.10. Read the following words and mind their pronunciation.

manipulator	[mə`nɪpjuleɪtə]	sight	[saɪt]
tactile	[`tæktaɪl]	breathe	[briːθ]
possess	[pə`zəs]	social	[`səuʃ(ə)l]

Memorize the following words and expressions

to tune	*настраивать*	**printed circuit board**	*печатная плата*
generation	*поколение*	**accuracy**	*точность*
to belong to	*принадлежать*	**underwater exploration research**	*подводные исследования*
to possess	*обладать*	**advantage**	*преимущество*
to carry out a decision	*принимать решение*	**disadvantage**	*недостаток*
to load	*загружать*	**to improve**	*улучшать, совершенствовать*
load	*загрузка*		
to affect	*влиять*	**to prevent**	*предотвращать*

4.111. Read the text.

ROBOTS

Throughout history people have tried to invent machines to perform a wide variety of tasks, such as writing, drawing or even playing musical instruments.

The word "robot" appeared first in a play called RUR (Rossum's Universal Robots) written by a Czech playwright Karel Čapec. It comes from the czech word "robota" meaning slave labour. In this play robots destroyed the humans and created a new world inhabited only by robots.

In 1954 American inventor George Devol began his work that eventually led to the development of industrial robots as we know them today.

The automatically controlled industrial manipulators are divided into three generations: programmed, adaptive and intellectual. Characteristic of the first generation – the programmed robots – is that their control system acts according to a rigid oft-repeated programme all the time. But the programmed robot is easily retuned to various action programmes. All the industrial robots in stamping, mechanical processing, and in other auxiliary "manual" operations as well as in loading and unloading that have been widely introduced belong to this generation. They will continue to be the main type of robots.

Adaptive robots, or robots of the second generation, are being developed along with them. Where they differ is that they possess the most elementary senses in their manipulators – tactile (sense and touch), power (reaction to the magnitude of the work effort), locating (reaction to the distance to the object and the speed of approaching it), and light (reaction to the object located within a beam of light).

The third generation – the intellectual robots – possesses far richer means for sensing (including sight), for processing information and carrying out a decision. It enables us to say that the robot possesses "artificial intellect".

Many of the robots in use today do jobs that are especially difficult for human workers. These are the types of jobs that require great strength or pose danger. For example, robots are particularly useful in the auto-manufacturing industry where parts of automobiles must be welded together. As mechanical supermen, robots may do anything from moving heavy components between workstations to carrying bags of cement.

Spray painting is another task suited to robots because robots do not need to breathe. Unlike human painters, they are unaffected by the poisonous fumes. Third in the list of useful jobs for robots is the assembly of electronic parts. Robots shine at installing chips in printed circuit boards because of a capability that robots have that people don't. A robot, once properly programmed, will not put a chip in the wrong place. Their automatic accuracy is particularly valuable in this kind of industry because locating and fixing mistakes is costly.

Now robots that are fitted with video cameras and other sensing devices can detect heat, texture, size and sound. These robots are used in space projects, nuclear reactor stations, and underwater exploration research.

The use of industrial robots has produced a number of economic and social advantages. Among them are the improvement in productivity, greater humanization of working life, prevention of labour accidents, improvement of product quality and the development of new industries.

Notes to the text

rigid oft-repeated program	*фиксированная часто повторяющаяся программа*
to weld	*сваривать*
texture	*текстура*
accident	*несчастный случай*

4.12. Read the text again and answer the questions.

1. Where does the word "robot" come from?
2. How are the robots classified?
3. How do programmed robots act?
4. What is the difference between programmed and adaptive robots?
5. What is the characteristic of intellectual robots?
6. Where are the robots used?
7. What is the role of robots?
8. Will the robots replace people? Why?
9. What are the advantages of using robots in industry?

4.13. Translate the following sentences from Russian into English.

1. Первый телевизор был продемонстрирован в 1939 году в Нью Йорке.
2. Черно-белые картинки были плохого качества и передавались на короткое расстояние.
3. Производство телевизоров прекратилось во время Первой мировой войны.
4. Сегодня телевизионная связь обеспечивается с помощью системы искусственных спутников земли.
5. Кабельное телевидение – это система, использующая провода для передачи TV программ.
6. В цифровой системе аналоговый сигнал заменяется цифровым кодом, содержащим информацию о яркости, цвете и т.д.
7. HDTV – это телевидение с высокой разрешающей способностью.
8. Слово робот произошло от чешского слова “robota”, означающего рабский труд.
9. Роботы делятся на три поколения: программируемые, адаптивные и интеллектуальные.
10. Роботы заменяют людей в монотонной и опасной работе.
11. Преимуществами роботов являются высокая производительность, улучшение качества продукции и т.д.

4.14. Topics for discussion.

1. Different types of industrial robots and their application.
2. Robots today and tomorrow.
3. Types of jobs suitable for robots.
4. Robots in space exploration.
5. Robots in military service.
6. History of television.
7. The role of television in people’s life.
8. Your favourite TV programs.
9. Different kinds of television.

Attribute group

4.15. Read and translate the following groups of words.

Energy spectrum, light pulse, copper wire, potential difference, flicker noise, frequency band, charge distribution, power gain, discrete-circuit design, feedback laser, ice thickness measurement, low-power TV transmitter, radar ice probe, large-scale integrated circuit, direct electrode voltage, displaced phase centre antenna, transmission distortion measuring set.

4.16. Choose the right variant.

1. Automatic frequency correction
   а) автоматическая частота коррекции,
   б) коррекция автоматической частоты
   в) автоматическая коррекция частоты
2. Parallel-feed amplifier
   а) усилитель с параллельным питанием
   б) параллельное питание усилителя
   в) параллельный усилитель с питанием
3. Transistor equivalent circuit
   а) транзистор эквивалентной схемы
   б) эквивалентная схема транзистора
   в) транзистор с эквивалентной схемой
4. Automatic gain control
   а) автоматическая регулировка усиления
   б) усиление с автоматической регулировкой
   в) регулировка автоматического усиления
5. Integrated-circuit electron device
   а) интегральная схема электронного прибора
   б) прибор с интегральной схемой
   в) электронный прибор на интегральной схеме
6. Temperature compensated oscillator
   а) температурная компенсация генератора
   б) генератор с температурной компенсацией
   в) компенсация температуры генератора
7. Automatic data processing system
   а) автоматическая система обработки данных
   б) система автоматической обработки данных
   в) автоматическая обработка данных системы

Complex sentences

4.17. Read and translate the following sentences paying attention to the subordinate 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. We know the warm air rises and the cooler air takes its place.
4. The facts you have been given above are an attempt to illustrate this phenomenon.
5. From this article we learned the hydrogen atom is the simplest.
6. The antenna we are speaking about is mounted on the airplane.
7. The laboratory he works in carried out an important research.
8. The report he made after their delegation had visited our plant shows he has finally realized the importance of the work we are doing here.
9. Associations will organize numerous meeting devoted to the part our state has played in the progress of modern society.
10. The most important effect the Moon has on the Earth is the production of the tides.
11. The local station is broadcasting the news I have already heard today.
12. The principles Ford used to make Model T are used in motor manufacturing up to now.
13. For a long time Bell couldn't get the results he was looking for.
14. The problem this article deals with is connected with subject we study.
15. It is difficult to imagine the world we live in without radio, television and telephone.
16. The new methods of research the engineers had used at the plant greatly improved their work.
17. It was stated the conclusion was correct.
18. Materials new computers depend on must be of the best quality.
19. The number of components supercomputers consist of is great.
20. The laboratory the Curies worked in was very primitive.
21. Satellites our communication goes through are sent into space regularly.
22. The problem Bell was interested in was not an easy one and it took several years to solve it.

23. The changes and movements of the air we are surrounded with influence our life.
24. This is an article that deals with some environmental problems we face.
25. This is the principle the mercury thermometer is based on.

4.18. Read and translate the following sentences paying attention to the conditional clauses.

1. If light is cut off, the flow of electrons from the cathode stops and the current is reduced to zero.
2. If sufficient heat is applied for a long period of time, the electrons will leave the metal and fly off into space.
3. Let us picture what would happen if there were a conducting wire between two points of unequal potential.
4. The force of the Earth gravitation will decrease provided the distance from the Earth increases.
5. If you had arranged the equipment the way you were told, the results of the work would have been much better.
6. If you classified the data, fewer tests would be needed.
7. If he had been able to get all the books on that subject, his report would have been much better.
8. The measurements were always correct provided the necessary instruments were used.
9. If they had completed their research, the results would have been discussed at the conference.
10. The manned spaceships could not have been launched into space unless the scientists had studied the information received from the space satellites.
11. An aircraft pilot can get all the information he needs provided he contacts a radio navigation station.
12. Space flights would be impossible unless special materials for space vehicles were produced.

Unit 5. INTEGRATED CIRCUITS

Text A *Integrated Circuits*
Text B *Cellphones*

Grammar: participle

Text A

INTEGRATED CIRCUITS

Pretext exercises

5.1. Read the following words and try to guess their meaning.

Electronics, microchip, components, integration, manual, discrete, photolithography, economically, to reflect, combination, vertically, horizontally, microwave.

5.2. Read the following words and mind their pronunciation.

substrate	[`sʌb.streɪt]	approach	[ə`prəutʃ]
enormous	[ɪ`nɔ:məs]	notably	[`nəutəblɪ]
guidance	[`gaɪdəns]	advance	[əd`vɑ:ns]
propose	[prə`pəuz]	initiated	[ɪ`nɪʃɪeɪtɪd]
entire	[ɪn`taɪə]	supercomputer	[`su:pəkəm.pju:tə]

Memorize the following words and expressions

surface	*поверхность*	**die**	*кристалл*
tiny	*крошечный, маленький*	**to consume**	*потреблять*
enormous	*громадный, огромный*	**guidance system**	*система-путеводитель, система управления*
assembly	*монтаж, сборка, компоновка*	**circuit board**	*печатная плата*
circuit design	*проектирование схем, конструкция схемы*	**growth**	*рост*

in place of	*вместо*	**entire**	*весь, полный, целый*
performance	*работа, производительность, характеристика*		

5.3. Read the text.

INTEGRATED CIRCUITS

In electronics, an integrated circuit is a miniaturized electronic circuit consisting mainly of semiconductor devices, as well as passive components that have been manufactured on the surface of a thin substrate of semiconductor material. The integration of large numbers of tiny transistors, diodes, resistors and capacitors into a small chip was an enormous improvement over the manual assembly of circuits using electronic components. The integrated circuit's mass production capability, reliability, and building-block approach to circuit design ensured the rapid adoption of standardized ICs in place of designs using discrete transistors.

There are two main advantages of ICs over discrete circuits: cost and performance. Cost is low because the chips, with all their components, are printed as a unit by photolithography and not constructed one transistor at a time. Furthermore, much less material is used to construct a circuit as a packaged IC die than as a discrete circuit. Performance is high since the components switch quickly and consume little power because the components are small and close together.

The first integrated circuits contained only a few transistors. The term "Small-Scale Integration" (SSI) was used to denote them. SSI circuits were crucial to early aerospace projects in 1960s as Apollo program needed lightweight digital computers for their guidance systems.

The next step in the development of integrated circuits, taken in the late 1960s, introduced devices which contained hundreds of transistors on each chip called "Medium-Scale Integration" (MSI). They were attractive economically because while they cost a little more to produce than SSI devices, they allowed more complex systems to be produced using smaller circuit boards, less assembly work and a number of other advantages.

Further development led to "Large-Scale Integration" (LSI) in the mid 1970s, with tens of thousands of transistors per chip.

The final step in the development process, starting in the 1980s and continuing through the present, was "Very Large-Scale Integration" (VLSI). To reflect further growth of complexity, the term *ULSI* that stands for "Ultra-Large-Scale Integration" was proposed for chips of complexity of more than 1 million transistors.

Wafer-scale integration (WSI) is a system of building very large integrated circuits that uses an entire silicon wafer to produce a single "super-chip". Through a combination of large size and reduced packaging, WSI could lead to dramatically reduced costs for some systems, notably massively parallel supercomputers.

A system-on-a-chip (SOC) is an integrated circuit in which all the components needed for a computer are included on a single chip. A three-dimensional integrated circuit (3D-IC) has two or more layers of active electronic components that are integrated both vertically and horizontally into a single circuit. Among the most advanced are the microprocessors or cores, which control everything from computers to cellular phones to digital microwave ovens.

Only half a century after their development was initiated, integrated circuits have become useful. That is, modern computing, communication, manufacturing and transport systems, including the Internet, all depend on the existence of integrated circuits.

Notes to the text

substrate	*подложка*
building block approach	*метод [построения функционально специализированных ИС на базе] стандартных блоков*
furthermore	*более того*
close together	*сжатый, без пропусков*
to denote	*означать, обозначать*
crucial	*решающий, критический*
Small-Scale Integration (SSI)	*малая степень интеграции; малые интегральные схемы, МИС*
Medium-Scale Integration (MSI)	*средняя степень интеграции; средние интегральные схемы, СИС*
Large-Scale Integration (LSI)	*высокая степень интеграции; большие интегральные схемы, БИС*
Very Large-Scale	*сверхвысокая степень интеграции;*

Integration (VLSI)	*сверхбольшие интегральные схемы, СБИС*
Wafer-scale integration (WSI)	*интеграция в масштабе (целой) пластины*
dramatically	*значительно, поразительно*
notably	*исключительно, особенно*
system-on-a-chip (SOC)	*система на микросхеме*

5.4. Complete the following sentences with the expressions from the box.

photolithography power performance capability lightweight useful cores complexity microprocessors layers substrate

1. Semiconductor devices, as well as passive components, are manufactured on the surface of a thin … of semiconductor material.
2. The rapid adoption of standardized ICs was due to its mass production … .
3. An IC is printed as a unit by … .
4. … is high since the components switch fast and consume little ….
5. SSI circuits were crucial to aerospace projects as they needed … digital computers for their guidance systems.
6. A three-dimensional integrated circuit has two or more … of active electronic components on a single circuit.
7. Microwaves are controlled by … .
8. Integrated circuits have become … for the last 50 years.
9. The term ULSI is used to denote chips of … of more than 1ml transistors.
10. The most advanced are … which control everything.

5.5. Complete the table.

Time period	Scale of integration	Number of transistors per chip
1960s	SSI	a few
…	…	hundreds of transistors
mid 1970s		…
…	VLSI	…
…	…	over a million

5.6. Read the text again and answer the questions.

1. What is an IC?
2. What material is the substrate of IC made of?
3. How were transistors assembled earlier?
4. What ensured the rapid adoption of ICs?
5. What are the main advantages of ICs over discrete circuits?
6. Why is the performance of IC high?
7. How many transistors were used in SSI?
8. How is an IC with tens of thousands of transistors per chip called?
9. How are the layers of active components integrated in 3D-ICs?
10. What do modern computing systems depend on?

Text B

CELLPHONES

Pretext exercises

5.7. Read the following words and try to guess their meaning.

Communication, aeroplane, mobile phone, service, system, message, type, limit, user, interference, car park, register, position, signal, contact, monitor, test.

5.8. Read the following words and mind their pronunciation.

emergency	[ɪ`mə:ʤənsɪ]	interference	[ˌɪntəɛ`fɪərəns]
available	[ə`veɪləbl]	compromise	[`kɔmprəmaɪz]
lightweight	[`laɪtweɪt]	permanently	[`pə:mənəntlɪ]
portable	[`pɔ:təbl]	automatically	[ˌɔ:tə`mætɪkəlɪ]
cellular	[`seljulə]	neighbouring	[`neɪbərɪŋ]

Memorize the following words and expressions

band	*полоса пропускания, диапазон*	**interference**	*интерференция, взаимное влияние, помехи*
to provide	*снабжать, обеспечивать*	**public telephone exchange**	*телефонная станция общего пользования*
to relay	*передавать*	**to make a call**	*позвонить по телефону*

lack	*недостаток, отсутствие*	**register**	*журнал записей, реестр*
to overcome	*преодолевать, превозмочь*	**to page**	***зд***. *сопровождать*
lightweight	*легкий*	**to cause**	*вызывать*
transceiver	*приемопередатчик*	**to tune**	*настраивать*
to allocate	*предназначать, резервировать*	**to take the call**	*ответить на телефонный звонок*
to vary	*меняться, разнообразить*	**to prevent**	*предотвращать, мешать*
to depend on	*зависеть от*	**signal strength**	*уровень сигнала*
cluster	*группа, блок, совокупность, пакет*		

5.9. Read the text.

CELLPHONES

Radiophones, using the VHF band, were developed during the Second World War to provide communications for ships and aeroplanes. At the end of the war they were further developed as mobile phones for use by the emergency services and other services such as taxis.

With mobile phone systems, all communications take place through a central control base station. Mobile units normally do not communicate directly with other mobile units. They send messages to the control base station and the base station controller relays the messages to the other mobile units. Although mobile phones can be moved, they must stay within fixed areas. This type of system is limited by the fact that there are not enough VHF frequencies available for large numbers of communications between individual users.

The problem of a lack of suitable frequencies can be overcome by using a cellphone network. A cellular phone (cellphone) is a lightweight, portable radio transceiver which can transmit and receive telephone calls anywhere in the cellular network area. In the network, the same frequencies can be used for many different telephone calls at the same time. To achieve this, each communications area is divided into a number of hexagonal-shaped cells.

Each cell is allocated a number of frequency channels for communications. Although the frequencies used in any one cell are not used in its neighbouring cells, the same frequencies can be used in cells further away

without causing interference. The size of the cells varies from 1 km to about 30 km across, depending on the output power of the cellphone transmitters. Each area can have a different number of cells, but a cluster of seven cells gives a good compromise between the number of frequency channels available in each cell and the interference between communications in different cells.

Each cell has a small electronic base station situated in a public place such as a car park or shopping centre. All the base stations for a cluster of cells are permanently connected to a main switching centre (MSC). This contains a computer to select suitable frequencies and control the communications for that cluster of cells. The MSC is also connected to other MSCs and to the public telephone exchange, allowing cellphones to make calls or receive calls from other cellphones and fixed telephones throughout the whole telephone system.

The MSC keeps a register of cellphones indicating their cell position. If the cellphone moves to another cell, its new position is signalled to the MSC. In this way, the MSC knows where to send signals to contact each cellphone. When a call is made to a cellphone, the MSC first checks the registrations to find the position of the cellphone. It then pages the cellphone and causes it to tune to the allocated frequency channel. The cellphone then begins sending an 8 kHz signal to the base station. When the user takes the call, the 8 kHz signal is discontinued and the speech channel is enabled.

The base station constantly monitors the signal level of a call. If the signal level becomes too strong, it will cause interference to other users. To prevent this, the power level of the cellphone is automatically reduced. If the signal level becomes too weak, the MSC tests the signal strength from neighbouring base stations and switches the call to another base station and speech channel if necessary. This may cause a period of silence of up to about 400 ms while the switching takes place.

Notes to the text

emergency service	*аварийная служба*
within	*в пределах, в рамках*
hexagonal	*шестиугольный*
compromise	*компромисс*

5.10. Read the text and say which paragraph deals with the following:

a) cellphone networks;
b) how signal levels are controlled;
c) how the MSC locates a cellphone;
d) limitations of mobile phone systems;
e) frequency distribution within cells and clusters;
f) the development of mobile phones;
g) how cellphones link with other cellphones and with the telephone system.

5.11. Match the beginnings and the ends of the following sentences.

1. Mobile phones using the VHF band were developed for use by …
2. Mobile phone systems work through a …
3. The lack of VHF bands for large numbers of individual users is the main reason for … of mobile units.
4. The same frequencies can be used for a large number of calls at the same time in the …
5. The size of the cells varies depending on the output power of the cellphone …
6. MSC is connected to other MSCs and to the … giving opportunity to make and receive calls via cellphones and fixed phones.
7. MSC first checks the registrations to find the position of the …
8. When the user takes the call, the 8 kHz signal is discontinued and the … is enabled.

a) limitations
b) emergency services
c) cellular network area
d) transmitters
e) central control base station
f) speech channel
g) public telephone exchange
h) cellphone

5.12. Read the text again and answer the questions.

1. Who uses mobile phones?
2. What does the MSC register of cellphones contain?
3. What is the difference between a mobile phone and a cellphone?
4. What does the word “cellphone” imply?
5. How large is the cell?
6. How does the MSC prevent interference caused by a strong signal level?
7. What is the most suitable number of cells to form a cluster?
8. When were radiophones developed?
9. How does an MSC ensure that a cellphone is using the right frequency for a call?
10. What is permanently connected to MSC?

5.13. Translate the following sentences from Russian into English.

1. Первый телевизор был продемонстрирован в 1939 году в Нью Йорке.
2. Черно-белые картинки были плохого качества и передавались на короткое расстояние.
3. Производство телевизоров прекратилось во время Первой мировой войны.
4. Сегодня телевизионная связь обеспечивается с помощью системы искусственных спутников земли.
5. Кабельное телевидение – это система, использующая провода для передачи TV программ.
6. В цифровой системе аналоговый сигнал заменяется цифровым кодом, содержащим информацию о яркости, цвете и т.д.
7. HDTV – это телевидение с высокой разрешающей способностью.
8. Слово робот произошло от чешского слова “robota”, означающего рабский труд.
9. Роботы делятся на три поколения: программируемые, адаптивные и интеллектуальные.
10. Роботы заменяют людей в монотонной и опасной работе.
11. Преимуществами роботов являются высокая производительность, улучшение качества продукции и т.д.

GRAMMAR

Participle

5.14. Choose the correct form of the participle.

1. A robot is a mechanical device **controlled / controlling by** a computer.
2. Students **studied / studying** at our university must know Mathematics well.
3. A smart card is a plastic card **containing / contained** a processor and memory chip.
4. The parts **producing / produced by** our plant are reliable.
5. The man **replacing / replaced** this device by a new one is our mechanic.
6. **Writing / Written** in pencil the article was difficult to read.
7. When **translating / translated** the article he used no dictionary.
8. The data **obtained / obtaining** are in full agreement with the theory.
9. Scientists **worked / working** at new computers have a lot of different problems to solve.
10. All components **needed / needing** for a computer are included on a single chip.

5.15. Complete the following sentences with the correct variant.

1. … this text I found a lot of interesting expressions.
   a) Read b) Having read c) Having been read
2. He sat all night … e-mails to his colleagues.
   a) writing b) written c) having written
3. I looked through the article … into Russian.
   a) translating b) translated c) having translated
4. The man … at the board is our English teacher.
   a) is standing b) standing c) stood
5. He told us about the problems … in his laboratory.
   a) solving b) having solved c) being solved
6. … the new engine was recommended for mass production.
   a) Having tested b) Having been tested c) Being tested

7. … to the meeting he came first.
   a) Having invited b) Inviting c) Being invited
8. … in action the device was greatly modified.
   a) Having been seen b) Having seen c) Being seen
9. … the student couldn't go out.
   a) Asking b) Being asked c) Having asked
10. … the Internet I find a lot of interesting information.
    a) Entered b) Being entered c) Entering

5.16. Complete the following sentences with the correct form of the participle.

Model: **Having given** a promise he couldn't fail us. (*дав, после того как он дал;* ***to give*** **–** *давать*)

1. … all his exams he decided to have a great party. (*сдав, после того как он сдал;* ***to pass*** *сдавать)*
2. I spent the rest of the day … a few problems. (*решая*; ***to solve*** *– решать*)
3. … at the airport we went to the check-in office. *(прибыв;* ***to arrive*** *– прибывать)*
4. He did it, … of the result. *(не думая;* ***to think*** *– думать)*
5. … enough money he bought the desired book. (*накопив; когда он накопил*; ***to save*** *– копить*)
6. The engineer … that experiment took a lot of measurements. (*делающий, проводящий*; ***to make*** *– делать, проводить*)
7. … quite often our car often breaks down. (*так как используют,* ***to use*** *– использовать*)
8. … the new apparatus was recommended for work in all the laboratories. (*после того как проверили;* ***to test*** *– проверять*)
9. The question … is a serious one (*который обсуждается;* ***to discuss*** *– обсуждать*)
10. … he passes his exams successfully. (*будучи трудолюбивым, так как он трудолюбивый;* ***to be hardworking*** *– быть трудолюбивым*).

5.18. Translate the following sentences paying attention to the functions of participles.

1. The device **made** in our laboratory will be used in industry.
2. **Having designed** the car radar the engineers started complex tests.
3. Robots **looking** more and more like human beings will take over a lot of the boring everyday work we do today.
4. **Using** the energy of the atom we produce electric energy at atomic power plants.
5. Algol is a system **being developed** and **intended** to become a universal programming language.
6. The instrument **used** is very reliable.
7. **Applying** this new method the operator received good results.
8. The computer **tested** showed that it needed no further upgrading.
9. **Being tested** in the laboratory the instrument showed good characteristics.
10. **Having lost** a negative charge the atoms became positively charged ions.
11. **Having been used** for a long time the device was out of order.
12. **Having been measured** with inaccurate instruments the data were incorrect.
13. **Solving** a problem you must write down the equation.
14. What do you think of the method **being used** now?
15. **Being produced** of modern materials devices met all requirements.
16. **Having been** carefully **tested** the device was put into operation.
17. The data **received** are of no interest.
18. The **completed** project was a great success.
19. **Having collected** all the necessary data we should analyse them.
20. The method **proposed** by the researcher was not acceptable.

Unit 6. COMPUTERS

Text A *History of Computing*
Text B *Configuration*

Grammar: **gerund**

Text A

HISTORY OF COMPUTING

Pretext exercises

6.1. Read the following words and try to guess their meaning.

Mechanical, era, analytical, microprocessors, machines, personal, individuals, form, laptops, netbooks, smartphones, market, analysts.

6.2. Read the following words and mind their pronunciation.

refer	[rɪ`fə:]	appliance	[ə`plaɪəns]
abacus	[`æbəkəs]	obsolete	[`ɔbsəlɪt]
decennial	[dɪ`senɪəl]		

Memorize the following words and expressions

originally	*изначально; сначала*	**vacuum tube computer**	*ламповая вычислительная машина*
to refer (to)	*иметь отношение, относиться*	**transistor(ized) computer**	*вычислительная машина на транзисторах*
punched card	*перфокарта*	**in conjunction with**	*в сочетании с*
data processing	*обработка данных*		

6.3. Read the text.

HISTORY OF COMPUTING

Originally, the term “computer” referred to a person who performed numerical calculations (a human computer) often with the aid of a mechanical calculating device. Examples of early mechanical computing devices included the abacus, the slide rule, etc. In 1623 Wilhelm Schickard built the first mechanical calculator and thus became the father of the computing era.

However, none of those devices fit the modern definition of a computer because they could not be programmed. In 1801, Joseph-Marie Jacquard developed a loom in which the pattern being woven was controlled by punched cards. The series of cards could be changed without changing the mechanical design of the loom. This was a landmark point in programmability. In 1837, Charles Babbage was the first to design a fully programmable mechanical computer that he called “The Analytical Engine”. In 1890, the United States Census Bureau used punch cards and sorting machines designed by Herman Hollerith to handle the flood of data from the decennial census mandated by the Constitution. Hollerith’s company eventually became the core of IBM. IBM developed punch card technology into a powerful tool for business data processing and produced an extensive line of specialized unit record equipment.

More powerful and flexible computing devices were constructed in the 1930s and 1940s, gradually adding the key features that are seen in modern computers. Vacuum tube computers were in use throughout the 1950s, but were largely replaced in the 1960s by transistor computers, which were smaller, faster, and cheaper, used less power and were more reliable. By the 1970s, the adoption of integrated circuit technology and the creation of microprocessors such as the Intel 4004 caused another leap in size, speed, cost and reliability. By the 1980s, computers had become sufficiently small and cheap to replace simple mechanical controls in domestic appliances such as washing machines. Around the same time, computers became widely accessible for personal use by individuals in the form of personal computers. In conjunction with the widespread growth of the Internet since the 1990s, personal computers are becoming as common as the television and the telephone and almost all modern electronic devices contain a computer of some kind.

The future of computers seems to be in Cheap Laptops and small netbooks or handheld smartphones. It is predicted by many market analysts that personal desktop computers will soon be as obsolete as the room-sized computers first built back in the 1940's.

Notes to the text

abacus	*абак (в мн.ч. abaci) древнейшее счётное устройство*
slide rule	*логарифмическая линейка*
Analytical Engine	*Аналитическая машина (механический компьютер Ч. Бэббиджа)*
landmark point	*веха, поворотный пункт*
gradually	*понемногу, постепенно*
leap	*прыжок, скачок (прям. и перен.)*
domestic appliances	*бытовая техника*
obsolete	*устарелый; вышедший из употребления*

6.4. Read the following statements and decide if they are true (T) or false (F).

1. Originally, the term "computer" referred to a person which (that) performed numerical calculations.
2. Joseph Marie Jacquard made an improvement to the transistor computer.
3. In 1837, Charles Babbage conceptualized and designed a fully programmable mechanical computer that he called "The Analytical Brain".
4. In 1890, punch cards and sorting machines were used to handle the flood of data from the decennial census mandated by the Constitution.
5. Vacuum tube computers were in use throughout the 1950s, but were largely replaced in the 1960s by transistor computers.

6.5. Read the text again and answer the questions.

1. What were the examples of early mechanical computing devices?
2. What device was the first of a number of mechanical calculators?
3. Why was Jacquard loom an important step in the development of computers?
4. What year "The Analytical Engine" was designed?
5. What technologies had begun to appear by the end of the 19th century?
6. What was the first name of IBM?
7. What caused another leap in size, speed, cost and reliability by the 1970s?
8. Why are personal computers becoming as common as the television and the telephone?

Text B

CONFIGURATION

Pretext exercises

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

Minimal, typical, desktop computer, processor, monitor, personal computer, microprocessor, cable, hard disk, optical drive (CD or DVD), operating system, memory card, video card, graphics adapter, computer display, network card, modem, router, printer, scanner, web cam, microphone, card reader, joystick, laptops, notebooks, personal computers, interface, parallel and serial ports, battery.

6.7. Read the following words and mind their pronunciation.

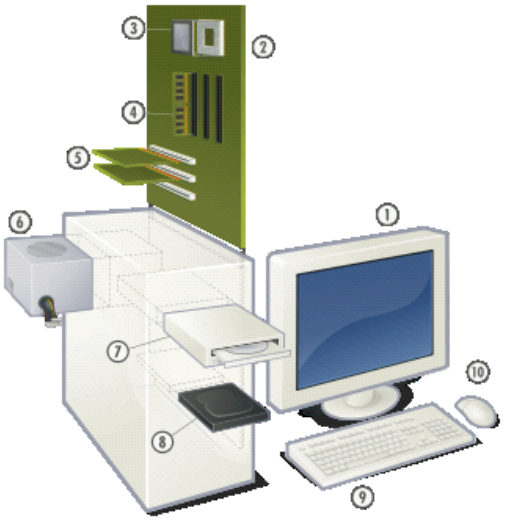
keyboard	[ˋkiːbɔːd]	processor	[ˋprəusesə]
execute	[ˋeksɪkjuːt]	video	[ˋvɪdɪəu]
microprocessor	[ˌmaɪkrəˋprəusesə]	visual	[ˋvɪʒuəl]
media	[ˋmiːdɪə]	interface	[ˋɪntəfeɪs]
microphone	[ˋmaɪkrəfəun]	hardware	[ˋhɑːdwɛə]

Memorize the following words and expressions

setup	*устройство, сборка, компоновка*	**operating system, (OS)**	*операционная система (ОС)*
computer case	*корпус компьютера*	**to render**	*воспроизводить; передавать, визуализировать*
power supply (PS)	*источник питания, блок питания*	**visual display unit (VDU)**	*дисплей; монитор*
mass storage	*внешняя память большого объёма, массовая память; накопитель (информации)*	**external = EXT**	*внешний*
primary circuit board	*главная печатная плата*	**router**	*маршрутизатор (устройство для соединения сетей, использующих разные архитектуры и протоколы)*
central processing unit (CPU)	*центральный процессор*	**card reader**	*устройство чтения (н-р, смарт-карт)*
software program instructions	*команды программного обеспечения*	**hardware**	*аппаратное обеспечение, хардвер, «железо»*
removable media	*съёмный носитель, сменный носитель (CD, DVD, флэш)*		

6.8. Read the text.

CONFIGURATION



Hardware of a modern Personal Computer:

1 – monitor;
2 – motherboard;
3 – CPU (microprocessor);
4 – RAM memory
5 – expansion cards;
6 – power supply;
7 – optical disc drive;
8 – hard disk
9 – keyboard;
10 – mouse.

A minimal setup of a typical contemporary desktop computer is: a computer case with power supply (usually sold together), a motherboard, a processor with a heat sink and a fan (usually sold together); at least one memory card, a mass storage, a keyboard and a mouse for input, a monitor for output.

The motherboard (or mainboard) is the primary circuit board within a personal computer. It connects everything together. The central processing unit, or CPU, is that part of a computer which executes software program instructions. Nearly all PCs contain a type of CPU known as a microprocessor. The microprocessor is often plugged into the motherboard using one of many different types of a socket.

The mass storage is connected to the motherboard with cables and can be installed in the computer case or in a separate case. The mass storage can be: a hard disk, an optical drive (CD or DVD, removable). The operating system (e.g.: Microsoft Windows, Mac OS, Linux or many others) can be located on either of these, but typically it's on one of the hard disks.

The memory card(s) and video card are mounted directly onto the motherboard in expansion slots. The video card – otherwise called a graphics card, graphics adapter or video adapter – processes and renders the

graphics output from the computer to the computer display, also called the visual display unit (VDU), and is an essential part of the modern computer.

The keyboard and the mouse are external and connected to the back plate of the motherboard. The monitor is also connected to the back plate, not (usually) directly to the motherboard, but to a connector in the graphics card.

A typical computer also has a network card, a modem and possibly a router. Common additions connected on the outside (peripherals) are: a printer, a scanner, a web cam, speakers, a microphone, a headset, a card reader, gaming devices, such as a joystick.

Nowadays laptop computers or simply laptops (also called notebooks) are in wide use. They are small personal computers designed for mobility. Usually all of the hardware needed to operate the laptop, such as parallel and serial ports, graphics card, sound channel, *etc*., is built-in to a single unit. They contain batteries to facilitate operation without a readily available electrical outlet.

Notes to the text

heat sink	*теплоотвод*
fan	*вентилятор*
to plug into	*соединять с помощью штепселя или штекера*
socket	*гнездо; (соединительная) панель; розетка (гнездовая часть разъёмного соединения); проф. сокет*
expansion slot	*гнездо для платы расширения (интерфейсных карт, сетевых адаптеров и т. д.)*
back plate	*задняя панель*
connector	*соединитель, разъём, коннектор*
to facilitate	*содействовать; способствовать*
outlet	*вывод; розетка*

6.9. Match the English terms with their definitions.

1. monitor	a. an output device which changes output data into printed form
2. primary storage (RAM)	b. an input device like a typewriter for entering characters
3. secondary storage (a hard disk)	c. an input device used in computer games for controlling the cursor or some other symbol in its movement around a screen
4. keyboard	d. random access memory: this is memory which can be read and written to
5. mouse	e. an input device which reads images on paper using a photoelectric cell and produces a computer graphic file as output
6. joystick	f. a fixed disk inside a computer which may not be removed
7. printer	g. the screen of a computer terminal or PC
8. scanner	h. a device used to point at a location on a computer screen

6.10. Complete the following sentences with the expressions from the box.

mass storage notebooks central processing unit video card optical drive microprocessor visual display unit motherboard

1. The … is the primary circuit board within a personal computer.
2. The … is that part of a computer which executes software program instructions.
3. All PCs contain a type of CPU known as a … .
4. The … can be: a hard disk, an … (CD or DVD, removable).
5. The … processes and renders the graphics output from the computer to the computer display, also called the … .
6. Nowadays laptop computers or simply laptops (also called …) are in wide use.

6.11. Translate the following sentences. Give the Russian equivalents of the words in bold.

1. **Hardware** means the different types of equipment a computer consists of.
2. A computer's hardware comprises a **central processing unit (CPU)** which is the heart and brain of the computer.
3. **Input and output devices** capable of putting information into a computer and getting it out of it are types of peripheral equipment. **Peripherals** are the units connected to the CPU: input devices, output devices and storage devices.
4. The simplest and most common type of input device is a keyboard, containing a typewriter **keyboard**.
5. **A laser printer** is a kind of output device to print information.
6. **Software** means the programs needed to operate computer equipment.
7. These programs are on **disks,** the **hard disks** inside the computer, or **floppy disks,** or on **CD-ROMs,** that is, Compact Disk Read Only Memory, which you can put on or store a large amount of information. A **disk** is a storage device made of flat circular plates with magnetizable surfaces. A **hard disk** is a disk made from a solid magnetic material and used as a storage device. A **floppy disk** (also called diskette) is a disk made of flexible plastic material upon which data are stored on magnetic tracks. **Tracks** are areas marked on the surface of a disk. A **disk drive** is the electronic mechanism that actually reads what is on a disk. In hard disks, the disk and the drive are built into a single unit.
8. A **word processor** is a computer program used to write documents, letters and reports, or the software that is used for this purpose.
9. **Databases** are programs, which allow you to store, look at or change a large quantity of information quickly and easily.
10. **Graphics** are pictures and symbols a computer program can produce.
11. An extra copy on a floppy disk is called a **back-up copy,** a copy of data or software, usually kept in case the original disk is damaged or destroyed.
12. A **bug** possible in a computer operation, also a virus is a soft ware problem or error in a program. **Debugging** means correcting program errors or bugs.

13. People send **e-mail** (electronic mail) messages with the help of the **Internet,** a system that lets computers connect by telephone lines.
14. A **laptop** is a portable computer weighing about 2–4 kg.
15. With a device called the **mouse** you can do a number of things by **clicking** on different **icons**.
16. A mouse is a small input device, on the top of which there are one or more buttons for communicating with the computer.
17. **Clicking** is a basic mouse action to place a cursor to close a window, etc.
18. An **icon** is a small picture representing an object, process or function.

6.12. 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. Транзисторные компьютеры потребляли меньше энергии и были более надежными, чем ламповые.

GRAMMAR

Gerund

6.13. Form a suitable form of gerund from the verb given in brackets.

1. I improve photos in my computer by … a few touches and then 1save them on a CD. (*make*)
3. I enjoy … at music portals on the Web. (*look*)
4. Citizens may feel a loss of privacy because of … unwanted electronic messages. (*receive*)
5. A young hacker was fined 1,000 after … an offence. (*admit*)
6. … into a system is strictly illegal nowadays. (*hack*)
7. After … from university you can get a technical role in a company. (*leave*)
8. It is worth … for a training course if you get serious about your career. (*pay*)
9. He is reasonable for … and … the software. (*develop, implement*)
10. GPS can be used for … the navigation of ships. (*aid*)
11. …the computer resources is an important function of the operating system. (*manage*)
12. …large amounts of information or data quickly is the most important function of the computer. (*process*)

6.14. Choose the correct translation.

1. **Using the method was his mistake.**
   а) Используя этот метод, он сделал ошибку.
   б) Использование этого метода было его ошибкой.
   в) Он сделал ошибку при использовании этого метода.
2. **We found the error without repeating this experiment.**
   а) Мы обнаружили ошибку при повторном эксперименте.
   б) Мы обнаружили ошибку, повторив этот эксперимент.
   в) Мы обнаружили ошибку, не повторяя этого эксперимента.
3. **These facts were taken into account in estimating the results.**
   а) Эти факты были приняты во внимание при подсчете результатов.
   б) Эти факты были рассмотрены, когда подсчитывали результаты.
   в) Когда они подсчитали результаты, принимали во внимание эти факты.

4. **Trying to minimize the importance of the discovery was of no use.**
   а) Не следует пытаться свести к минимуму важность этого открытия.
   б) Попытка свести к минимуму важность этого открытия была бесполезной.
   в) Не пытайтесь свести к минимуму важность этого открытия.
5. **They are responsible for doing this work.**
   а) Они ответственно выполняют эту работу.
   б) Для того чтобы выполнить эту работу, их выбрали ответственными.
   в) Они ответственны за выполнение этой работы.

6.15. Translate the sentences and choose the right variant. Pay attention to the functions of the gerund and participle I.

1. **Discussing** a problem they argued a lot.
   а) обсуждение б) обсуждая в) обсуждаемая
2. **Having made** a great number of experiments with different devices the research group chose the best one for practical work.
   а) сделав б) делая в) сделанный
3. We avoided **using** the reagent.
   а) используя б) использование в) использующий
4. **Having access** to the code was symbolic.
   а) Получив доступ б) Получение доступа в) Получающий доступ
5. **Writing the article** he had to use a lot of foreign materials.
   а) Написание статьи б) Пишущий статью в) Когда он писал статью
6. Some people insist on **including** this question in the conference program.
   а) включение б) включая в) включающий
7. We were all for **starting** the experiment at once.
   а) начало б) стартовый в) начиная
8. H**aving read** this article he went home.
   а) прочитав б) читая в) то, что он прочёл
9. M**inimizing** experimental errors is one of our principal difficulties.
   а) уменьшая б) сведение к минимуму в) минимальные
10. **Applying** this new method the operator received good results.
    а) применяя б) применяющий в) применение

6.16. Translate the following sentences. What parts of speech are *-ing* forms: noun, adjective, participle or gerund?

1. In 1952, a major **computing** company took a decision to get out of the business of **making** mainframe computers.
2. The **following** year they reversed their decision.
3. The first IBM PC was developed **using existing** available electrical components.
4. When IBM were **looking** for an operation system, they went initially to Digital Research, who were market leaders in command-based **operating** systems.
5. The basic job of computers is the **processing** of information.
6. Newspaper, book and other print **publishing** are **adapting** to Web site technology.
7. Electronic mail (e-mail) is only the **starting** point of using computer communication services.
8. Computer will offer you **training** programs in **accounting**, foreign languages and many other fields.
9. A **functioning** computer system combines hardware elements with software elements.
10. The **defining** feature of modern computers which distinguishes them from all other machines is that they can be programmed.

THE INTERNET

Text A *The Internet*
Text B *Programming Languages*
Grammar: **infinitive**

Text A

THE INTERNET

Pretext exercises

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

Global system, computer networks, user, million, private, public, academic, local, global, electronic, optical, networking technology, information resources and services, hypertext documents, World Wide Web (WWW), infrastructure, electronic mail, materials, journals, information, system, the Internet, hypertext, document, special program, browser, Web pages, click, code, commands, textual and graphical information, e-mail, film, Web site, actors of the film, telephone lines, fibre-optic cables, satellites, signals.

7.2. Read the following words and mind their pronunciation.

suite	[swɪ:t]	vice versa	[`vaɪsɪ`və:sə]
private	[`praɪvɪt]	standard	[`stændəd]
array	[ə`reɪ]	resource	[rɪ`zɔ:s]
hypertext	[`haipətekst]	virtual	[`və:tʃuəl], [`və:tjuəl]
navigate	[`nævɪgeɪt]	aerial	[`ɛərɪəl]

Memorize the following words and expressions

Internet Protocol Suite	*стек протоколов IP*	**navigate**	*передвигаться*
array	*массив (информации, данных)*	**to surf the Web**	*бродить по сети*
networking technology	*сетевые технические средства*	**vice versa**	***лат.*** *наоборот*
World Wide Web (WWW)	*глобальная гипертекстовая система для поиска и использования ресурсов Интернет, «всемирная паутина»*	**dish aerial**	*параболическая антенна*
hypertext markup language	*язык гипертекстовой маркировки, язык HTML*	**wide area network**	*глобальная сеть*

7.3 Read the text.

THE INTERNET

The Internet is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide. It is a network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries a vast range of information resources and services, such as the interlinked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail.

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

browsers understand hypertext markup language or code, a set of commands to indicate how a Web page is formatted and displayed.

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

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

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

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

7.4. Read the text again and answer the questions.

1. What does the Internet consist of?
2. What are networks linked by?
3. What is the Web?
4. What does hypertext contain?
5. What is the browser?
6. What do Internet Video conferencing programs enable users to do?
7. What does Internet-enabled TV mean?
8. How can networks be linked together?
9. Why do modern telecommunication systems use fibre-optic cables?
10. How are the computers connected?
11. Do you use Internet? What for? How often?

Text B

PROGRAMMING LANGUAGES

Pretext exercises

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

Machine code, symbolic languages, special program, equivalent, assembler, information structures, actions, architecture, person, compiler, popular, commercial, mini, micro and personal computers, version, style of programming, generation.

7.6. Read the following words and mind their pronunciation.

process	[`prəuses]	version	[`vəːʃən]
sequence	[`siːkwəns]	compiler	[kəm`paılə]
advantage	[əd`vɑːntıʤ]	artificial	[ˌɑːtı`fıʃəl]

Memorize the following words and expressions

machine code	*машинный код, программа на машинном языке*	**assembler**	*ассемблер (машинно-ориентированный язык программирования)*
basic language	*основной язык*	**to run**	***зд.*** *выполнять, запускать программу*
symbolic language	*символический язык*	**compiler**	*компилятор, компилирующая программа*
portable program	*мобильная программа (легко переносимая на компьютер другого типа)*	**software engineer**	*специалист по разработке (разработчик) программного обеспечения*
instruction	*машинная команда, команда (в языках низкого уровня)*	**application program**	*прикладная программа*
machine oriented language	*машинно-ориентированный язык*	**artificial intelligence**	*искусственный интеллект*

7.7. Read the text.

PROGRAMMING LANGUAGES

The only language computers can understand directly is called machine code. It consists of the 1s and 0s (binary code) that are processed by the CPU. However, machine code as a means of communication is very difficult to write. That is why it is necessary to use symbolic languages that are easier to understand. Then, by using a special program, these languages can be translated into machine code.

Basic languages, in which the program is similar to the machine code version, are known as low-level languages. In these languages, each instruction is equivalent to a single machine code instruction, and the program is converted into machine code by a special program called an assembler. These languages are quite complex and restricted to particular computers.

To make the program easier to write, higher-level languages were developed such as BASIC, COBOL, FORTRAN, Pascal, Ada, C and others. A higher-level language is a problem oriented programming language, whereas a low-level language is machine oriented. This means that a high-level language is a convenient and simple means of describing the information structures and sequences of actions to be performed for a particular task.

A high-level language is independent of the architecture of the computer which supports it. This has two advantages. Firstly, the person writing the program does not have to know anything about the computer the program will be run on. Secondly, programs are portable, that is, the same program can (in theory) be run on different types of computer. Programs written in one of these languages should be converted by means of a compiler into a lower-level language or machine code so that the CPU could understand it.

C, a high-level programming language, is very popular today because it is very efficient and portable so one can use it with all kinds of computers. A lot of software engineers use C to write commercial applications programs for mini, micro and personal computers. There are also various versions of C – C^{++} and Objective C, which represent a new style of programming.

People communicate instructions to the computer in symbolic languages and the easier this communication can be made, the wider the application of computers will be. Scientists are already working on Artificial Intelligence

and the next generation of computers may be able to understand human languages.

Notes to the text

BASIC (Beginner's All-purpose Symbolic Instruction Code)	*язык программирования БЕЙСИК Первоначально язык реализовывался в виде интерпретаторов, что существенно облегчало программирование и особенно отладку программ*
COBOL (COmmon Business-Oriented Language)	*язык программирования КОБОЛ для экономических задач.*
FORTRAN (*сокр.* **от FORmula TRANslator)**	*язык программирования ФОРТРАН для численных методов.*
Pascal	*язык программирования Паскаль; широко используется для обучения студентов программированию.*

7.8. Match the English terms with their definitions.

1. COBOL	a. a computer programming language that uses common English terms
2. FORTRAN	b. a high-level computer programming language developed as a teaching language: used for general-purpose programming
3. BASIC	c. a high-level computer programming language for mathematical and scientific purposes, designed to facilitate and speed up the solving of complex problems
4. Pascal	d. a high-level computer programming language designed for general commercial use

7.9. Complete the following sentences with the expressions from the box.

programming	**compiler**	**programmed**	**program**
assembler	**language**	**programmers**	**portable**
	low-level	**machine code**	

1. A computer ... is a set of instructions that tells the computer what to do.
2. Converting an algorithm into a sequence of instructions in a programming language is called … .
3. Most computer ... make a plan of the program before writing it.
4. Coding is the translation of the logical steps into a programming ... .
5. In the next century computers will be ... in natural languages like English or French.
6. A ... is a special program that converts a program written in a high-level language into a program written in a lower level language.
7. It is difficult to use ... , which is the only language understood by the processor.
8. A special program called ... converts a program written in a low-level language into machine code.
9. If the same program can be used for different computers, it is called ... .
10. In a ... language each instruction has a corresponding machine code equivalent.

7.10. Discuss the new programming language you have heard of or read about.

7.11. Translate the following sentences from Russian into English.

1. Интернет – это глобальная система, связанных между собой компьютерных сетей.
2. Через интернет можно получить доступ к любым материалам, которые вас интересуют.
3. Браузер – это программа, которая помогает вам найти любую информацию.
4. Программа в режиме видео конференции помогает пользователям разговаривать и видеть друг друга.
5. Сети могут быть связаны между собой с помощью телефонных проводов или волоконно-оптического кабеля.
6. Современные системы используют волоконно-оптический кабель, так как у него много преимуществ.
7. Компьютер не может работать непосредственно с программой, написанной на языке высокого уровня.

8. Машинный язык – это язык низкого уровня.
9. Программирование – это написание подробных инструкций для машины.
10. Языки программирования делятся на языки высокого уровня и языки низкого уровня.

GRAMMAR

Infinitive

7.12. Put the verbs in brackets into the correct form, as in the model.

Model He didn't want **to be asked** that question. (***ask*** – *simple passive*)

1. I'm sorry … you but the question is very important (***disturb*** – *simple active*)
2. I was very upset … the seminar. (***miss*** – *perfect active*)
3. The high-speed devices … as secondary storage are both input and output devices. (***use*** – *perfect passive*)
4. These difficulties are too great … . (***ignore*** – *simple passive*)
5. Russia was the first country … the cosmic era. (***start*** – *simple active*)
6. A printer is an example of a device … output in a human readable format. (***produce*** – *simple active*)

7.13. Change the following complex sentences according to the model and translate them.

Model: This scientist was the first **who developed** the new process.
This scientist was the first **to develop** the new process.

1. The engineer was the last **who made** the report at the conference.
2. The famous scientist was the first **who proved** this theory.
3. These metals were the first **that were used** in industry.
4. These devices were the first **that were tested** in our laboratory.
5. This radio station was the first **that was built** in our country.

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

Model: The method **that will be used** was developed in our laboratory.
The method **to be used** was developed in our laboratory.

1. The method **which will be used** is reliable.
2. The results **which will be received** will be published next month.
3. The data **that are to be obtained** will be of great interest.
4. The measurements **that must be made** should be accurate enough.
5. The experiments **which will be demonstrated** are closely related to our research.
6. The problem **that must be solved** is very difficult.
7. The work **that must be done** is of great importance.
8. The process **to be described** in this article is known as ionization.
9. The equipment **that is to be installed** is very effective.
10. The instrument **which will be used** must make precise measurements.

7.15. Translate the following sentences, point out the infinitive function.

1. To translate such an article without a dictionary is difficult.
2. Automation makes it possible **to obtain and develop** new sources of energy.
3. **To work** with computer was new to us.
4. Signals **to be measured** must be strong enough.
5. Our aim is **to translate** technical articles without a dictionary.
6. **To distinguish** between cause and effect is sometimes difficult.
7. A special electronic device signals the engine **to stop**.
8. **To convert** the electrical connections of the peripheral an interface is used.
9. Some minicomputers allow the word length **to vary**.
10. Programming a computer involves analyzing the problem **to be solved** and a plan **to solve** it.
11. **To develop** the supercomputer, highly developed electronics and new materials were required.
12. Recently a radar **to be mounted** on cars has been developed.
13. There are projects **to use** lasers for long distance communication.

14. In a new Japanese car the information **to be received** by the driver will come through a navigation earth satellite.
15. A very interesting problem is **to produce** a practically limitless source of energy.
16. Lasers **to be placed** on Earth satellites will transform solar radiation into laser beams.
17. The idea **to use** this substance is not new.
18. He described the device **to be used** in all modern systems.
19. **To translate** the text without a dictionary is difficult.
20. **To carry out** the experiment you must improve the device.

7.16. Translate the following sentences.

1. To carry out this research work requires special knowledge.
2. We'll consider a very simple example to explain this phenomenon.
3. The fastest way to detect an artificial satellite is by radio.
4. We are to study the main laws of physics.
5. An electronic machine has to be used to perform these calculations.
6. To analyze this effect is to take into consideration all the elements of the circuit.
7. The machinery to be installed in our laboratory was built by the modern machine-building plant.
8. To prevent corrosion metal must be covered with paint.
9. The wire to be tested is connected to the measuring instrument.
10. The voltage that is to be produced in this circuit is to be sufficiently high.
11. The motor is a device to change mechanical energy into electric one.
12. The galvanometer must be sensitive enough to detect the existence of the current.
13. The main objective of the cosmonaut was to study the human organism in space.
14. The signals of different frequencies are combined to form a single complex wave output which is transmitted to the receiver.
15. Most minicomputers have extra registers and indicators to perform particular functions.
16. We will discuss the operation of the junction transistor to show how amplification may be achieved.

17. The useful work to be done by a machine is less than the total work to be performed by it.
18. One of the best ways to keep the car speed constant is to use a computer.
19. In a new Japanese car the information to be received by the driver will come through a navigation earth satellite.
20. To detect objects at a distance such as ships, aircrafts, buildings, *etc*. is of great importance for navigation both at sea and in air.
21. Materials used for superliner structures must be strong enough to withstand the air resistance at high speeds.
22. A very interesting problem is to produce a practically limitless source of energy.
23. One of the ways to make planes as economical as possible is to lighten the aircraft by using new composite materials.
24. All a pilot needs to do is to tune to radio transmitters and he will get direction signals he needs.
25. A new electronic device to be installed in the car's panel will calculate how far one can drive on the fuel left.
26. Besides, there is one more problem to be studied – that of sur face cooling.
27. Every student of Cambridge is to go to his tutor once a week to discuss with him the work done.

7.17. Translate the text. Point out the infinitive function.

Information is frequently considered **to be** almost synonymous with knowledge. It is in this context that information scientists are concerned with information. What then is a satisfactory definition of information? In order **to define** information, the thing **to begin with** is the use of information. Information is used **to make** decisions; in fact, the only available resource for a decision maker is information. The decision maker may be a single person, a committee, or a machine, but in any case the decision is based on information selected from the available data. Thus information represents data of value **to make** decisions.

Unit 8. INFORMATION SECURITY

Text A *Information Security*
Text B *Computer Crimes*
Grammar: **revising verbals**

Text A

INFORMATION SECURITY

Pretext exercises

8.1. Read the following words and try to guess their meaning.

Biological, virus, organism, program, resource, file, to activate, destructive, message, monitor, hard disk, command, limit, attack, container.

8.2. Read the following words and mind their pronunciation.

routine	[ru`ti:n]	disaster	[dɪ`zɑ:stə]
dormant	[`dɔ:mənt]	measure	[`meʒə]
monitor	[`mɔnɪtə]	uninterruptible	[ˌənˌintə`rʌptəbəl]
sequence	[`si:kwəns]	supply	[sə`plaɪ]
patching	[`pætʃɪŋ]	surge	[sə:ʤ]
virus	[`vaɪrəs]	fireproof	[`faɪəpru:f]

8.3. Choose the best translation to the following word-groups.

1. Virus protection program	а) программа защиты от вирусов б) программа защиты вирусов в) вирусная защитная программа
2. Common programming technique	а) обычный метод программирования б) обычный программный метод в) метод обычного программирования
3. Monitor screen	а) мониторный экран б) экран монитора в) отслеживание экрана

4. Normal execution sequence	а) обычное выполнение последовательности б) последовательность нормы выполнения в) обычная последовательность выполнения
5. Uninterruptible power supply	а) мощность бесперебойной подачи б) бесперебойный источник питания в) источник бесперебойной энергии

Memorize the following words and expressions

to reproduce	*воспроизводить*	**host program**	*главная программа*
routine	*стандартная программа*	**execution**	*выполнение*
to run	*запускать, выполнять*	**misdirection**	*неправильное направление, указание*
to stay resident	*оставаться в памяти*	**to take security measures**	*принимать меры безопасности*
payload	*полезная нагрузка*	**to implement**	*выполнять, осуществлять*
to remain	*оставаться*	**firewall**	*межсетевое устройство защиты, брандмауэр*
trigger	*запускающее устройство*	**encrypted data**	*зашифрованные данные*
destructive	*разрушительный*	**uninterruptible**	*бесперебойный*
to replace	*заменять*	**vendor-supplied software**	*программное обеспечение поставщика*

8.4. Read the text.

INFORMATION SECURITY

A biological virus is a very small, simple organism that infects living cells, known as a host, by attaching itself to them and using them to reproduce itself. This often causes harm to the host cells.

Similarly, a computer virus is a very small program routine that infects a computer system and uses its resources to reproduce itself. It often does this by patching the operating system to enable it to detect program files, such as

.COM or .EXE files. It then copies itself into those files. This sometimes causes harm to the host computer system.

When the user runs an infected program, it is loaded into memory carrying the virus. The virus uses a common programming technique to stay resident in memory. It can then use a reproduction routine to infect other programs. This process continues until the computer is switched off.

The virus may also contain a payload that remains dormant until a trigger event activates it, such as the user pressing a particular key. The payload can have a variety of forms. It might do something relatively harmless such as displaying a message on the monitor screen or it might do something more destructive such as deleting files on the hard disk.

When it infects a file, the virus replaces the first instruction in the host program with a command that changes the normal execution sequence. This type of command is known as a JUMP command and causes the virus instructions to be executed before the host program. The virus then returns control to the host program which then continues with its normal sequence of instructions and is executed in the normal way.

To be a virus, a program only needs to have a reproduction routine that enables it to infect other programs. Viruses can, however, have four main parts. A misdirection routine that enables it to hide itself; a reproduction routine that allows it to copy itself to other programs; a trigger that causes the payload to be activated at a particular time or when a particular event takes place; and a payload that may be a fairly harmless joke or may be very destructive. A program that has a payload but does not have a reproduction routine is known as a Trojan.

To prevent or limit the effects of disaster you should take security measures and protect hardware and software. If your work deals with the use of the Internet, you should implement network controls by installing firewalls to protect external and internal attacks. Another way of protection is using encrypted data including monitoring username and password use. Don’t use common names or dictionary words in passwords. To protect from natural disasters install uninterruptible power supplies and surge protectors.

Periodically make full backups, which copy all files. If your files are very important, keep backups in separate locations, in fireproof containers, under lock and key. Virus protection programs are another way of feeling safe. Use only vendor-supplied software products that guarantee they are virus-free.

Notes to the text

host	*носитель (вируса)*
patching	*коммутация, вставка в программу*
dormant	*неактивный, бездействующий*
variety	*множество, разнообразие*
to hide	*скрываться, прятать*
fairly	*довольно*
disaster	*катастрофа, бедствие*
surge protector	*устройство защиты от скачков напряжения*
fireproof	*огнеупорный*
to lock	*запирать, закрывать*

8.5. Complete the following sentences with the expressions from the box.

backups	**to be executed**	**payload**	**reproduction**	**host**
	program	**resources**	**hide**	
	encrypted data		**security measures**	

1. A computer virus infects a computer system and uses its … to reproduce itself.
2. The virus contains a … that remains dormant until the user presses a particular key.
3. The virus replaces the first instruction in the … with a command that changes the normal execution sequence.
4. A JUMP command causes the virus instructions … before the host program.
5. A … routine is needed to infect other programs.
6. A misdirection routine enables a virus to … itself.
7. To protect hardware and software you should take … .
8. Installing … helps to withstand external and internal attacks.
9. To protect your work from stealing use … .
10. Copy all your files and keep your … in separate locations under lock and key.

8.6. Read the text again and answer the questions.

1. How does a biological virus infect living cells?
2. What is a computer virus?
3. What files does the virus copy itself into?
4. What technique is used by virus to become resident in memory?

5. How long does the process of infection continue?
6. How long does a payload remain dormant?
7. What is a trigger event?
8. What forms can the payload have?
9. What event changes the normal execution sequence?
10. What does the program need to have to be a virus?
11. How many parts do viruses usually have?
12. How is the program without reproduction routine named?
13. What should you do to prevent external and internal attacks?
14. Why should you install uninterruptible power supplies and surge protectors?
15. What software products guarantee they are virus-free?

Text B

COMPUTER CRIMES

Pretext exercises

8.7. Read the following words and try to guess their meaning.

Physically, business, original, manipulation, act, function, to accumulate, individual, identification, code, file, to modify, address, server, reputation, percent.

8.8. Read the following words and mind their pronunciation.

employee	[ɪm`plɔɪiː] [ˌem-ploɪ`iː]	accident	[`æksɪdənt]
property	[`prɔpətɪ]	fraud	[frɔːd]
alter	[`ɔːltə]	ramification	[ˌræmɪfɪ`keɪʃn]
illegitimate	[ˌɪlɪ`ʤɪtəmənt]	guilty	[`gɪltɪ]
piracy	[`paɪərəsɪ]	prosecute	[`prɔsɪkjuːt]
bombing	[`bɔmɪŋ]	tolerate	[`tɔləreɪt]

Memorize the following words and expressions

computer crime	*преступление, совершаемое с помощью компьютера*	**victim**	*жертва*
criminal	*преступник*	**to be unaware of**	*не подозревать*
to steal	*воровать, красть*	**to log off**	*выходить из системы*
theft	*кража*	**piracy**	*пиратство*
destruction	*разрушение*	**mail bombing**	*бомбардировка почтового адреса*
property	*собственность*	**to crash**	*выводить из строя*
benefit	*выгода, польза*	**by accident**	*случайно*
to alter	*изменять (данные)*	**by no means**	*отнюдь не, никоим образом*

8.9. Read the text.

COMPUTER CRIMES

Computer crimes are 'clean' white-collar crimes; no one gets physically hurt. But computer crime is serious business and deserves to be taken seriously by everyone. After all, if computer criminals can steal money from major banks, can they not steal from you?

Computer crime basically falls into three categories:

- Theft of computer time for development of software for personal use or with the intention of selling it. It is difficult to prove programs were stolen when copies are made because the originals are still in the hands of the original owners.
- Theft, destruction, or manipulation of programs or data. Such acts may be committed by disgruntled employees or by persons wishing to use another's property for their own benefit.
- Altering data stored in a computer file.

The Trojan Horse is the name given to the crime in which a computer criminal is able to place instructions in someone else's program that allow

the program to function normally but perform additional, illegitimate functions as well.

Salami shaving method means manipulating programs or data so that small amounts of money are deducted from a large number of transactions or accounts and accumulated elsewhere. The victims are often unaware of the crime because the amount taken from any individual is so small.

Piggybacking means using another person's identification code or using that person's files before he or she has logged off.

Software piracy is unauthorized copying of a program for sale or distributing to other users.

Data diddling is a technique whereby data is modified before it goes into the computer file. Once in the file, it is not as visible.

Mail bombing is inundating an email address with thousands of messages, slowing or even crashing the server.

Prosecuting the computer criminal is difficult because discovery is often difficult. The nature of the crime is such that it is hard to detect, and thus many times it simply goes undetected. In addition, crimes that are detected – an estimated 85 percent of the time – never reported to the authorities. By law, banks have to make a report when their computer systems have been compromised, but other businesses do not. Often they choose not to report because they are worried about their reputations and credibility in the community.

Most computer crimes, unfortunately, are discovered by accident. Even if a computer crime is detected, prosecution is by no means assured. There are a number of reasons for this. First, law enforcement agencies do not fully understand the complexities of computer-related fraud. Second, few attorneys are qualified to handle computer crime cases. Third, judges are not educated in the ways of computers and may not consider data valuable.

In short, the chances of committing computer crimes and having them go undetected are, unfortunately, good. And the chances that, if detected, there will be no ramifications are also good: a computer criminal may not go to jail, may not be found guilty if prosecuted, and may not even be prosecuted. You can be sure, however, that this will not be tolerated for long.

Notes to the text

to get hurt	*пострадать*
deserve	*заслуживать*
after all	*в конце концов*
intention	*намерение, цель*
to commit	*совершать*
disgruntled	*недовольный*
employee	*работник*
illegitimate	*незаконный*
as well	*также*
account	*счёт, учётная запись*
to account	*рассчитывать*
data diddling	*сдвиг элементов данных*
to inundate	*наводнять*
in addition	*кроме того*
to compromise	*подвергать риску*
to assure	*гарантировать*
fraud	*обман, мошенничество*
attorney	*районный прокурор*
ramification	*последствия*
to prosecute	*преследовать судебным порядком*

8.10. Complete the sentences with the words from the box. There are two extra words. Translate the sentences.

to hide a sequence of instructions security measures victims encrypted data gets physically hurt machine code theft program routine the normal execution sequence by accident

1. To protect your work from stealing use … .
2. A misdirection routine enables a virus … itself.
3. To protect hardware and software you should take … .
4. It is difficult to use … , which is the only language understood by the processor.
5. … , destruction, or manipulation of programs or data may be committed by disgruntled employees.
6. Most computer crimes are discovered … .
7. The … are often unaware of the crime because the amount taken from any individual is so small.

8. A computer virus is a very small … that infects a computer system.
9. Computer crimes are 'clean' white-collar crimes, no one … .
10. The virus replaces the first instruction in the host program with a command that changes … .

8.11. Read the following sentences and decide if they are true (T) or false (F).

1. Everyone gets physically hurt in computer crimes.
2. A computer crime doesn't deserve to be taken seriously.
3. Computer crimes fall into 4 categories.
4. It is easy to prove that programs were stolen.
5. Altering data stored in smb's computer file is not a crime at all.
6. The Trojan Horse can replicate itself.
7. The victims of 'Salami shaving' method of stealing money are always aware of the crime.
8. Software piracy is unauthorised copying of programs.
9. Mail bombing can crash the server.
10. Prosecuting the computer criminals is impossible.
11. Businesses choose not to report about the crime because they are worried about their reputation.
12. The computer criminal being caught never goes to jail.

8.12. Read the text again and answer the questions.

1. Why is a computer crime called 'clean'?
2. How many categories does a computer crime fall into?
3. What is the name of the virus which allows the program to function normally but performs additional illegitimate functions?
4. What does 'Salami shaving' mean?
5. Which method is used by hackers to slow down or even crash the server?
6. Why is it difficult to punish computer criminals?
7. Do the banks have to make a report about the crime against them?
8. Why do other businesses prefer not to report about the crime?
9. How are most computer crimes discovered?
10. Why do computer criminals often remain unpunished even if they are detected?
11. What is the percentage of detected crimes which are never reported to the authorities?

8.13. Translate the following sentences from Russian into English.

1. Компьютерный вирус – это маленькая программа, которая заражает компьютерную систему.
2. Вирус может содержать полезную нагрузку, которая остается неактивной до тех пор, пока пользователь не нажмет на определенную кнопку.
3. Полезная нагрузка может быть безвредной, когда, например, на экране отображаются сообщения.
4. Полезная нагрузка может быть и разрушительной, когда, например, с жесткого диска удаляются файлы.
5. Программа воспроизведения копирует себя в другие программы.
6. Троянский конь – это программа, которая имеет полезную нагрузку, но не имеет подпрограмму воспроизведения.
7. Чтобы защитить аппаратное и программное обеспечение, вы должны принять меры безопасности.
8. Пиратство – это незаконное копирование программы для продажи.
9. Природа компьютерного преступления такова, что его трудно обнаружить.
10. Большинство компьютерных преступлений раскрываются случайно.

8.14. Topics for discussion.

1. Computer crime and prosecution.
2. Virus-protection software that is used nowadays. Which is the most effective?
3. Ways of protecting hardware and software.

GRAMMAR

Revising Verbals

8.15. Translate the following sentences paying attention to the function of the gerund and the participle I.

1. Numbers can be multiplied by repeated addition, by **adding** and **shifting** or by **using** multiplication tables.
2. **Adding** numbers is the easiest process in the system of calculation.
3. **Having made** a great number of experiments with different devices the research group chose the best one for practical work.
4. At least one advantage of **using** this technique is obvious.
5. Each research center is interested in **training** a younger generation of efficient specialists.
6. We are **developing** a new program of cooperation.
7. **Acquiring** knowledge is not sufficient in itself; you must also practice the art of **applying** this knowledge to problems you hit upon.
8. The applications of laser techniques are **expanding** very rapidly.
9. The next question of the discussion is **making** a program for the computer.
10. When **discussing** a problem they argued a lot.
11. M**inimizing** experimental errors is one of our principal difficulties.
12. **Writing the article** he had to use a lot of foreign materials.
13. We found the error without **repeating** this experiment.
14. I suggest **exchanging** the latest information on this subject.

8.16. Translate the sentences from Russian into English using the gerund or the participle I. Point out their functions.

1. **Переводить** статьи с английского языка на русский необходимо каждому инженеру.
2. Мое хобби – **переводить** статьи.
3. Он **переводит** интересную статью сейчас.
4. Он любит **переводить** статьи.
5. Я часто читаю статьи о различных способах **перевода**.
6. Его способ **перевода** статьи не очень хороший.
7. Человек, **переводящий (который переводит)** статью, – наш коллега.
8. **Прежде чем переводить** статью, нужно как следует научиться этому.
9. **Переводя** статью, студент пользовался словарем.

8.17. Translate the following sentences.

1. The current entering the device is amplified by a secondary-emission multiplier.
2. The signal received by the antenna is transmitted to the radio receiver by some form of balanced line.
3. The modulated radio frequency carrier is fed to the transmitting antenna from which it is radiated.
4. All the systems discussed employed a scanning pattern which was independent on the content of the picture transmitted.
5. The energy required to remove the electron is called the impurity ionization energy.
6. Ordinary computers can remember only the data fed into them on a magnetic tape or disk.
7. The information appears on a television-like screen called computer display.
8. Being electrically neutral an atom must have an equal number of positive and negative charges.
9. Experiments conducted recently have shown that the laser can be used for welding.
10. Having solved many important problems connected with installation of the apparatus we continued our work.
11. Having received the information required they started their research work.
12. Certain materials possess the property of emitting electrons when exposed to light.
13. Scanning is produced by deflecting an electron stream periodically in two perpendicular directions.
14. The problem of turning heat directly into electricity has always attracted the attention of scientists.
15. Biologists are working hard upon the problem of using radiation to change the properties and qualities of plants.
16. The gas of hydrogen is easy for transporting and storing.
17. Reading such books you will improve your knowledge on this speciality.
18. These measures prevent the particles from leaving the interaction zone.
19. Converting heat directly into electricity without using machines is one of the complicated engineering problems.

20. Having stated the laws of gravity Newton was able to explain the structure of the Universe.
21. Being more efficient than human beings computers are used more and more extensively.
22. Having been published in 1687 Newton's laws of motion are still the basis for research.
23. Our engineers will discuss the methods used and the results obtained.

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

1. **Overcoming** these difficulties is not so easy as it may seem.
   Overcoming these difficulties the designers can increase the fuel efficiency.
2. **Setting** a problem the scientist makes the first step to its solution.
   Setting a problem is the first step to its solution.
3. **Covering** the distance between Tokyo and Moscow in less than two hours this superliner develops a speed five times above the speed of sound.
   Covering the distance between Tokyo and Moscow on board a superliner requires about two hours.
4. **Putting** the discovery into practice the engineers will solve a complicated technological task.
   Putting the discovery into practice sometimes requires more effort than making it.
5. He persisted in **trying** to solve that difficult problem.
   Trying to solve that difficult problem he came to an interesting conclusion.
6. **Using** the new method has brought very good results.
   Thousands of scientists **using** the most modern equipment are studying the atmosphere.
7. A fax machine is used for **sending** and receiving copies of original documents via a phone line.
   Don't forget to write down your address when **sending** a letter.
8. Joystick is an input device especially helpful in **playing** computer games.
   They are **playing** computer games now.

Unit 9. OPTICAL COMMUNICATION

Text A *Modern Light-Wav Communication Technology*
Text B *Optical Technology*

Grammar: **absolute participle constructions, gerund construction**

Text A

MODERN LIGHT-WAVE COMMUNICATION TECHNOLOGY

Pretext exercises

9.1. Read the following words and try to guess their meaning.

Decade, concept, second, system, type, cable, communication, electron, diameter, interference, regeneration.

9.2. Read the following words and mind their pronunciation.

efficiency	[ɪ`fɪʃ(ə)nsɪ]	versatile	[`vəːsətaɪl]
fibre	[`faɪbə]	quality	[`kwɔlətɪ]
alternately	[ɔːl`təːnətlɪ]	install	[ɪn`stɔːl]
substitute	[`sʌbstɪtjuːt]	lightguide	[`laɪtgaɪd]
immune	[ɪ`mjuːn]	pure	[pjuə]
instead	[ɪn`sted]	diameter	[daɪ`æmɪtə]

Memorize the following words and expressions

light pulse	*световой импульс*	**to substitute**	*заменять, замещать*
to install	*устанавливать*	**lightguide**	*световод*
capacity	*мощность, способность*	**immune**	*невосприимчивый*
glass fiber	*стекловолокно*	**protection**	*защита*

contents	*содержание*	**carrier system**	*многоканальная система связи*
accommodate	*включать, охватывать*	**signal regenerator**	*регенератор сигнала*
conventional	*обычный, традиционный*		

9.3. Read and translate the following word-groups paying attention to nouns as attributes.

Light-wave communication system, transmission system, glass fiber, voice signal, data signal, telephone conversation, telecommunication transmission, underground duct, copper cable, signal regenerator, carrier system, device reliability, laser beam, radio wave speed.

9.4. Match up the words which have a similar meaning.

1. concept	a. important
2. information	b. to operate
3. sophisticated	c. to demand
4. versatile	d. room
5. enormous	e. idea
6. speed	f. traditional
7. to undermine	g. data
8. single	h. many-sided
9. inexpensive	i. cheap
10.conventional	j. the only
11. significant	k. very large
12. to handle	l. to destruct
13. to require	m. rate
14. space	n. intricate

9.5. Match the following definitions with the words from the text.

1 para

1. to send information in the form of electrical signals to a radio, TV, computer, *etc.*
2. highly developed and complex
3. to set up for use or service

2 para

4. extra ordinarily great size
5. the largest amount or number that can be contained, volume

3 para

6. relating to information that is stored in the form of binary code
7. to make smth weaker or less effective
8. the act of talking in an informal way
9. one having the same function or characteristics as another

9.6. Read the text.

MODERN LIGHT-WAVE COMMUNICATION TECHNOLOGY

Not long ago the concept of using light pulses instead of electrical signals to transmit information was only a concept. Today, light-wave communication systems are among the most sophisticated transmission systems in the telecommunication network. They are at once efficient, versatile and relatively inexpensive to install and maintain.

The efficiency of light-wave systems is perhaps their most renowned quality. They carry enormous amounts of information over long distances at very high speeds. Consider, for example, the speed and capacity of the Bell System's long distance light-wave system. Light pulsing through a single, hair-thin glass fiber in this system can transmit the entire contents of Webster's dictionary – more than 2700 pages – over thousands of miles in only six seconds.

Not less impressive than this tremendous speed and capacity is the versatility of light-wave systems. As they are digital systems they can transmit easily any of these types of information: voice signals, high-speed data signals, and television signals. Without undermining quality or efficiency a single system can accommodate thousands of telephone conversations, and alternately handle data or video signals. Finally light-wave systems are inexpensive to install and operate compared to their wire-and-cable counterparts. Moreover, they allow considerable savings.

The reasons for such savings stem from the technology of light-wave communication. Conventional telecommunication transmission is based on the conduction of electrons through metal (usually copper wires). Light-wave systems, however, substitute photons for electrons and glass fibers for copper. Since lightguide cables are only a fraction of the diameter

and weight of copper cables they are easy to handle and take up far less space. They can be installed in existing underground ducts sometimes right next to copper cables.

In addition, light-wave systems are immune to electromagnetic interference, and therefore require no protection from it. Also, light can travel much farther through light-wave cables without regeneration than can electrons through copper carrier systems. This is because the light encounters little resistance from the very pure glass fiber through which it travels. Light-wave systems require significantly fewer signal regenerators than do electrical digital carrier systems: typically one every ten miles instead of one every mile.

Notes to the text

versatile	*универсальный*
to accommodate	*включать, охватывать*
alternately	*попеременно*
considerable savings	*значительная экономия*
fraction	*доля, часть*
to take up	*занимать*
to encounter	*встречать, сталкиваться*

9.7. Read the following statements and decide if they are true (T) or false (F).

1. Light-wave communication systems are not as efficient as conventional ones.
2. The versatility of light-wave systems is one of their most renowned qualities.
3. It is expensive to install and maintain light-wave systems.
4. In conventional systems electrons flow in a conductor.
5. Lightguide cables take up too much space.
6. It is not possible to place lightguide cables next to copper cables.
7. Electrical digital carrier systems require one regenerator every mile.

9.8. Read the text again and answer the questions.

1. Is the idea of using light pulses to transmit information new?
2. What are the qualities of light-wave communication systems?
3. What is their efficiency?
4. What is their versatility?
5. Are they cheaper to install and operate than their wire-and-cable counterparts?
6. Is there any difference between conventional and light-wave systems?
7. What is conventional transmission based on?
8. What is light-wave transmission based on?
9. Are light-wave systems immune to electromagnetic interference?
10. Why does light travel farther through light-wave cables without regeneration than electrons through copper wires?
11. How many signal regenerators every mile do light-wave systems require?

Text B

OPTICAL TECHNOLOGY

Pretext exercises

9.9. Read the words and try to guess their meaning.

Integrated, virtual, combine, laser, fabrication, silicon, regeneration, installation, destruct, reason, limitation, equivalent, intensive, connect, transcontinental.

9.10. Read the following words and mind their pronunciation.

increase (*n*)	[`ınkri:s]	reliability	[rı.laıə`bılətı]
virtually	[`və:tʃuəlı] [`və:tjuəlı]	simultaneously	[.sım(ə)l`teınıəslı]
medium	[`mi:dıəm]	fiber	[`faıbə]

Memorize the following words

to improve	*улучшать*	**reliability**	*надежность*
to increase	*увеличивать*	**to replace**	*заменять, замещать*
increase	*увеличение*	**drive**	*дисковод, привод, накопитель*
performance	*работа, эффективность*	**application**	*применение, приложение*

9.11. Read the text.

OPTICAL TECHNOLOGY

One of the most interesting developments in telecommunication is the rapid progress of optical communication where optical fibers are replacing conventional telephone wires and cables. Just as digital technologies greatly improved the telephone system, optical communication promises a considerable increase in capacity, quality, performance and reliability of the global telecommunication network. New technologies such as optical fibers will increase the speed of telecommunication and provide new, specialized information service. Voice, computer data, even video images will be increasingly integrated into a single digital communication network capable of processing and transmitting virtually any kind of information.

It is a result of combining two technologies: the laser first demonstrated in 1960 and the fabrication 10 years later of ultra-thin silicon fibers which can serve as lightwave conductors. Optical systems can transmit pulses of light as far as 135 kilometers without the need for amplification or regeneration.

A revolution in information storage is underway with optical disc technology.

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

One CD-ROM disc (650 MB) can replace 300,000 pages of text, which represents a lot of savings in databases.

The future of optical storage is called DVD (digital versatile disc). A DVD-ROM can hold up to 17 GB, about 25 times an ordinary CD-ROM. For this reason it can store a large amount of multimedia software and complete full-screen Hollywood movies in different languages. However, DVD-ROMs are "read-only" devices. To avoid this limitation companies also produce DVD rewritable drives.

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

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

Notes to the text

to promise	*обещать*
to coat	*покрывать*
to be underway	*проходить, проводить*

9.12. Fill in the blanks with the following words.

capacity	**as well**	**laser**	**information**	**light**	**existing**
advantage	**space**	**doubt**	**amplified**	**cost**	**conventional**

Optical fibers are made of glass and use … (usually from a …) to transmit messages. There is no … optical fiber systems have enormous … over … transmission systems. They have a much higher … than copper wires, can carry much more … and have a potentially lower material … . Besides, optical fibers occupy far less … . The quality of transmission is high … . The signal doesn't need to be … as often as with … cables. Optical fibers don't suffer from interference.

9.13. Read the following statements and decide if they are true (T) or false (F).

1. Optical fibers are replaced by conventional telephone wires.
2. Optical systems transmit light pulses without any regeneration.

3. The first digital optical discs were produced as compact discs for music.
4. Digital optical discs can't be used as a storage medium for computers.
5. The information is recorded and read by laser.
6. CD-ROM can store much more information than DVD-ROM.
7. DVD-ROMs are "read-only" devices.

9.14. Read the text again and answer the questions.

1. What does optical communication promise?
2. What is a digital communication network capable of?
3. What are two combined technologies?
4. Do optical systems need any amplifiers or regenerators?
5. When were the first digital optical discs produced?
6. How is the information recorded and read?
7. What are the advantages of optical discs?
8. Are there any disadvantages? What are they?
9. How do the companies try to avoid the problem?
10. Are optical electronic computers used today?

9.15. Translate the following sentences from Russian into English.

1. Оптические системы связи являются эффективными и универсальными.
2. Они передают огромное количество информации на большие расстояния за несколько секунд.
3. Преимуществами стекловолокна являются их размер, вес.
4. Оптические волокна не подвержены интерференции.
5. Свет встречает маленькое сопротивление, когда проходит по стекловолокну.
6. Обычные системы требуют один регенератор сигналов на одну милю.
7. Компакт диски делают из пластика, покрытого алюминием.
8. Информация, записанная на диске, является цифровой.
9. Информация записывается и считывается лазером.
10. Оптические технологии находят новые применения каждый день.

GRAMMAR

Absolute Participle Constructions, Gerund Construction

9.16. Translate the following sentences paying attention to absolute participle construction.

1. The choice having been made, all the other alternatives have been rejected.
2. The other conditions being equal, the acceleration will be the same.
3. The equipment failed, the explorers stopped the experiment.
4. We carried out a series of reactions, the raw materials brought from their laboratory.
5. With water being cooled, the rate of the reaction was low.
6. The reaction must have taken place, with the data showing a change in the infra-red region.
7. With the structure of various companies being different, the model is often inadequate in each particular case.
8. They took all the measurements during actual operation of the machine, this being the usual practice in those days.
9. The cars at that time were very small, the engine being placed under the seat.
10. Brakes having become more efficient, cars achieved greater reliability.

9.17. Translate the following sentences. Point out the absolute participle II construction.

1. The results obtained, we informed the manager of this fact.
2. The data coded, we finished our work.
3. All the delegations met, the conference began.
4. The article translated, he returned the dictionary.
5. The research finished, the scientists made the analysis of the data obtained.
6. The session was over, with many aspects of the problem left unsolved.

7. All factors considered, we believed that the mechanism is the most likely.
8. All the equipment removed, the explorers stopped working.

Gerund Construction

9.18. Read and translate the sentences paying attention to the gerund construction.

1. We know of Kondakov's having made the first synthetic rubber in the world.
2. We know of Yoffe's having contributed much to the research of transistors.
3. I have heard of their experiment being successfully completed soon.
4. This scientist's taking part in the design of the new data processing system was of great help for us.
5. We were told about their having studied a number of problems connected with the development of computing machinery.
6. Mankind is interested in atomic energy being used only for peaceful purposes.
7. Benjamin Franklin's having invented the first lightning conductor is a well established fact.
8. We all know of their designing a new type of computer.
9. He mentioned his having shown these slides at the conference.
10. Your having worked at the plant helped you to master technical subjects.
11. Kurchatov's having devoted all his life to nuclear physics is well known.
12. I know of their being shown the new device.
13. We know of the Curies' having discovered some new radioactive elements.
14. They were told of Rutherford's having investigated the nature of alpha-particles.
15. There was no hope of our solving this complex engineering problem so soon.
16. Alexander Bell's being a teacher of deaf people influenced his interest in sound and its transmission.

9.19. Choose the sentences with the absolute participial construction from the ones given below. Translate them into Russian.

1. Speaking about the new methods of work the engineer told us many interesting details.
2. There are two diagrams in this figure, one of them showing the relation between volume and temperature.
3. Special instruments measuring cosmic radio signals are being installed in the observatory.
4. We defined the volume, all the measurements having been done according to the instruction.
5. The computer performing addition, two numbers to be added come from the memory.
6. While improving the design the constructor made many calculations.
7. A lot of attempts having been made, the scientist came to a successful solution of the problem.
8. Having stated the laws of gravity, Newton was able to explain the structure of the Universe.
9. The first man-made satellite having been sent up, it became possible to investigate various types of radiation.
10. Having published his book about space exploration in 1895, Tsiolkovsky became known all over the world.
11. Part of the energy being changed into heat, not all the chemical energy of the battery is transformed into electric energy.

9.20. Read and translate the sentences paying attention to the participle and gerund constructions.

1. With the current being switched on, the machine automatically starts operating.
2. We know of his working at the problem of protection from radioactivity.
3. His going home so early caused a storm of protest.
4. An electron leaving the surface, the metal becomes positively charged.
5. Belyaev's having been elected a correspondent member of the Academy of Sciences was met with satisfaction.
6. Other things being equal, the electron energy values remain constant.
7. His work being criticized makes him revise his method.

8. In spite of the gases having been compressed they returned to their original volume as soon as the applied force stopped acting.
9. The temperature being raised, the kinetic energy is increased.
10. Our being invited to take part in such a conference is very important.
11. There is no hope of our getting all the necessary information on this subject.
12. With the structure of various companies being different, the model is often inadequate in each particular case.
13. Some scientists do not distinguish between pure and applied mathematics, the distinction being, in fact, of recent origin.
14. Several treatments of this problem have been presented, with theories resulting from this investigation falling into one of the two categories.
15. Instructions being obtained, the control unit causes other units to perform the necessary operations.
16. Newton's having made a mistake in his calculations has no influence on his theory.

Unit 10. NEUTRINO

Text A	**Communicating through the Earth**
Text B	**What is GPS?**
Grammar:	**infinitive constructions**

Text A

COMMUNICATING THROUGH THE EARTH

Pretext exercises

10.1. Read the following words and mind their pronunciation.

neutrino	[nju:`trınəu]	molecule	[`mɔlıkju:l]
earth	[ə:θ]	nucleus	[`nju:klıəs]
curve	[kə:v]	straight	[streıt]
occasionally	[ə`keıʒnəlı]	induce	[ın`dju:s]
eventually	[ı`ventʃualı]	intelligent	[ın`telıʤənt]

10.2. Read the words and try to guess their meaning.

Horizon, copper, region, ionosphere, storm, subatomic, to detect, molecule, to combine, code, civilization.

Memorize the following words and expressions

curve	*кривая линия*	**to affect**	*влиять, воздействовать*
to unite	*объединять*	**to take place**	*происходить*
maintenance	*эксплуатация, поддержание*	**to disrupt**	*прерывать*
straight line	*прямая линия*	**to induce**	*вызывать*
to relay	*ретранслировать*	**earth's crust**	*земная кора*
mirror	*зеркало*		

10.3. Read the text.

COMMUNICATING THROUGH THE EARTH

How do we communicate with people beyond the horizon? What can be made to follow the curve of the earth's surface?

Of course, we can send electrical signals through wires around any curves. In the 19th century copper wires were strung across the continents and the world was united through telegraphy. That takes a lot of copper and a lot of maintenance.

We could send light-wave signals and do away with wires, but light waves move in a straight line and won't curve around the earth's bulge. We would have to set up relay stations or place mirrors in orbit to make that work.

We could use radio waves. They travel in straight lines too but the upper atmosphere contains regions rich in charged particles (the ionosphere) that tend to reflect the radio waves. That makes it possible to send radio signals over long distances, and in the 20-th century the world was united without wires.

However, the ionosphere is affected by the solar wind. When the sun produces flares, an electrical storm can take place that will disrupt radio communications. But short radio waves (microwaves) can go right through the ionosphere and be sent on by communication satellites. As communication satellites improve, signals will be sent from place to place on earth with so little trouble that it would seem unreasonable to ask for anything better.

What can go through the earth itself? Light certainly can't. Radio waves can't. We can't even string wires through the earth to carry electrical signals. But there are certain massless subatomic particles called neutrinos that travel at the speed of light and go through matter as though it weren't there. A beam of neutrinos could travel through trillions of miles of solid lead and come out the other end just about unaffected. Neutrinos reach us from any direction and pass through the earth in less than a twentieth of a second.

This doesn't mean that neutrinos can't be detected. Out of many trillions one neutrino may occasionally combine with an atomic nucleus and induce a detectable change. Thus, huge vats of cleaning fluid made up of molecules that include chlorine atoms can serve as a "neutrino telescope". Such

neutrino telescopes can be placed in mines, a couple of miles under the earth's crust. In that case nothing can reach them but neutrinos.

Scientists can produce neutrino beams without much trouble. The day may come when improved neutrino telescopes, using water rather than cleaning fluid, will be placed all over the earth. Eventually television sets might be built that would incorporate the equivalent of neutrino telescopes and convert the signals directly into sight or sound.

If this could be done, communication satellites would be unnecessary. Any two points on earth's surface (or in mines, or under the sea) would be connected by a mathematically straight line along which neutrinos would move at the speed of light. There is no way of communicating more quickly.

Neutrinos move in a straight line throughout the universe. They are unaffected by the electromagnetic fields and dust clouds that can disrupt or block microwaves and light.

In the end, then, it may be that communications among worlds would be carried out through neutrino beams.

Perhaps that is why we aren't detecting signals from other intelligent civilizations out there. We are looking for beams of microwaves, but perhaps we should be looking for beams of neutrinos.

Notes to the text

to take	***зд.*** *требовать*
to set up	*устанавливать*
occasionally	*иногда*
fluid	*жидкость*
rather than	*а не*
to be carried out	***зд.*** *осуществляться*

10.4. Match the words to make an expression.

1. light wave	a. beam
2. straight	b. field
3. relay	c. signal
4. charged	d. change
5. neutrino	e. station
6. cleaning	f. line
7. upper	g. satellite

8. detectable	h. fluid
9. communication	i. particle
10. electromagnetic	j. atmosphere

10.5. Read the following statements and decide if they are true (T) or false (F).

1. Light wave signals can't be used for communication without mirrors.
2. Short radio waves are reflected by ionosphere.
3. A beam of neutrinos can pass through the earth.
4. It is impossible to detect neutrino.
5. Neutrino telescopes are placed on the earth's surface all over the world.
6. Today neutrinos are widely used for communication.
7. Scientists should use beams of neutrinos to detect signals from other intelligent civilizations.

10.6. Read the text again and answer the questions.

1. Are copper wires used for communication?
2. How do light waves propagate?
3. Is it possible to use them for communication?
4. What is ionosphere?
5. What waves does ionosphere reflect?
6. Can light waves pass through the earth?
7. What is neutrino?
8. Are neutrinos used for communication today?
9. Can they be detected? How?
10. What is the future of neutrino?
11. How do scientists try to detect signals from other intelligent civilizations?

Text B

WHAT IS GPS?

Pretext exercises

10.7. Read the following words and mind their pronunciation.

available	[ə`veɪləbl]	precise	[prɪ`sais]
latitude	[`lætɪtju:d]	longitude	[`lɔnʤɪtju:d]
altitude	[`æltɪtju:d]	launch	[lɔ:nʧ]
weigh	[weɪ]	error	[`erə]

10.8. Read the following words and try to guess their meaning.

Global, position, satellite, navigation, military, location, speed, extreme, channel, design, correct, to degrade, atmosphere, block.

Memorize the following words

to intend	*намереваться, предназначать*	**to run**	*работать*
to launch	*запускать*	**path**	*путь*
precise / accurate	*точный*	**to degrade**	*ухудшать*
location	*расположение*	**to affect**	*влиять, воздействовать*
to track	*следить, отслеживать*	**error**	*ошибка*
destination	*место назначения*	**to cause**	*вызывать*
onboard	*на борту, бортовой*		

10.9. Read the text.

WHAT IS GPS?

The Global Positioning System (GPS) is a satellite-based navigation system made up of a network of 24 satellites. GPS was originally intended for military applications, but now the system is available for civilian use. GPS works in any weather conditions, anywhere in the world, 24 hours a day.

The first GPS satellite was launched in 1978. Each satellite is built to last about 10 years. Replacements are constantly being built and launched into orbit. A GPS satellite weighs approximately 2,000 pounds and is about 17 feet across. Transmitter power is only 50 watts or less.

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

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

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

24 satellites are orbiting the earth about 12,000 miles above us. They are constantly moving, making two complete orbits in less than 24 hours. These satellites are traveling at speeds of roughly 7,000 miles an hour.

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

GPS satellites transmit two low power radio signals. The signals travel by line of sight, meaning they will pass through clouds, glass and plastic but will not go through most solid objects such as buildings and mountains.

Some factors that can degrade the GPS signal and thus affect the accuracy include the following:

- The satellite signal slows as it passes through the atmosphere.

- The GPS signal is reflected off objects such as tall buildings before it reaches the receiver. This increases the travel time of the signal, thereby causing errors.
- A receiver's built-in clock is not as accurate as the atomic clocks onboard the GPS satellite. Therefore, it may have very slight timing errors.
- The more satellites a GPS receiver can "see", the better the accuracy. Buildings, terrain, electronic interference, or sometimes even dense foliage can block signal reception, causing position errors or possibly no position reading at all. GPS units typically will not work indoors, underwater or underground.

Notes to the text

latitude	*широта*
longitude	*долгота*
altitude	*высота*
booster	*ускоритель*

10.10. Match the words with their definitions.

1. to launch	a. to establish smth. exactly
2. to last	b. the situation when the sun looks like it is completely or partially covered with a dark circle
3. precise	c. to make the quality of smth worse
4. to determine	d. to send a rocket into outer space
5. back up	e. smth that is not correct
6. eclipse	f. to continue in time
7. path	g. a thing that can be used to replace another one
8. solid	h. the area in front of smth that is moving
9. to degrade	i. accurate and exact
10. error	j. firm or hard

10.11. Read the following statements and decide if they are true (T) or false (F).

1. GPS is used only for military purposes.
2. The receiver displays the user's position on the electronic map.
3. To calculate a 3D position the receiver must be locked on to the signal of three satellites.
4. The accuracy of the GPS receiver is far from being high.

5. Backup batteries are used when there is no solar power.
6. Low power radio signals will not pass through solid objects.
7. GPS units operate well in any environment.

10.12. Read the text again and answer the questions.

1. What is the GPS?
2. What is it used for?
3. Do weather conditions affect the GPS operation?
4. How does the unit determine the user's position?
5. What information can GPS unit calculate?
6. How are GPS satellites powered?
7. What is the function of backup batteries?
8. What is the weight and size of a GPS satellite?
9. Do signals from GPS satellite pass through any object?
10. Is there anything that affects the accuracy of the GPS signal? What?
11. Are there any disadvantages of the GPS units? What?

10.13. Translate the sentences into English.

1. Чтобы использовать световые волны для связи, на орбите необходимо устанавливать зеркала или ретрансляционные станции.
2. Радиоволны распространяются по прямой линии.
3. Ионосфера отражает длинные волны.
4. Микроволны не отражаются ионосферой, а проходят через неё.
5. Ученые могут обнаружить нейтрино с помощью телескопов, которые устанавливают под землей.
6. Нейтрино не подвергается воздействию электромагнитных полей.
7. GPS – это система, состоящая из 24 спутников.
8. GPS приемник может определить точное положение пользователя и отобразить его на электронной карте.
9. Сигналы от GPS спутников не могут проходить через высокие здания и горы.
10. Когда сигнал проходит через атмосферу, его скорость уменьшается.

GRAMMAR

Infinitive Constructions

Complex Object and Complex Subject

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

Model: I know **that he is** a great scientist.
I know **him to be** a great scientist.

1. I hate **when you repeat** this nonsense.
2. I expect **that he will understand** your problem and help you to solve it.
3. The teacher wants **that our homework will be prepared** well.
4. We expect **that everybody will be re**ady by seven.
5. I hate **when you do** this work so slowly.
6. I want **that the work will be done** in time.
7. We expect **that you will help** us.
8. He hates **when we play** computer games.

10.15. Point out the complex object in the following sentences and translate them.

1. An engineer wanted the device to be examined in this laboratory.
2. We know electrons to be negatively charged particles.
3. We know the data to be translated into direct distance or range.
4. A scientist said a new device to give a high accuracy.
5. Experts know vacuum tubes to amplify the voltage.
6. We all surprised him to become a good engineer.
7. They considered the idea to be reasonable.
8. We know physical changes to be caused by heat.
9. They assume the information to be correct.
10. He believed the results of this test to have been plotted in the diagram.

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

Model 1: **Scientists consider that his invention is** of great importance.
His invention is considered to be of great importance.

Model 2: It is said **that the book is** popular with both old and young.
The book **is said to be** popular with both old and young.

1. It is expected that some new textbooks will be published soon
   Some new textbooks … soon.
2. Scientists consider that electricity exists throughout space.
   Electricity … throughout space.
3. It is said that radium is very radioactive.
   Radium … very radioactive.
4. They say that he is a good translator.
   He … a good translator.
5. It is expected that this company will pay on time.
   This company … on time.
6. We consider that these devices are very effective.
   These devices … very effective.

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

Model: It seems **that they have heard** all about it.
They seem **to have heard** all about it.

1. It seems **that you don't approve** of the idea.
   You … seem … of the idea.
2. It appeared **that he was losing** patience.
   He appeared … patience.
3. It turned out **that the language of the article was** quite easy.
   The language of the article turned out … quite easy.
4. It happened **that I was present** at the opening session.
   I happened … at the opening session.
5. It turned out **that he was** a good programmer.
   He turned out … a good programmer.
6. It appears that this new method of work **is** very effective.
   The new method of work appears … very effective.
7. It seems **that he is writing** a new article.
   He seems … a new article.
8. It doesn't seem **that she wants to do** anything I suggest.
   She … seem to want … anything I suggest.

10.18. Point out the complex subject in the following sentences, as in the model.

Model: – **They** are expected **to come** to an agreement.

1. The problem is shown to be urgent.
2. The instrument seems to have been tested.
3. The result is certain to be valid.
4. Printers are known to vary greatly in performance and design.
5. The figures are considered to be reliable.
6. The effect is known to be due to radiation.
7. The results are reported to contradict the idea.
8. He is known to be a good specialist.
9. The article is said to have become the scandal of the week.
10. In ancient time the Earth was thought to be motionless.

Infinitive Construction with *for*

10.19. Translate the following sentences. Point out the infinitive construction with *for*.

Model: – This question is easy enough **for me to solve**.

1. This situation is too complex for us to understand.
2. This work is simple enough for him to do.
3. This equation is too difficult for me to solve.
4. There is no reason for computer experts to use computers of the first generation nowadays.
5. For these experiments to be meaningful the observations must be made at regular intervals.
6. For me to learn to speak English fluently is not easy.
7. The text was very interesting but rather difficult for the students to translate it without a dictionary.
8. For the results to be valid our technique should be used in combination with statistical analysis.

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

1. We know silver to be the best of conducting materials.
2. We expect the article to be published next year.
3. We want them to receive this information as soon as possible.
4. The only thing for you to do is to use the microscope.

5. We are sure this work to be completed in a month.
6. Our professor wants us to use these data.
7. For the decision to be correct all the facts must be taken into consideration.
8. These elements are known to have been found two decades ago.
9. Semiconductors are shown to be good detectors of radio waves.
10. This engineer appears to have presented some interesting data.
11. The origin of the word “robot” is said to have appeared first in a play of a Czech playwright Karel Capec.
12. The improvement of the technological processes is supposed to ensure lower cost of power.
13. Long transmission lines are known to be necessary for the transfer of electric energy over long distances.
14. Some types of reactors are known to produce more nuclear fuel during their operation than they consume.
15. Infrared rays emitted by an object on the road are to be intensive enough for sensors to pick them up.
16. High temperature alloys make it possible for jet engines to be operating under severe conditions for a long period of time.
17. Scientists expect lasers to solve the problem of controlled thermonuclear reaction.
18. Japanese designers believe a new ceramic engine to replace the conventional one.
19. We know the first digital optical discs to have been produced in 1982 as discs for music.
20. The students are waiting for the lecturer to describe the properties of a new composite material.
21. A system of satellites is provided for people to watch the central TV program.
22. Intensive research on optical electronic computer is said to be going on in a number of US companies.
23. A method for recording information on crystal by means of laser is known to have been developed by a Russian researcher.
24. Optical technology has been found to be cost-effective.
25. About 50 per cent of Lake Baikal water proves to have been polluted since the Baikal plant has begun its work.
26. Lasers appeared to be highly useful for solving the problem of controlled thermonuclear reaction and communication.
27. A system of Earth satellites appears to have solved the problem of transmitting the central TV program to any part of the world.

28. Electricity proved to be able to travel instantly over a long piece of wire.
29. A new manned craft is reported to be able to submerge to the depth of 21,000 feet.
30. Radio navigation stations are known to be located all over the world to guide the pilots.
31. The phenomenon of superconductivity appears to have been discovered as early as 1911.
32. M. Faraday supposed a light beam to reverse its polarization as it passed through a magnetized crystal.
33. A Dutch physicist found a superconducting material to return to normal state when a strong magnetic field was applied.
34. Properties of materials obtained in space prove to be much better than those produced on Earth.
35. There are prospects for lasers to be used in long distance communication and for transmission of energy to space stations.

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**	
me – him – her – it	*мне (меня), ему (его), ей (ее), ему (его)*	**there was – there were**	
us – you – them	*нам (нас), вам (вас), им (их)*	**there will be**	

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

can	*могу, умею (для всех лиц и чисел)*	**though (although)**	*хотя*
(could),	*(мог, умел)*		
may	*могу (можно),*		
(might)	*может быть*		
be able to,	*мочь, быть*	**because**	*потому что*
must,	*способным,*		
need	*должен нужно*		
that	*тот, что, который*	**as**	*как, так как*
what	*что, какой*	**for**	*для, в течение, так как*
who	*кто, который*	**since**	*с, так как*
which	*который*	**before**	*до; перед тем как*
while	*в то время как (когда)*	**after**	*после; после того как*
when	*когда*	**where**	*где*
whether	*ли*	**why**	*почему, зачем*
if	*если*	**how**	*как*
whereas	*в то время как, когда*	**how many (much)**	*сколько*

Exercise 1. 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.

Exercise 2. Read and translate the following words.

That, what, who, which, while, when, how, whether, if, where, whereas, though, because, as, since, before, after, where, if, how many, whether, when, while, which, who, what, that, since, as, for, after, before, although, whereas, how, why, if, that, which, where, when, whether, since, as, for, what, because, while, though, after, if, whereas, although, when, that, why, how many.

Exercise 3. Read and translate the following words.

As, can, that, if, what, because, was able to, since, how, though, must, whether, could, if, where, for, might, need, when, while, could, which, whereas, because, is able to, after, could, as, must, that, can, though, might, while, how, whether, since, as, for, why, how many.

Exercise 4. 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. I can go by bus or I can walk.
6. You may come in.
7. We can take this book from the library.
8. She can't do this work in time.
9. They must go to Moscow for a few days.
10. We were able to read this article without dictionary.
11. Everyone must know a foreign language.
12. He could do this work without any help.
13. Students may ask a lot of questions after the lecture.
14. You couldn't translate the text as it had many new words.
15. You may enter any university in our country after you finish school.
16. This subject is very important for our future speciality.
17. You must pass all the exams well to enter the university.

Exercise 5. 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. To make supercomputers we need highly developed electronics.
6. We may communicate over long distances with the help of satellite systems.
7. People couldn't solve many complex engineering problems without computers.
8. You may take part in our discussion.
9. We must make a report on the results of his calculations.
10. Ultraviolet radiation may produce ionization.
11. We must measure the distance between the elements.
12. After the invention of engine the first industrial revolution started.

13. He says that the graduates must be able to work with the technology of tomorrow.
14. New robots will have some manipulators that will carry out many functions.

Exercise 6. Translate the sentences from Russian into English.

1. Он может читать и писать по-английски.
2. Она должна сделать эту работу в конце месяца.
3. Теперь студенты могут войти в аудиторию.
4. Он должен прочитать эту статью.
5. Можно мне взять ваш учебник?
6. Я должен пойти в библиотеку и взять книги.
7. Этот ребенок умеет ходить?
8. Вы должны вернуть книгу завтра.
9. Вы можете закончить эту работу завтра.
10. Статья должна быть напечатана в газете.
11. Они могли узнать об этом изобретении.
12. Я не могу больше ждать, я должен идти. Вы тоже можете идти домой.
13. Можно нам присутствовать на конференции? – Конечно!
14. Студенты могли продолжить эту интересную работу.
15. Модель может и не иметь этих свойств, но это надо проверить.
16. Их работа может стать основой для новой отрасли науки.
17. Они должны работать в очень трудных условиях.

Exercise 7. Read and translate the text.

Physics is the science that studies different phenomena in nature. Its object is to determine exact relations between physical phenomena. There are two great branches in physics: experimental and theoretical. The task of the experimental branch is to make observations and carry out experiments. On the basis of the experimental facts theoretical physics formulates laws and predicts the behavior of natural phenomena. Every law is based on experiments. Scientists all over the world do their best to find answers to many unsolved problems.

LESSON 3

Prepositions

Cases		Place and movement	
of	*кого, чего*	**in**	*в*
for	*для*	**on**	*на*
to	*кому*	**to**	*к*
by	*кем, чем*	**from**	*из, от*
with	*чем, с*	**into**	*внутрь*
without	*без*	**out of**	*изнутри*
about	*о*	**near (at)**	*рядом (у)*
Time		**behind**	*позади*
by	*к*	**over**	*выше*
at	*в*	**below**	*ниже*
before	*перед (тем как)*	**above**	*над*
after	*после (того как)*	**under**	*под*
since	*с*	**across**	*поперек*
till (until)	*до*	**along**	*вдоль*
during	*в течение*	**around**	*вокруг*
for	*во время*	**against**	*напротив*
within	*в рамках*	**among**	*среди*
in 2010, **in** winter, **in** May		**between**	*между*
on Monday, **on** the 1st of May			
in the morning / evening / afternoon		**Cause**	
at (mid)night		**because**	*потому что*
in a day		**because of**	*из-за*
for a week		**since, as, for**	*так как*

Exercise 1. 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 2. 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 the concentration, at a speed, at the angle, at the pressure, at the energy, at a frequency, at a point, at the altitude, under the action of, under (in) some conditions, under (in) vacuum, in contrast to, in fact, on the basis of, as a result, under the load, in the region of spectrum.

Exercise 3. Read and translate the following words.

Where, the, thirty, doing, whereas, those, fiftieth, though, no, him, having, second, because, can, there is, another, why, seventeenth, as, there was, it, to, of, eighth, before, has, out of, whether, may, them, few, for, when, had, by, while, with, such, no, within, during, because of, how, first, that, will, near, on, some, their, at, fourth, them, had, other, his, above, below, how many, under, of, why, one hundredth, more, least, him, twelfth, less, although, most, its, must, was able to, it, done, there were, fifteenth, when, why, in the afternoon, how, in July, in winter, in 2050, in five years, on the thirtieth of August, on Sunday, at nine o'clock, at night, by the evening, for a day, in the picture, at speed of, in fact, as a result.

Exercise 4. Translate the following word-groups into English.

На занятиях, на собрании, у доски, учиться в университете, идти в институт, утром, летом, в аудитории, через день, в четыре часа, на улице, на заводе, в сентябре, пятнадцатого октября, днем, в воскресенье, первого января, во время экзаменов, в течение года, из университета, в библиотеку, к концу семестра.

Simple Tenses

Present Simple	Past Simple	Future Simple
always…never, twice a week, every *day/week/year/Monday*	yesterday, last Monday / *week / month* in *2010 / May*, when I **was** *10 / in Japan*	tomorrow, next *Monday /week / month/year*
S + V(s)*	**S + Ved/2**	**S + will V**
I **go** to the cinema *every week*. (He go**es**…)	I **went** to the cinema *yesterday*. I **played** tennis in 2009.	I **will go** to the cinema tomorrow (if I have time)*
Do / Does + S + V?	**Did + S + V?**	**Will + S + V?**
Do you **go** to the cinema every week? Yes, I **do**. /No, I **don't**. (**Does** he **go**…? – Yes, he **does**. / No, he **doesn't**.)	**Did** you **go** to the cinema yesterday? Yes, I **did**. / No, I **didn't**.	**Will** you **go** to the cinema tomorrow? Yes, I **will**. / No, I **won't**.
S + don't / doesn't + V.	**S + didn't + V.**	**S + won't + V.**
I **don't go** to the cinema every week. (He **doesn't go**…)	I **didn't go** to the cinema yesterday.	I **won't go** to the cinema tomorrow.

Exercise 5. Put the following sentences into negative and interrogative forms.

1. You **speak** English well.
2. These students **live** in a hostel.
3. His brother **studies** at the University.
4. The teacher **delivers** lecture on mathematics.
5. She **is** a first-year student.
6. Students **make** a new experiment.
7. They **study** hard.
8. We **work** at the laboratory.
9. He **studied** at school last year.
10. They **got** all the necessary things.
11. We **were** at the University museum yesterday.
12. My brother **became** an engineer two years ago.
13. Her parents **graduated** from the University.
14. The engineers **worked** in the field of nuclear physics.

15. The students **asked** many questions at the lesson.
16. On Sunday I **got up** at 10 o'clock.
17. Our lectures **begin** at 9 o'clock.
18. We **were** schoolchildren last year.
19. We **had** four entrance exams in summer.
20. Yesterday the first-year students **saw** the institute laboratories.

Exercise 6. Put the questions to the underlined words or word-groups.

1. The students make various experiments at the laboratory.
2. The teacher holds seminars on history.
3. There are twenty students in our group.
4. Many students of our group live in the hostel.
5. They studied at school last year.
6. We went to the lecture in the morning.
7. The academic year starts in September.
8. There are six universities in Tomsk.
9. My parents graduated from the University twenty years ago.
10. These engineers worked in the field of electronics.
11. The students asked many questions at the lesson.
12. On Sunday he gets up at 9 o'clock.
13. Mendeleyev arranged the elements into the system according to their atomic weights.
14. He took his examination last week.
15. We carried out research at the laboratory of our University.
16. This student knows physics very well.
17. We go to the University on foot.
18. He studies many special subjects at the University.
19. There were only a few students in the laboratory.

Exercise 7. Answer the following questions.

1. Do you work or study?
2. Where do you study?
3. What University do you study at?
4. What is your speciality?
5. Where does your friend study?
6. What foreign language does your group study?
7. What subjects do you like?
8. Do you study well?
9. Where do you live?

10. When do you get up?
11. When do your lessons begin?
12. Do you go to the University on foot?
13. What subjects do you study?
14. Are you a second-year student?
15. Do you like music?
16. What is your mother?
17. Did you pass your entrance exams well?
18. Do your parents live in Tomsk?
19. Do you live far from the University?
20. How do you get to the University?
21. Why do you study at the University?

Exercise 8. Read and translate the text.

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.

LESSON 4

thus	*таким образом*	**yet**	*еще*
then	*затем, тогда*	**still**	*все еще*
than	*чем (сравнение)*	**also**	*также*
rather than	*а не*	**so**	*так; поэтому*
however	*однако*	**almost**	*почти*
both	*оба, пара*	**always**	*всегда*
both … and	*как ... так; и ... и*	**recently**	*недавно*
either … or	*или ... или*	**the only**	*единственный*
neither … nor	*ни ... ни*	**once**	*однажды*
as many as	*так много, как*	**at least**	*по крайней мере*
as well as	*так же, как*		

Exercise 1. Read and translate the following words.

At least, thus, then, however, still, yet, than, also, rather than, so, however, almost, both, always, both …and, recently, either …or, the only, neither …nor, once, as well as, at least, as many as, thus, than, however, both …and, neither …nor, as well as, at least, the only, recently, so, also, still, then, rather than, either …or, almost, once, thus.

Exercise 2. Read and translate the following words.

More, still, them, doing, also, first, both …and, out of, so, to, either …or, almost, such, fifth, neither …nor, as many as, every, recently, our, as well as, the only, ninth, once, at, at least, by, why, how, how much, where, while, thus, few, then, there were, having, below, rather than, behind, as, for, since, that, us, there will be, was, what, under, of, because, with, during, because of, at least, least, most, less, might, was able to, other, their, eighteenth, although, did, yet, as well as, which, how many, without, across, whereas, its, must, around, it, however, the only.

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, -at***
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 3. Read and translate the following words.

Movement, statement, economist, electronics, biology, physical, religious, variable, powerful, useful, noiseless, identify, lighten, accumulate, unimportant, invisible, disconnect, organize, defreeze, reproduce, counterrevolution, supersensitive, dependence, independently, conversion, transformation, future, equipment, disadvantage, peaceful, hopeless, weightless, decompose, elementary, composition, conductivity, investigator, weightlessness, stimulate, nationalize.

Exercise 4. Fill in the blanks with the appropriate question words.

1. … do you live?
2. … do you go to the University?
3. … do your friends do at the University?
4. … books do you like to read?
5. … many students work at the laboratory?
6. … do you go after lessons?
7. … is your friend's name?
8. … students are there in your group?
9. … did the students work at the laboratory?
10. … do you study at the University?
11. … did you study at school?
12. … can answer my question?
13. … don't you know the rule?
14. … were you born?
15. … did you go yesterday?
16. … did you and your friends spend your summer holidays?
17. … delivers lectures to you on mathematics?
18. … subjects do you like?
19. … will you do next summer?
20. … do you get up on weekdays?

Exercise 5. Put the general questions to the following sentences.

1. They did many interesting things last weekend.
2. He works at his report every day.
3. They will come to see you soon.
4. The students asked the lecturer many questions.
5. There is a computing centre in our University.
6. The students can take part in scientific conference.
7. Higher education is very important for a person.
8. A lab assistant shows the equipment to the students.
9. Practice accompanies theory.
10. Our teacher taught us to use the lab equipment.
11. He will deliver his report at the international conference.
12. They invited me to visit their new hostel.
13. Universities develop new methods of students' training.
14. The study of foreign languages is of great use for the specialists.
15. There are seven faculties in our University.

Exercise 6. Fill in the blanks with the appropriate prepositions.

1. He writes … a chalk on the blackboard.
2. Students … our group take part in different competitions.
3. He went … his friend … the dean's office.
4. They know everything … me and my friend.
5. Take your books … your bags and put them … the table.
6. The academic year begins … September.
7. We have no lessons … Sunday.
8. The academic year begins … the first of September.
9. First-year students may take the textbooks … the library.
10. We live … Tomsk.
11. Usually I go … bed … midnight.
12. We are students … radioengineering faculty.
13. There are some new hostels not far … our University.
14. There are three rooms … our flat.
15. He enters the room and sits down … the chair … the table.
16. … the evening we watch TV or read books.
17. The accident happened … night.
18. Usually I get … the University … bus.
19. We will graduate … the University … five years.
20. The course … study lasts five years.
21. Higher education is necessary … further development … the country.
22. Entrance exams are held … summer.

Exercise 7. Translate the text.

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.

LESSON 5

V1	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	**(will) be + $V_{ed/3}$**
$V_{ed/2}$ делал **$V_{(s)}$ делаю(-ет)** **will V будет делать**	**was (were) + $V_{ed/3}$ делалось** **am (is, are)+ $V_{ed/3}$ делается** **will be + $V_{ed/3}$ будет делаться**
Progressive (Continuous)	
(will) *be* + V_{ing}	***be* + being+ $V_{ed/3}$**
was (were) + V_{ing} делал **am (is, are)+ V_{ing} делаю (-ет)** **will be + V_{ing} будет делать**	**was (were) + being + $V_{ed/3}$ делалось** **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 **have (has) + $V_{ed/3}$ сделал** **will have + $V_{ed/3}$ сделает**	**had + been + $V_{ed/3}$ было сделано** **have (has) + been +$V_{ed/3}$ было сделано** **will have + been + $V_{ed/3}$ будет сделано**

Exercise 1. Put the right pronouns instead of numbers and translate into Russian.

1 was decided, 2 will be decided, 3 had decided, 4 will decide, 5 is decided, 6 has been decided, 7 will have decided, 8 decided, 9 was being decided, 10s are deciding, 11 will have been decided, 12s were decided, 13 has decided, 14 decides, 15s are being decided.

Exercise 2. Put the right pronouns instead of numbers and translate into Russian.

1 have read, 2s were being read, 3 is reading, 4 has been read, 5 will be read, 6 reads, 7 read, 8 will have been read, 9s were reading, 10 is read.

Exercise 3. Put the right pronouns instead of numbers and translate into Russian.

1 have been written, 2 wrote, 3 was writing, 4 have written, 5 writes, 6 will be written, 7 were writing, 8 is being written, 9 will have written, 10 will write.

Exercise 4. Put the right pronouns instead of numbers and translate into Russian.

1 calculate, 2s are being calculated, 3 calculated, 4 will have been calculated, 5 will be calculating, 6s are calculated, 7 calculates, 8 has calculated, 9 will calculate, 10 will have calculated, 11 was calculated, 12s are calculating, 13 calculate, 14s have calculated, 15 is being calculated.

Exercise 5. Read and translate the following word-groups.

Scientists are developing, they were obtaining, the device was produced, a new radio set was demonstrated, the results are being calculated, 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, the invention has influenced, physics is studying, the operation was being controlled, the scientist discovered, the observation shows, the current is being rectified, 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 6. Fill in the blanks with the words given in the right column.

1.	A new experiment in physics … made in our laboratory now.	was
2.	When I came in the last student … examined.	will have been
3.	New equipment … installed in our University last week.	were
4.	These electronic devices … produced by the end of the year.	is being
5.	The scientists … working at the design for two months.	are
6.	Diodes … used as detectors and rectifiers.	will be
7.	The results of their research … discussed next week.	was being

Exercise 7. Read and translate the following sentences.

1. The output of the factory will be growing during the next decade.
2. Scientists are using the energy of atom in various spheres of life.
3. The engineers were attaching the wires to the devices when I came in.
4. When we listen to a radio program we use the rays that are called radio waves.
5. The scientist was solving a new problem when we visited the laboratory last week.
6. My friend is writing an article for the newspaper.
7. The student was carrying out the experiment for twenty minutes.
8. Molecules in gas are constantly moving.
9. The electron is circling in an orbit around a nucleus.
10. He understood the text after he had read it again.
11. He will have finished his work by the end of the week.
12. The operator will have recorded the data before you come.
13. I have not seen him since he graduated form the university.
14. We will have completed our experiments by the next month.
15. They have accepted the scientist's suggestion.
16. The apparatus used in our research has been described recently.
17. Many difficulties had been overcome before the researcher succeeded in his work.
18. After the new device had been tested it was installed in our laboratory.
19. The construction of this television center will have been completed soon.
20. We analyzed the data that have been obtained by our investigators.

Exercise 8. Read and translate the text.

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.

LESSON 6

Revising Tenses

Exercise 1. Put the correct pronouns instead of numbers and translate into Russian.

1 have divided, 2 will divide, 3 will have been divided, 4s were divided, 5 is being divided, 6 is dividing, 7s are divided, 8 divided, 9 had divided, 10 will be divided, 11s were dividing, 12 will divide, 13 divides, 14 has divided, 15 will have divided.

Exercise 2. Read and translate the following sentences.

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.

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.

Exercise 3. Read and translate the following word-groups.

The century began, they are obtaining, the satellite was on its orbit, a new radio set was demonstrated, new results are being obtained, the methods have been developed, the observation has shown, the scientist was applying, the question has been solved, the error will have been determined, the property differed, the engineer is measuring, the student has written, the concept explains, the energy had been converted, the discovery depended, the particle will be divided, physics is studying, power plants were being controlled, the data will be tested.

Exercise 4. 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. For twenty minutes the air in the laboratory was being purified by two ventilators.
5. The solar battery is converting the energy of sun rays directly into electric energy.
6. The experiment was being carried out under low pressure.
7. For a long time the electronic devices were being used for control.
8. Scientists and engineers are developing new types of electronic and cybernetic devices.
9. We were looking for a more simple method of solution but couldn't find it.
10. The engineers will discuss the advantages of this new system.
11. Our laboratory is housed in an old building.
12. In our country great progress has been achieved in developing all branches of science and engineering.
13. Many different devices have been produced in order to improve the quality of communication.
14. The information has been based on the data received from a computer.
15. Much research has been carried out in order to establish the causes of this phenomenon.
16. This question has already been discussed at the scientific conference.
17. By the end of the year various semiconductor devices will have been produced.
18. That equipment had been repaired before you came.
19. This text has just been translated.
20. Mendeleyev's periodic law has been accepted as a universal law of nature.

Exercise 5. Translate the following sentences from Russian into English.

1. Опыты показывают, что в металлах есть много свободных электронов.
2. Электрический ток в металлах представляет собой движение свободных электронов.
3. Ученые используют лазер в промышленности и медицине.
4. Протон имеет античастицу, которая несет отрицательный заряд.

5. Ученые достигли больших успехов в области развития электроники.
6. Электроника используется в промышленности для автоматизации и управления.
7. Электронные приборы помогают решать сложные проблемы.
8. На конференции будет обсуждаться проблема использования лазеров для связи.
9. Электронные приборы контролируют работу спутников и автоматических станций.
10. Ученые заметили, что электрический ток создает магнитное поле.
11. Через неделю они будут испытывать машину, сконструированную нашими инженерами.
12. Звук – это колебания среды, в которой он распространяется.
13. Ученые провели много экспериментов по применению ультразвука в промышленности.

Exercise 6. Translate the text.

Radio waves are the longest waves in the family of electromagnetic waves. Their wavelengths range from about three hundredth of a centimeter to about 300 kilometers. Radio broadcasts today are made by two different methods known as AM (amplitude modulation) and FM (frequency modulation). The frequencies of the waves are expressed in kilocycles or megacycles.

Microwaves are the smallest radio waves. In the spectrum of electromagnetic waves they lie between infrared rays and the long radio waves. The shortest microwaves have a wavelength of about three hundredth of a centimeter and a frequency of one million megacycles. The longest microwaves have a wavelength of about three meters and a frequency of one hundred megacycles.

The first microwaves were the two-foot waves produced by Heinrich Hertz. But they were not widely used in practice because long waves were easier to produce and send out over long distances. Scientists returned to the use of short waves during World War II. They tried to solve a problem “How can you detect an approaching enemy plane while it is far away?” The answer to the problem was to send a beam of radio waves. Long radio waves could not be used for this purpose because they fan out too quickly from the antenna. Very short waves were necessary for the work of radar system. So new transmitters and receivers were designed to make and use microwaves.

Exercise 7. Answer the questions to the text.

1. What is the wavelength of radio waves?
2. What are microwaves?
3. Where do they lie in the spectrum of electromagnetic waves?
4. What wavelength do they have?
5. Who produced the first microwaves?
6. What is Hertz?
7. Can we use long waves to detect a plane? Why?
8. Why did scientists use short waves during World War II?

LESSON 7

Participle I, Participle II (Simple forms)

Exercise 1. Read and translate the following sentences.

1. The students studying at the universities passed entrance exams well.
2. The subjects studied in the first two years are very important for future engineers.
3. The lecture delivered by the professor was on new methods of technology.
4. The man delivering this lecture is the dean of our faculty.
5. An article discussing the new system of school education appeared in all newspapers.
6. The results of the experiments discussed yesterday will be published next week.
7. The attention paid to the study of fundamental subjects is great.
8. Students interested in computer engineering enter technological universities.
9. The number of specialists connected with new branches of science and engineering grows every year.

Exercise 2. Read and translate the following sentences.

1. More than one hundred years have passed since the day when A.S. Popov demonstrated his radio receiver.
2. The problem of radioactivity is very important for our research.
3. Since you were not at the meeting, we took the decision without you.
4. We must be very attentive in experimenting for the accuracy is necessary here.
5. I haven't seen my friend for more than five years.
6. The discovery of atomic energy is as important as the discovery of fire.
7. Scientists couldn't discover the secret of the atom for a long time.
8. Franklin is respected both as a scientist and a progressive political leader.
9. As we know there is neither air nor water in any part of the Moon.
10. The laboratory is the place where experiments as well as scientific research may be carried out.

11. After the international conference on ecology, they began working at environmental problems.
12. Electricity has replaced other sources of energy as it offers improved service and reduced cost.
13. Electricity is widely used in industry as well as in our houses.
14. It was necessary to lay cables across the Atlantic Ocean as there was no radio or satellites at that time.
15. Because of the earth's rotation there are days and nights on the earth.
16. He was the only person who could help us to solve this problem.
17. They were making their experiment for three hours.
18. They can't use this device as it is out of date.
19. They couldn't start their experiment for the equipment was not prepared.
20. We use transistors since they are smaller and lighter.

Exercise 3. Choose the correct variant.

1. The service area of this transmitter (*ограничивалась*) to a radius of 25 to 50 miles.
   a) is limited
   b) was to limit
   c) was limited
   d) limited
2. The signal received by the antenna (*будет передаваться*) to the radio receiver.
   a) will transmit
   b) is transmitted
   c) will be transmitted
   d) transmitted
3. Radio frequency output of the first stage (*смешивается*) with the output of the local oscillator.
   a) is to be mixed
   b) mixed
   c) will be mixed
   d) is mixed
4. The video signal (*необходимо усилить*) by several stages of video amplification.
   a) is to be amplified
   b) was amplified

c) to be amplified
d) will amplify

5. A wide range of functions (*выполняется*) by the laser.
   a) perfom
   b) is performed
   c) performed
   d) is to perform
6. Transistors (*делаются*) from germanium or silicon.
   a) to make
   b) are made
   c) were made
   d) make
7. These programs (*выполняют*) logical and mathematical operations.
   a) are performed
   b) perform
   c) will perform
   d) are to perform

Exercise 4. Read and translate the following sentences.

1. Some other planets of our solar system are being investigated by our scientists.
2. Much preparatory work had been done before they could obtain satisfactory results.
3. A report on different kinds of radiation will have been prepared by the next scientific conference.
4. The new equipment had been carefully tested before it was used in the plant.
5. Two wires were placed parallel to each other and the current was passed through one of them in order to find a current in the other.
6. These phenomena have already been investigated and they will be discussed later.
7. We used different types of measuring devices in our research.
8. By the end of the year all the experiments necessary for the completion of our research will have been made.
9. Automation is being widely used in space research.
10. Satellites are equipped with solar batteries and various accurate instruments.

11. Experiments are carried out in many laboratories in order to increase the efficiency of energy conversion.
12. In our scientific age great progress is being made in the study of semiconductor devices.
13. Electronics is becoming very important to engineers working in various branches of industry.
14. We must study the design of these units in order to understand them and to learn to control them.

Exercise 5. Translate the sentences from Russian into English.

1. Я не видел его вчера, но видел его друга.
2. На прошлой неделе её навестили её друзья.
3. Я хочу показать им их новую лабораторию.
4. Преподаватель объяснил им их ошибки.
5. Мы любим свой университет. Он новый и красивый. Его выпускники работают во многих городах страны.
6. Она помогает своему брату по физике, а он помогает ей по истории.
7. Я не вижу свою книгу. Куда я положил её?
8. Она взяла его портфель и отдала его его товарищу.
9. Мы проводили свои исследования в лаборатории.
10. Университетская газета писала о них и об их достижениях.
11. У нас не будет лекций вечером.
12. В следующем месяце мы переедем в новую квартиру, и я буду ходить в институт пешком.

Exercise 6. Read and translate the following sentences paying attention to modal verbs.

1. Electrons can be removed by the application of a very high electric field.
2. Although the methods by which electrons may be obtained have been considered the remaining two questions have still to be answered.
3. A stream of electrons may be regarded as a large number of small particles moving in the same direction.
4. In order to overcome this limitation plasma generated by a radio frequency oscillator could be used as the source of helium ions.
5. These materials can reflect light well.

6. Engineers had to prepare detailed drawing according to which a machine could be made.
7. In many cases man-made satellites may be used instead of natural ones.
8. They will not be able to continue their work because there are not enough data.
9. Students may consult dictionaries while translating the text.
10. May we use the data obtained by the other group?
11. A transformer can not be called a machine for it has no moving parts.
12. You won't be able to control the temperature all the time.
13. A good engineer must know many other things besides the theoretical knowledge he gets at the university.
14. The flights have proved that a man can live and work in space.
15. We are to take certain steps to reduce the weight of the mechanical part.
16. Nuclear energy may be used to light and heat our houses.
17. Vacuum tubes are able to convert alternating current into direct current.
18. Very difficult calculations in mathematics and electrical engineering must be solved by computers.
19. Without a computer scientists will not be able to solve complicated problems.
20. Scientists of different countries must cooperate in their research and peaceful application of their discoveries.
21. You must take into consideration all the advantages and disadvantages of this device for the future work.
22. Our work must have been completed by the next conference.
23. Some day atomic energy might have been used to control the weather on the planet.

GRAMMAR REFERENCE

Unit 1.

ARTICLES, PRONOUNS, THE VERB *TO BE*, THE VERB *TO HAVE (GOT)*, PLURALS, POSSESSIVE CASE

Неопределенный и определенный артикли (Articles *a (an) / the*)

Неопределенный артикль **a(an)** произошел от слова **one** (один) и поэтому употребляется только с исчисляемыми существительными, стоящими в единственном числе. Он имеет две формы: **a** перед словом, начинающимся с согласного звука, например: **a dog**, и **an** перед словом, начинающимся с гласного звука: **an apple.**

У определенного артикля только одна форма – **the**. Данный артикль произошел от указательного местоимения, поэтому в некоторых случаях его можно ассоциировать со словами *этот, эта, это, эти* (и их падежными формами). Определенный артикль употребляется с существительными в единственном и множественном числе.

Неопределенный артикль употребляется, когда мы сообщаем факт, какую-то новую информацию, например:

I see **a** man in the street. — Я вижу (какого-то) человека на улице.

Следует иметь в виду, когда сообщенная информация уточняется, употребляется определенный артикль.

The man I see is your brother. — Человек, которого я вижу, – твой брат.

Неопределенный артикль не употребляется:

- С неисчисляемыми и «абстрактными» существительными
  I like cheese and milk. — Я люблю сыр и молоко.
- С существительными во множественном числе
  There are people in the street. — На улице есть люди.
- С именами собственными
  John is my husband. — Джон – мой муж.
- С существительными, перед которыми стоят притяжательные или указательные местоимения
  His car is in the garage. — Его машина в гараже.
- С существительными, за которыми следует количественное числительное, обозначающее номер
  Mary lives in apartment seven. — Мэри живет в седьмой квартире.

Определенный артикль употребляется:

- Когда говорящему и слушающему известно (из контекста, из окружающей обстановки и т.д.), о каком предмете (предметах, явлении) идет речь

  Open **the** window, please — Открой (это) окно, пожалуйста.

- Когда речь идет об уникальном, единственном в своем роде предмете или явлении

  The sun is shining brightly. — Солнце светит ярко.

- В словосочетаниях типа **in the east**, **to the south**, **at the theatre**, **the same**, **in the country**.

  We were at **the** theatre yesterday. — Вчера мы были в театре.

- Когда существительное имеет ограничивающее определение, чаще всего с предлогом **of**

  I don't know **the** name of this street. — Я не знаю названия этой улицы.

- Если перед существительным стоит прилагательное в превосходной степени

  He is **the** best student in our group. — Он самый лучший студент в нашей группе.

- Перед порядковыми числительными

  My birthday is on **the** fifth of April. — Мой день рождения пятого апреля.

С географическими названиями, как и с прочими собственными именами, артикль, как правило, **не употребляется**, кроме следующих случаев:

- С названиями океанов, морей, рек, горных хребтов, групп островов

  the Thames, the Alps — Темза, Альпы.

- С названиями ряда стран и областей (хотя обычно с этими существительными артикль не используется)

  the Ukraine, **the** Crimea — Украина, Крым

- С названиями стран, имеющих в своей номенклатуре уточняющие слова (republic, federation, states, etc.)

  the United States of America (**the** USA) — Соединённые Штаты Америки (США)

Множественное число (Plurals)

Все существительные делятся на две основные категории: имена собственные, т.е. имена и фамилии, названия стран, городов и т.д., которые всегда пишутся с большой буквы (например: **America, John**); и нарицательные (**a pen** – ручка, **silver** – серебро). Последние, в свою очередь, подразделяются на **исчисляемые** (**countable nouns**), т.е. те, которые можно сосчитать (**a pen – pens**) и **неисчисляемые** (**uncountable nouns**): **silver**.

Стандартные способы образования множественного числа (Regular Plurals)

Исчисляемые существительные, как правило, имеют форму единственного и множественного числа. В единственном числе они не имеют никаких окончаний.

Множественное число существительных образуется путем прибавления к основе окончания **-s**, которое произносится как **[z]** после гласных: **a boy** – **boys**, и звонких согласных: **a girl** – **girls**, и как **[s]** после глухих согласных: **a parent** – **parents**.

Окончание **-es**, которое читается как **[ɪz]**, добавляется в следующих случаях:

- после шипящих и свистящих звуков: **an address – addresses**;
- если форма единственного числа оканчивается на букву **-o**, которой предшествует согласная: **a potato – potatoes**.

Исключения: **a piano** – **pianos**, **a solo** – **solos**, **a photo** – **photos**, **radio** – **radios**, **studio** – **studios**.

Существительные, форма единственного числа которых оканчивается на **-y**, следующую за согласной, подвергаются во множественном числе некоторым изменениям: буква **y** переходит в **i**; слово принимает окончание **-es**: **a family** (семья) **– families**.

В существительных, оканчивающихся в единственном числе на **-f, -fe**, в ряде случаев во множественном числе **-f**, **-fe**, переходят в **-ves**: **a wife – wives**, **a scarf – scarves**.

Исключения: **a chief** – **chiefs**, **a roof** – **roofs**.

Нестандартные способы образования множественного числа (Irregular Plurals)

Ряд существительных образует множественное число не по общим правилам.

- Изменяется корневая гласная (или гласные): **a man – men**, **a woman – women**, **a tooth – teeth**, **a goose – geese**, **a foot – feet**, **a mouse – mice**.
- Добавляется окончание **-en**: **an ox – oxen**; **a child – children**.
- Не подчиняется правилу образование множественного числа существительного **a person – people**.
- Форма множественного числа совпадает с формой единственного числа: **an aircraft – aircraft**, **a sheep – sheep**, **a swine– swine**, **a fish – fish**, **a deer – deer**.
- Заимствуются формы единственного и множественного числа из латинского и греческого языков: **an analysis – analyses**, **a basis – bases**, **a crisis – crises**, **a thesis – theses**, **a criterion – criteria**, **a datum – data**, **a phenomenon – phenomena**.

Некоторые существительные имеют только единственное число: **money**, **fruit**, **progress**, **advice**, **information**, **news**, **knowledge**, **furniture**, **luggage**, **peace**, **love** , **hair**.

Только во множественном числе употребляются:

- обозначения предметов, состоящих из двух и более частей: **trousers**, **jeans**, **shorts**, **glasses**, **scissors**;
- собирательные существительные: **police**;
- **clothes**, **goods**, **riches**, **manners**, **thanks**.

Притяжательный падеж (Possessive Case)

Притяжательный падеж (Possessive Case) соответствует родительному падежу в русском языке. Существительное в притяжательном падеже является определением к другому существительному, перед которым оно стоит. Оно выражает принадлежность предмета или его отношение к другому предмету, т.е. практически заменяет оборот с предлогом **of**. Притяжательный падеж образуется путем прибавления знака апострофа **(')** и окончания **-s** к существительному. Как правило,

в форме притяжательного падежа употребляются существительные, обозначающие одушевленные предметы.

Притяжательный падеж существительных в единственном числе образуется путем прибавления к ним окончания **-'s**:

his **son's** name — имя его сына
(= the name **of** his son)

При наличии двух и более подлежащих апостроф ставится только после последнего.

Diana and Richard**'s** brother — брат Дианы и Ричарда
(= the brother of Diana and Richard)

Притяжательный падеж существительных, во множественном числе оканчивающихся на **-s**, образуется прибавлением к ним знака апострофа (**'**):

his **sons'** names — имена его сыновей
(= the names of his sons)

Притяжательный падеж существительных, не имеющих во множественном числе окончания **-s** (**men**, **women**, **children)**, образуется, как в единственном числе, путем прибавления окончания **-'s**:

his children**'s** names — имена его детей
(= the names of his children)

Существительное в притяжательном падеже может быть заменено соответствующим притяжательным местоимением.

She is **Dan's** girlfriend = She is **his** girlfriend.

Следует различать притяжательную **'s (')** и показатель множественного числа **-s**:

Their **friends'** room is good. — Комната их друзей – хорошая.
They are good **friends.** — Они – хорошие друзья.

Не путайте притяжательную **'s** с сокращенной формой глагола **to be** – **is**.

Her son**'s** friend is a student. — Друг её сына – студент.
Her son**'s** a worker. — Её сын – рабочий.
(= Her son is a worker.)

Как видно из последнего примера, сокращенную форму глагола **to be** можно заменить полной.

Глагол *to be*
(The verb *to be*)

В русском языке глагол-связка **быть** в настоящем времени обычно опускается. Вместо него часто ставится тире. В английском языке глагол-связка обязателен.

Я – студент. I **am** a student.

Вопросительная форма глагола **to be** – это пример полной инверсии (т.е. сказуемое предшествует подлежащему). Ответ может быть кратким и полным. В отрицательной форме после глагола **to be** ставится частица **not**.

– **Are** you a student?
– Yes, I **am**. I **am** a student. / No, I **am not**. I **am not** a student.

Второе значение глагола **to be** – *находиться*.

He **is** at work. Он на работе.

В **таблице 1** приведено спряжение глагола **to be** в настоящем времени.

Таблица 1 — **Настоящее время глагола *to be***

Утвердительные формы
I → **am** He, She → **is** ← It We, You → **are** ← They
Вопросительные формы
Am → I? **Is** → he, she, it? **Are** → we, you, they?
Отрицательные формы
I → **am not** He, She → **is not** ← It We, You → **are not** ← They

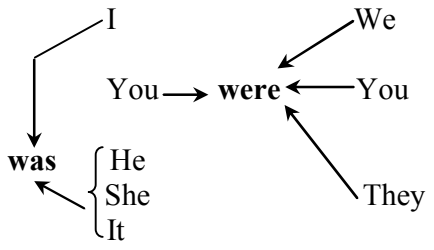
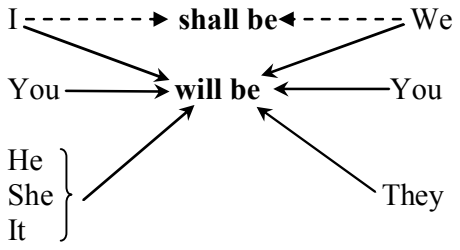
Следует иметь в виду, что в утвердительных и отрицательных предложениях обычно используются сокращенные формы (в прошедшем времени – только в отрицательных). В **таблице 2** представлены полные и краткие формы глагола **to be**.

Таблица 2 — **Полные и краткие формы глагола *to be***

Утвердительные формы		**Отрицательные формы**	
Полные	**Краткие**	**Полные**	**Краткие**
I am	I'm	I am not	I'm not
you are	you're	you are not	you aren't
he is	he's	he is not	he isn't
she is	she's	she is not	she isn't
we are	we're	we are not	we aren't
you are	you're	you are not	you aren't
they are	they're	they are not	they aren't

Спряжение глагола **to be** в прошедшем (Past) и будущем (Future) временах показано в **таблице 3**.

Таблица 3 — **Прошедшее и будущее времена глагола *to be***

Прошедшее время	**Будущее время**
	
Short negative forms: **wasn't, weren't**	Short negative forms: **shan't be, won't be**

В будущем времени к основе глагола добавляется вспомогательный глагол **will**. **Shall** используется только для выражения оттенка долженствования с местоимениями **I** и **we**.

Глагол *to have (got)*
(The verb *to have (got)*)

Глагол **to have** (иметь, обладать) – один из самых употребляемых глаголов в английском языке. Следует иметь в виду особенность перевода глагола **to have** (иметь) на русский язык:

I **have** a computer.	У меня есть компьютер (*а не*: Я имею компьютер).
She **has** a new coat.	У неё новое пальто.
We **have** a good mood.	У нас хорошее настроение.

Англичане предпочитают использовать конструкцию **to have got** вместо **to have** в устном общении и в неофициальных письмах. Для американцев более характерна форма **to have**.

Форма глагола **to have** в настоящем времени изменяется лишь в третьем лице единственного числа – **has**, в остальных случаях она неизменна.

I **have** got a brother.	У меня есть брат.
He **has** got a car.	У него есть автомобиль.

Часто используются сокращенные формы глагола **to have** got*:
I've got (= **I have** got), **she's** got (= **she has** got).

Не путайте сокращенную форму глагола **has got** с аналогичной формой глагола **to be**:

She's got a new watch.	У неё есть новые часы.
She's a good student.	Она хорошая студентка.

При построении вопросительных предложений глагол **to have** выносится на первое место.

Have you got a brother? – Yes, I **have**. / No, I **haven't**. (= **have not**)
Has he got a car? – Yes, he **has**. / No, he **hasn't**. (= **has not**)

Если вопрос ставится к существительному во множественном числе, добавляется местоимение **any**, которое не переводится.

Have you got *any* children?	У вас есть дети?

Отрицательная форма образуется путем постановки частицы **not** после глагола **have (has)**, которая, сливаясь с ним, образует сокращенные формы: **haven't**, **hasn't**.

I **haven't** got a brother.	У меня нет брата.
He **hasn't** got a car.	У него нет автомобиля.

Перед существительными множественного числа так же, как в вопросах, ставится местоимение **any**.

We **haven't** got *any* children. У нас нет детей.

В прошедшем времени всем местоимениям соответствует одна и та же форма – **had**. В будущем времени наблюдается та же тенденция, что и в случае с глаголом **to be** – к основе глагола добавляется вспомогательный глагол **will** (**shall** используется только для выражения оттенка долженствования с местоимениями **I** и **we**).

He **had** some problems. У него были проблемы.
She **will have** a good job. У нее будет хорошая работа.

Спряжение глагола **to have (got)** в прошедшем и будущем временах показано в таблице 4.

Таблица 4 – **Прошедшее и будущее времена глагола *to have (got)***

Прошедшее время	**Будущее время**
I, We, You, He, She, It, They – **had**	I → **shall have** ← We I, You, He, She, It, You, They → **will have** Short form – **'ll**
	Short negative forms: **shan't have, won't have**

Примеры:

He **had** some problems. У него были проблемы.
She **will have** a good job. У нее будет хорошая работа.

Unit 2.

PRESENT SIMPLE, PRESENT PROGRESSIVE, FUTURE SIMPLE, PAST SIMPLE, PRESENT PERFECT

Настоящее простое время (Present Simple Tense)

Настоящее простое время (Present Simple Tense) имеет форму инфинитива смыслового глагола без частицы **to** для всех лиц и чисел, кроме **3-го лица единственного числа**. С местоимениями или существительными в третьем лице единственном числе к основе инфинитива глагола прибавляется окончание **-s** или **-es**.

I always **do** my homework in the evening.
He always **does** his homework in the evening.

Present Simple употребляется:

1. Для выражения действия, которое происходит **регулярно**, **обычно**, **вообще**. Эти действия обозначают **традиции**, **привычки** или **ежедневную рутину**.

I **wake up** early *every morning.*	*Каждое утро* я **просыпаюсь** рано.
He **goes** to the gym *twice a week.*	Он **ходит** в спортзал *два раза в неделю*.
I *usually* **get up** at 7 o'clock in the morning.	Я *обычно* **встаю** в семь часов утра.
Greg **is** *sometimes* ill.	Грэг *иногда* **болеет**.

2. Для выражения фактов и общеизвестных истин.

It *often* **snows** in winter.	Зимой *часто* **идет** снег.
Banks **open** at nine a.m.	Банки **открываются** в девять часов утра.

3. Для выражения постоянного состояния или чувства.

I **like** reading novels by Steven King.	Я **люблю** читать романы Стивена Кинга.
She **lives** in a flat not far from the city center.	Она **живет** недалеко от центра города.

4. Для выражения будущего действия, совершающегося по расписанию, со следующими глаголами: **leave**, **depart**, **arrive**, **begin**, **go**, **start**, **come**, **end.**

The show **starts** at 8 o'clock.	Представление (спектакль) **начинается** в восемь.
The train **arrives** at one twenty.	Поезд **прибывает** в час двадцать.
The exhibition **opens** next Tuesday.	Выставка **открывается** в следующий вторник.

Вопросительные предложения образуются при помощи вспомогательных глаголов **do** или **does**, которые ставятся перед подлежащим, и **инфинитива смыслового глагола**.

Do you **have** lunch at the university cafeteria? – **Yes**, I **do**. / **No**, I **don't**.	Вы **обедаете** в университетской столовой? – **Да**. **/ Нет**.
Does he **work** in an office? – **Yes**, he **does**. / **No**, he **doesn't**.	Он **работает** в офисе? – **Да**. **/ Нет**.
What time **do** you **go** to bed? – I **go** to bed late. Where **does** he **live**? – He **lives** in the hostel.	Во сколько вы **ложитесь** спать? – Я **ложусь** спать поздно. Где он **живет?** – Он **живет** в общежитии.

Отрицательные предложения образуются при помощи вспомогательных глаголов **do** или **does,** отрицательной частицы **not** и **инфинитива смыслового** глагола. Вспомогательный глагол **does** употребляется с существительными или местоимениями в 3-ем лице единственного числа.

I **do not (don't) do** my homework in the morning.	Я **не делаю** домашнее задание утром.
She **does not (doesn't) work** in a shop.	Она **не работает** в магазине.

Формы настоящего простого времени показаны в таблице 5.

Таблица 5 — **Формы настоящего простого времени**

Утвердительные формы	Вопросительные формы	Отрицательные формы
I work	Do I work?	I don't work
You work	Do you work?	You don't work
He **works**	**Does** he work?	He **doesn't** work
She **works**	**Does** she work?	She **doesn't** work
It **works**	**Does** it work?	It **doesn't** work
We work	Do we work?	We don't work
You work	Do you work?	You don't work
They work	Do they work?	They don't work

Настоящее продолженное время (Present Progressive Tense)

Настоящее продолженное время (Present Progressive Tense) образуется при помощи вспомогательного глагола **to be** в настоящем времени **(am**, **is**, **are)** и причастия настоящего времени **(Participle I)** смыслового глагола. Глагол **to be** является вспомогательным и, следовательно, на русский язык не переводится.

Present Progressive употребляется:

1. Для выражения **длительного** действия, совершающегося **в момент говорения**.

He **is reading** a book *now.*	*Сейчас* он **читает** книгу.
She **is typing** a letter *at the moment.*	*В данный момент* она **печатает** письмо.

2. Для выражения **длительного** действия, совершающегося в **настоящий период времени или в данный период жизни**.

She **is writing** a new novel *at the moment.*	*В данный момент* она **пишет** новый роман.
He **is living** in England *now.*	Он **живет** в Англии *сейчас.*

3. Для обозначения **действия в будущем**, когда выражается **уверенность** в его совершении. В этом случае в предложении обычно имеется обстоятельство времени, указывающее на будущее время.

They **are going** to the theatre *tonight*.	Они **идут** в театр *сегодня вечером*.
My friend **is coming** *on Monday*.	Мой друг **приезжает** *в понедельник*.

В **вопросительных предложениях** вспомогательный глагол ставится перед подлежащим.

Is your friend **looking** for a well-paid job? – **Yes**, he **is**. / **No**, he **isn't**.	Ваш друг **ищет** хорошо оплачиваемую работу? – **Да**. / **Нет**.
Are you **working** on your course project *at the moment*? – **Yes**, I **am**. / **No**, I **am not**.	Вы *сейчас* **работаете** над курсовым проектом? – **Да**. / **Нет**.

Отрицательные предложения образуются при помощи частицы **not**, которая ставится после вспомогательного глагола.

My friend **is not (isn't) looking** for a well-paid job.	Мой друг **не ищет** хорошо оплачиваемую работу.
I **am not ('m not) working** on my course project *at the moment.*	*В данный момент* я **не работаю** над курсовым проектом.
We **are not (aren't) preparing** for the test on Computer science *now.*	*Сейчас* мы **не готовимся** к тесту по информатике.

Формы настоящего продолженного времени показаны в таблице 6.

Таблица 6 — **Формы настоящего продолженного времени**

Утвердительные формы	**Вопросительные формы**	**Отрицательные формы**
I **am speaking** You **are speaking** He **is speaking** She **is speaking** It **is speaking** We **are speaking** You **are speaking** They **are speaking**	**Am** I **speaking**? **Are** you **speaking**? **Is** he **speaking**? **Is** she **speaking**? **Is** it **speaking**? **Are** we **speaking**? **Are** you **speaking**? **Are** they **speaking**?	I **am not ('m not) speaking** You **are not (aren't) speaking** He **is not (isn't) speaking** She **is not (isn't) speaking** It **is not (isn't) speaking** We **are not (aren't) speaking** You **are not (aren't) speaking** They **are not (aren't) speaking**

Настоящее простое
и настоящее продолженное времена

Изучите сравнительную таблицу употребления настоящего простого и настоящего продолженного времен (таблица 7).

Таблица 7 — **Настоящее простое и настоящее продолженное времена**

Настоящее простое время (Present Simple Tense)	**Настоящее продолженное время** (Present Progressive Tense)
1. **Present Simple** употребляется для выражения действия, которое повторяется обычно (usually), всегда (always), каждый день (every day), т.е. регулярно. I *always* **have lunch** with my class-mates at 12.30 in the afternoon. Я *всегда* **обедаю** с одноклассниками в 12.30 дня.	1. **Present Progressive** употребляется для выражения действия, которое происходит в данный период времени (at the moment), сейчас, (now), на этой неделе (this week). I **am having lunch** with my class-mates *now.* Я *сейчас* **обедаю** с одноклассниками.
2. Для выражения будущего действия, совершающегося по расписанию, со следующими глаголами: **leave**, **depart**, **arrive**, **begin**, **go**, **start**, **come**, **end.** When **does** our plane **leave**? Когда **улетает** наш самолет? I **am going to call** home..	2. Для обозначения **действия в будущем**, когда выражается **уверенность** в его совершении. В этом случае в предложении обычно имеется обстоятельство времени, указывающее на будущее время. She **is leaving** *at 5 o'clock*. Она **уезжает** *в 5 часов*. Если не указано обстоятельство времени, используется конструкция be going to (собираться делать что-л.) Я **позвоню** (**собираюсь позвонить**) домой.

Будущее простое время (Future Simple Tense)

Будущее простое время образуется при помощи вспомогательного глагола **will** и 1-й формы основного глагола.

I**'ll call** you later.	Я **позвоню** вам позже.
You **will not** (**won't) get** to work in time.	Вы **не доберетесь** до работы вовремя.

В общих вопросах вспомогательный глагол **will** ставится перед подлежащим.

– **Will** you **work**?	– Ты **будешь работать**?
– **Yes**, I **will**. / **No**, I **won't**.	– **Да**. / **Нет**.

В специальных вопросах перед глаголом на первое место выносится вопросительное слово.

– ***Where*** **will** you **work**?	– ***Где*** ты **будешь работать**?
– I **will work** at home.	– Я **буду работать** дома.

Future Simple обозначает:

1. Общие факты, относящиеся к будущему.

They **will have** English lessons twice a week.	У них **будут** уроки английского языка два раза в неделю.

2. Спонтанное решение, принятое в момент речи.

– Jane, I'm hungry.	– Джейн, я голоден.
– I'**ll make** you a sandwich.	– Я **сделаю** тебе сэндвич.

3. Обещание, согласие или отказ сделать что-либо.

I'**ll send** you a letter.	Я **пришлю** вам письмо.
OK, I **will** really **stop** smoking.	Хорошо, я действительно **брошу** курить.
I **won't help** you.	Я **не буду** тебе **помогать**.

4. Предсказания, предположения, догадки в отношении будущего. Часто они сопровождаются вводными сочетаниями **I think** (я думаю), **I guess** (я полагаю), **probably** (вероятно), **I'm sure (**я уверен) и т.п.

I'm sure Ann **will manage** the project.	*Я уверен*, Энн **справится** с проектом.

5. Условное наклонение в условных предложениях первого типа (*см. ниже*).

Условные предложения первого типа (Conditionals I)

Условные предложения первого типа **Conditionals I** употребляются, когда мы говорим о том, что произойдет в будущем при определенных условиях (таблицу 7).

Таблица 7 – **Условные предложения первого типа**

Придаточное* **предложение**	**Главное предложение**	**Перевод**
If you **study** hard,	you **will pass** your exams.	Если ты **будешь** упорно учиться, ты **сдашь** экзамены.
If he **runs** fast,	he **will win** the race.	Если он **побежит** быстро, он **выиграет** забег.
If you **don't study** hard,	you **won't pass** your exams.	Если ты **не будешь** упорно учиться, ты **не сдашь** экзамены.
If he **doesn't run** fast,	he **won't win** the race.	Если он **не побежит** быстро, он **не выиграет** забег.

Это правило относится также к условным предложениям с союзом **unless** (пока не, если не) и к предложениям с придаточным времени с союзами **when** (когда), **as soon as** (как только), **before** (прежде чем), **after** (после того как), **until** (пока не).

I won't go to the party **unless** I write the report.	Я не пойду на вечеринку, **пока не** напишу доклад.
You will understand people better **when** you grow older.	Ты будешь лучше понимать людей, **когда** станешь старше.
He will come **as soon as** I ask him.	Он придет, **как только** я его попрошу.

* В отличие от русского языка, где в обеих частях предложения употребляется будущее время, в английских условных предложениях в главном предложении используется будущее время, но в придаточном предложении с **if** употребляется **настоящее время** (см. примеры в таблице: **study, runs**).

Прошедшее простое время (Past Simple Tense)

В английском языке существует две группы глаголов: **правильные (regular) и неправильные (irregular)**.

Прошедшее время **правильных** глаголов образуется путем прибавления окончания **-ed** к форме инфинитива:

work – work**ed** talk – talk**ed**

При добавлении окончания **-ed** с некоторыми глаголами происходят следующие изменения:

liv**e** – live**d** st**o**p – sto**pped** cr**y** – cr**ied** (но: pl**a**y – play**ed)**

К **неправильным** глаголам принадлежат глаголы, образующие прошедшее время не путем прибавления окончания **-ed** к инфинитиву, а различными другими способами (их формы даны в словаре).

- Некоторые неправильные глаголы образуют прошедшее время путем изменения корневой гласной инфинитива.

  beg**i**n – beg**a**n m**ee**t – m**e**t dr**i**nk – dr**a**nk

Past Simple употребляется:

1. Для выражения действия в прошлом.

I **played** football *two years ago*.	Я **играл** в футбол *два года назад*.
Yesterday she **went** to the cinema.	*Вчера* она **ходила** в кино.

2. Для выражения ряда последовательных действий в прошлом.

The manager **entered** the office, **sat down** at the desk and **began** to look through the documents.	Менеджер **вошел** в офис, **сел** за стол и **начал** просматривать документы.

Вопросительные предложения образуются при помощи вспомогательного глагола **did**, который ставится перед подлежащим, и инфинитива **смыслового** глагола.

Did you **play** football *two years ago*?	Ты **играл** в футбол *два года назад*?
– **Yes**, I **did**. / **No**, I **didn't**.	**– Да**. / **Нет**.
Did she **go** to the cinema *yesterday*?	Она **ходила** в кино *вчера*?
– **Yes**, she **did**. / **No**, she **didn't**.	**– Да**. / **Нет**.

Отрицательные предложения с участием как правильных, так и неправильных глаголов образуются при помощи вспомогательного глагола **did**, отрицательной частицы **not** и инфинитива смыслового глагола без частицы **to**.

I **did not (didn't) play** football *two years ago.*	Я **не играл** в футбол *два года назад.*
Yesterday she **did not (didn't go)** to the cinema.	*Вчера* она **не ходила** в кино.

Формы прошедшего простого времени показаны в таблице 8.

Таблица 8 — **Формы прошедшего простого времени**

Утвердительные формы	Вопросительные формы	Отрицательные формы
I work**ed**	**Did** I **work**?	I **didn't work**
You work**ed**	**Did** you **work**?	You **didn't work**
He work**ed**	**Did** he **work**?	He **didn't work**
She work**ed**	**Did** she **work**?	She **didn't work**
It work**ed**	**Did** it **work**?	It **didn't work**
We work**ed**	**Did** we **work**?	We **didn't work**
You work**ed**	**Did** you **work**?	You **didn't work**
They work**ed**	**Did** they **work**?	They **didn't work**

Настоящее совершенное время (Present Perfect Tense)

Present Perfect образуется при помощи вспомогательных глаголов **have** (**has**) и третьей формы глагола – причастия прошедшего времени **(Participle II).**

Participle II правильных глаголов образуется при помощи прибавления окончания **-ed,** то есть аналогично образованию Past Simple правильных глаголов. **Participle II неправильных глаголов** образуется другими способами (формы даны в словаре).

We **have visited** the Art Gallery.	Мы **посетили** художественную галерею.
I **have** *already* **done** my homework.	Я *уже* **сделал** домашнее задание.

В **вопросительных предложениях** вспомогательный глагол **have (has)** ставится перед подлежащим.

Have you **washed** the dishes *yet*?	Вы *уже* **помыли** посуду?
– **No**, I **haven't**.	– **Нет**.
– **Yes**, I **have**.	– **Да**.
Has he **met** Mr. White *yet*?	Он *уже* **встретил** мистера Уайта?
– **Yes**, he **has**.	– **Да**.
– **No**, he **hasn't**.	– **Нет**.

Отрицательные предложения образуются при помощи частицы **not**, которая ставится после вспомогательного глагола **have** (**has**).

I **have not (haven't) gone** shopping *yet*.	Я *еще* **не ходил** за покупками.
She **has not (hasn't) made** the dinner *yet*.	Она *еще* **не приготовила** обед.

Present Perfect употребляется:

1. Для сообщения говорящим о своем жизненном опыте или о событиях, которые произошли в прошлом, без указания, когда это происходило. В таких предложениях часто сообщается, сколько раз свершилось действие.

I **have read** "Gone with the Wind" *three times*.	Я **читал** «Унесенные ветром» *три раза*.
He **has traveled** abroad *twice.*	Он **был** за границей *дважды*.
We **have** *never* **made** pizza before.	Мы *никогда* **не готовили** пиццу раньше.

2. Для выражения действия, совершившегося в прошлом, результат которого имеется или подразумевается в настоящий момент. Предложения в Present Perfect на русский язык переводятся прошедшим временем.

She **has written** an article for the conference.	Она **написала** статью для конференции.
We **have finished** the course project.	Мы **закончили** курсовой проект.

3. Для выражения действия, которое началось в прошлом и продолжается в настоящий момент (со статичными глаголами).

I **have known** my friends *since 2001*.	*Я* **знаю** своих друзей *с 2001 года*.
She **has been** in Paris *for three months already*.	Она **(находится)** в Париже *уже три месяца*.
John **has** *always* **wanted** to be more sensible.	Джон *всегда* **хотел** быть более разумным.

Формы настоящего совершенного времени показаны в таблице 9.

Таблица 9 — **Формы настоящего совершенного времени**

Утвердительные формы	**Вопросительные формы**	**Отрицательные формы**
I **have worked (met)**	I **have not (haven't) worked (met)**	**Have** I **worked (met)**?
You **have worked (met)**	You **have not (haven't) worked (met)**	**Have** you **worked (met)**?
He **has worked (met)**	He **has not (hasn't) worked (met)**	**Has** he **worked (met)**?
She **has worked (met)**	She **has not (hasn't) worked (met)**	**Has** she **worked (met)**?
It **has worked (met)**	It **has not (hasn't) worked (met)**	**Has** it **worked (met)**?
We **have worked (met)**	We **have not (haven't) worked (met)**	**Have** we **worked (met)**?
You **have worked (met)**	You **have not (haven't) worked (met)**	**Have** you **worked (met)**?
They **have worked (met)**	They **have not (haven't) worked (met)**	**Have** they **worked (met)**?

Настоящее совершенное и прошедшее простое времена

Различие между употреблением **Past Simple** и **Present Perfect** существует во времени совершения действия.

- Действие, выраженное в **Past Simple**, совершилось в прошлом в определенный момент времени и закончилось.

He **passed** his English exam *a week ago.*	Он **сдал** экзамен по английскому языку *неделю тому назад.*
I **did not (didn't) read** the fashion magazine *yesterday morning.*	*Вчера утром* я **не читал** журнал мод.
When **did** you **go** to Italy?	Когда вы **ездили** в Италию?
– I **went** there *three years ago.*	– Я **ездил** туда *три года назад.*
Did you **like** living there?	Вам **понравилось** там жить?
– **Yes**, I **did**. / **No**, I **didn't**.	– **Да**. / **Нет**.

- Действие, выраженное в **Present Perfect**, или совершилось в прошлом в неопределенный (неизвестный) момент времени, или длится до сих пор.

He **has** *just* **passed** his English exam.	Он *только что* **сдал** экзамен по английскому языку.
I **have not (haven't) read** the fashion magazine *yet.*	Я *еще* **не прочитал** журнал мод.
Have you *ever* **been** to Italy?	Вы *когда-либо* **были** в Италии?
– Yes, I **have**. / **No,** I **haven't**.	**– Да**. / **Нет**.

Present Perfect не употребляется:

- с выражениями, указывающими на прошедшее время типа **yesterday** (вчера), **last week** (**month, year**) (на прошлой неделе, в прошлом месяце, в прошлом году), **in 1930** (в 1930 году) и т.д.;
- в вопросительных предложениях, начинающихся с **when**.

В этих случаях употребляется **Past Simple**.

Unit 3.

PRESENT SIMPLE PASSIVE, PAST SIMPLE PASSIVE

Простое настоящее (Present Simple) и простое прошедшее (Past Simple) времена в страдательном залоге

В английском языке существует два залога: **действительный (активный) – the Active Voice**, и **страдательный (пассивный) – the Passive Voice.**

Формы залога показывают, является ли подлежащее лицом (предметом), совершающим действие, или лицом (предметом), подвергающимся действию.

Когда подлежащее является лицом (предметом), совершающим действие, глагол употребляется в форме **действительного залога**.

People **drink** coffee in most countries.	Люди **пьют** кофе во многих странах.
We **discuss** the problems of the faculty once a month.	Мы **обсуждаем** проблемы факультета один раз в месяц.
The students **asked** Professor Bright a lot of questions yesterday.	Вчера студенты **задали** профессору Брайту много вопросов.

Когда подлежащее является лицом (предметом), подвергающимся действию со стороны другого лица или предмета, глагол употребляется в форме **страдательного залога**.

Coffee **is drunk** in most countries.	Кофе **пьют** во многих странах.
The problems of the faculty **are discussed** once a month.	Проблемы факультета **обсуждаются** один раз в месяц.
Professor Bright **was asked** a lot of questions after the lecture yesterday.	Вчера после лекции профессору Брайту **задали** много вопросов.

Формы страдательного залога образуются при помощи вспомогательного глагола **to be** в соответствующем времени и причастия прошедшего времени **(Participle II)** смыслового глагола. Следовательно, при спряжении глагола в страдательном залоге изменяется только глагол **to be**, смысловой глагол имеет во всех временах одну и ту же форму – **Participle II**.

Professor Bright **is** usually **asked** a lot of questions after the lecture.	Профессору Брайту обычно **задают** много вопросов после лекции.
The authorities of the faculty **are** always **asked** some questions during their meetings with teachers and students.	Руководству факультета **задают** вопросы во время их встреч с преподавателями и студентами.
A lot of letters **were sent** yesterday to inform everybody about the conference.	Вчера было отправлено много писем, чтобы сообщить всем о конференции.
Professor Bright **was asked** a lot of questions after the lecture yesterday**.**	Вчера после лекции профессору Брайту **задали** много вопросов.

При образовании **вопросительных** предложений вспомогательный глагол ставится перед подлежащим.

Are my questions **understood?**	Мои вопросы **понимают?**
Is Professor Bright usually **asked** many questions after the lecture?	Профессору Брайту обычно **задают** много вопросов после лекции?
Was Professor Bright **asked** many questions after the lecture yesterday?	Вчера профессору Брайту **задали** много вопросов после лекции?
Were the letters **sent** yesterday?	Письма **отправили** вчера?

При образовании **отрицательных** предложений частица **not** ставится после вспомогательного глагола.

I **am not** usually **asked** about my family.	Меня обычно **не спрашивают** о семье.
Professor Bright **wasn't asked** many questions yesterday.	Профессору Брайту вчера **не задали** много вопросов.

Формы пассивного залога настоящего простого времени и прошедшего простого времени показаны в таблицах 10 и 11.

Таблица 10 — ***Формы пассивного залога настоящего простого времени***

Утвердительные формы	**Вопросительные формы**	**Отрицательные формы**
I **am asked**	**Am** I **asked**?	I **am not (’m not) asked**
You **are asked**	**Are** you **asked**?	You **are not (aren’t) asked**
He **is asked**	**Is** he **asked**?	He **is not (isn’t) asked**
She **is asked**	**Is** she **asked**?	She **is not (isn’t) asked**
It **is asked**	**Is** it **asked**?	It **is not (isn’t) asked**
We **are asked**	**Are** we **asked**?	We **are not (aren’t) asked**
You **are asked**	**Are** you **asked**?	You **are not (aren’t) asked**
They **are asked**	**Are** they **asked**?	They **are not (aren’t) asked**

Таблица 11 — ***Формы пассивного залога прошедшего простого времени***

Утвердительные формы	**Вопросительные формы**	**Отрицательные формы**
I **was asked**	**Was** I **asked**?	I **was not (wasn’t) asked**
You **were asked**	**Were** you **asked**?	You **were not (weren’t) asked**
He **was asked**	**Was** he **asked**?	He **was not (wasn’t) asked**
She **was asked**	**Was** she **asked**?	She **was not (wasn’t) asked**
It **was asked**	**Was** it **asked**?	It **was not (wasn’t) asked**
We **were asked**	**Were** we **asked**?	We **were not (weren’t) asked**
You **were asked**	**Were** you **asked**?	You **were not (weren’t) asked**
They **were asked**	**Were** they **asked**?	They **were not (weren’t) asked**

Предложение со сказуемым, выраженным глаголом в действительном залоге, носит название **действительного оборота,** а предложение со сказуемым, выраженным глаголом в страдательном залоге, носит название **страдательного оборота.**

Страдательные обороты употребляются в тех случаях, когда лицо или предмет, совершающие действие, неизвестны, или когда отсутствует необходимость о них сообщить.

This problem **was discussed** during the last faculty meeting.	Эта проблема **обсуждалась** на прошлом собрании факультета.
About 200 articles **are** usually **written** for the conference.	Для конференции обычно **пишут** около 200 статей.

В тех случаях, когда необходимо указать лицо или предмет, совершающие действие, употребляется **действительный** оборот или **страдательный** оборот с предлогом **by.**

The authorities of the faculty **discussed** this problem during the last meeting.	*Руководство* факультета **обсудило** эту проблему на последней встрече.
This problem **was discussed** *by the authorities* of the faculty during the last faculty meeting.	Эта проблема **обсуждалась** *руководством* факультета на последней встрече.
The students usually **write** about 200 articles for the conference.	*Студенты* обычно **пишут** около 200 статей для конференции.
About 200 articles **are** usually **written** *by the students* for the conference.	Около 200 статей обычно **пишется** *студентами* для конференции.

Существует несколько способов перевода сказуемого в страдательном залоге:

1. Глаголом в страдательном залоге с окончанием **-ся** или **-сь.**

Professor Bright **is** usually **asked** a lot of questions.	Профессору Брайту обычно **задается** много вопросов.

2. Глаголом во множественном числе без указания лица, совершающего действие. (Весь страдательный оборот, таким образом, является безличным предложением).

Professor Bright **is** usually **asked** a lot of questions.	Профессору Брайту обычно **задают** много вопросов.

3. Если в страдательном обороте употребляется лицо (лица), совершающее действие, данный оборот можно переводить двумя способами:

а) страдательным оборотом

Professor Bright **is** usually **asked** a lot of questions *by the students*.	Профессору Брайту обычно **задается** много вопросов *студентами*.

б) действительным оборотом

Professor Bright **is** usually **asked** a lot of questions *by the students***.**	*Студенты* обычно **задают** профессору Брайту много вопросов.

Unit 4.

FUNCTIONS OF THE VERBS *TO BE, TO HAVE TO DO;* MULTIFUNCTIONAL WORDS *IT, ONE, THAT;* ADJECTIVES AND ADVERBS: DEGREES OF COMPARISON

Функции глаголов *to be, to have, to do*

Функции глагола *to be*

Функция	Пример	Перевод
Смысловой глагол со значением *быть, находиться*	The device **was** in the lab. The device **is** in the lab.	Прибор был в лаборатории. Прибор в лаборатории.
2. **Связка*** в составном именном сказуемом со значением *быть, являться, состоять, заключаться*	I **am** a programmer. His notes **were** *of great help* in our work.	Я – программист. Его заметки оказались очень полезными в нашей работе.
Вспомогательный глагол	They **are** still waiting for him. The work **was** finished in time.	Они все еще ждут его. Работа была закончена вовремя.
Модальный глагол (означает действие в соответствии с намеченным планом)	The teacher **is** to come at five.	Преподаватель должен прийти в 5 часов.

* С сочетаниями типа **to be of interest**, **to be of importance**, в которых связочный глагол **to be** стоит перед существительным с предлогом **of**, следует использовать глаголы типа *иметь*, *представлять*, *оказывать*.

Функции глагола *to have*

Функция	Пример	Перевод
Смысловой глагол со значением *иметь, обладать* (часто с **got**)	They **have (got)** new laboratory equipment.	У них (они имеют) новое лабораторное оборудование.
Вспомогательный глагол	We **have** introduced a new system of work.	Мы ввели новую систему работы.
Модальный глагол	I **have** to buy another newspaper.	Я должен (мне придется) купить еще одну газету.

Функции глагола *to do*

Функция	Пример	Перевод
Смысловой глагол со значением *делать, выполнять*	They **do** their homework every day.	Они делают домашнюю работу каждый день.
Вспомогательный глагол для образования действительного залога	'**Do** you go to work every day?' 'No, I **don't**.' '**Does** she study at the university?' 'Yes, she **does**.' '**Did** they finish the job yesterday?' 'No, they **didn't**.'	Вы ходите на работу каждый день? – Нет. Он учится в университете? – Да. Они закончили работу вчера? – Нет.
Глагол-заместитель для замены смыслового глагола во избежание его повторения	Metals conduct electricity better than semiconductors **do**.	Металлы проводят электричество лучше, чем (проводят) полупроводники.
Глагол-усилитель для усиления значения действия, выраженного смысловым глаголом.*	This device **does** help them in their work. 'Why didn't you translate this article?' 'But I **did** translate it!'	Этот прибор действительно помогает им в работе. Почему ты не перевел эту статью? – Да я же перевел ее!

* В русском предложении усиление значения передается частицей *же*, или словами *действительно*, *несомненно*.

Многофункциональные слова
Функции и перевод слова *one* (*ones*)

Функция	Пример	Перевод
Числительное	**One** example is enough.	Одного примера достаточно.
Формальное подлежащее* (стоит перед сказуемым).	**One** is never late to learn. **One** must work hard to get good results.	Учиться никогда не поздно. Надо упорно работать, чтобы получить хорошие результаты.
Формальное дополнение** (стоит после сказуемого)	This enables **one** to observe and record all the changes.	Это позволяет (нам) наблюдать и регистрировать все изменения.
One в форме притяжательного падежа***	One should always keep **one's** word.	Надо всегда держать свое слово.
Слово-заместитель**	I haven't got a dictionary. I must buy **one**. Here are some books. Which **ones** would you like to take?	У меня нет словаря. Я должен купить **(словарь)**. Вот несколько книг. Какие (**книги**) вы хотели бы взять?

* Данное предложение является неопределенно-личным. В этом случае **one** часто употребляется с модальными глаголами.

** Обычно не переводится или заменяется формальным *нам*.

*** Переводится на русский язык местоимением *свой, своя, свое.*

**** Употребляется для замены ранее упомянутого исчисляемого существительного или существительных. Переводится или словом, которое заменяет, или не переводится совсем.

Функции и перевод слова *that (those)*

Функция	Пример	Перевод
That (ед. ч.) – указательное местоимение *тот, та, то* (иногда *этот*) **Those** (мн.ч.) – *те*	Give me **that** textbook, please. I like **those** books.	Дайте мне, пожалуйста, **тот** учебник. **Те** книги мне нравятся.
That (**of**), **those** (**of**) – слова-заместители	The work of the new device is much more efficient than **that of** the old one.	Работа нового прибора гораздо более эффективна, чем **работа** старого.
That – относительное местоимение *который, -ая, -ое, -ые*	Spaceships can cover distances **that** are measured in millions of kilometers.	Космические корабли могут покрывать расстояния, **которые** измеряются миллионами километров.
That – союз *что*	He said **that** he would do his best to help them.	Он сказал, **что** сделает все возможное, чтобы помочь им.

Функции и перевод местоимения *it*

Функция	Пример	Перевод
Подлежащее /Дополнение (личное местоимение)	Repeat the experiment. **It** is very important.	Повторите опыт. **Он** очень важен.
Подлежащее (указательное местоимение)	What is this? **It** is a new device.	Что это? **Это** новый прибор.
Подлежащее (формальное)	**It** is cold in the laboratory.	В лаборатории холодно.
Часть усилительной конструкции (для выделения отдельных членов предложения)	**It** was D.I. Mendeleyev who published the Periodic Law of Elements in 1869.	Именно (**это**) Д.И. Менделеев опубликовал периодический закон в 1869 году.

Степени сравнения прилагательных и наречий (Degrees of Comparison)

Прилагательные и наречия

Имена прилагательные в английском языке не изменяются по родам, числам и падежам.

an **interesting** book	**интересная** книга
a **good** film	**хороший** фильм
famous people	**известные** люди

В предложении имена прилагательные употребляются в функции **определения** или в функции **именной части составного именного сказуемого**.

В функции определения прилагательное стоит перед определяемым словом.

He is reading an **interesting** book.	Он читает **интересную** книгу.
I am watching a **good** film.	Я смотрю **хороший** фильм.
I know some **famous** people.	Я знаю несколько **известных** людей.

Наречие указывает на признак действия или на различные обстоятельства, при которых протекает действие. Наречие относится к глаголу и показывает **как, где, когда** и т.д. совершается действие.

I work **hard** to get a better mark in Chemistry.	Я **усердно** работаю, чтобы получить хорошую оценку по химии.

Производные наречия образуются от имен прилагательных при помощи суффикса **-ly:**

quiet – quiet**ly** (тихо, спокойно)
loud – loud**ly** (громко)
dangerous – dangerous**ly** (опасно).

Степени сравнения прилагательных (Degrees of Comparison)

В английском языке имена прилагательные образуют две степени сравнения: **сравнительную** (**the Comparative Degree**) и **превосходную** (**the Superlative Degree**). Основная форма имени прилагательного не выражает сравнения и является **положительной** (**the Positive Degree**).

При образовании сравнительной степени с именами прилагательными происходят следующие изменения:

- К односложным прилагательным добавляется суффикс **-er.**
  cheap – cheap**er**
  cold – cold**er**

Today it is **colder** *than* it was yesterday. Сегодня **холоднее,** *чем* вчера.

- Большинство прилагательных, состоящих из двух и более слогов, образуют сравнительную степень при помощи слова **more**, которое ставится перед прилагательным.
  intelligent – **more** intelligent
  difficult – **more** difficult

Cleaning the house is **more difficult** *than* washing the dishes.	Сделать уборку в доме **труднее**, *чем* помыть посуду.

Имена прилагательные в **превосходной** степени употребляются с определенным артиклем **the**. Превосходная степень образуется при прибавлении суффикса **-est** к прилагательному.

- Если прилагательное оканчивается на гласную букву **-y** с предшествующей ей согласной буквой, то при прибавлении суффикса **-est** гласная **-y** изменяется на **-i**.
  eas**y** – the eas**iest**
  funn**y** – the funn**iest**

"The Problem Child" is **the funniest** comedy I have ever seen.	«Трудный ребенок» – **самая смешная** комедия, которую я когда-либо видел.

- Большинство прилагательных, состоящих из двух и более слогов, образуют превосходную степень при помощи слова **most**, которое ставится перед прилагательным.
  intelligent – the **most** intelligent
  difficult – the **most** difficult

Writing the article for the conference is **the most difficult** task for me.	Написать статью для конференции – **самая сложная** задача для меня.

- Некоторые имена прилагательные образуют превосходную степень от другого корня.

good – the **best**	bad – the **worst**
much – the **most**	many – the **most**
little – the **least**	far – the **farthest** / **furthest**

I have **the least** number of bad marks of all the students of the faculty.	У меня **наименьшее** количество плохих оценок среди всех студентов факультета.

Способы образования сравнительной и превосходной степеней сравнения прилагательных и наречий показаны в таблице 12.

Таблица 12 – ***Образование сравнительной и превосходной степеней прилагательных и наречий***

Positive	Comparative	Superlative
large большой	**larger** больше	**the largest** самый большой
easy легкий	**easier** более легкий (легче)	**the easiest** самый легкий
difficult трудный	**more difficult** более трудный (труднее)	**the most difficult** самый трудный
good хороший **bad** плохой **much** много **many** много **little** мало **far** далекий	**better** лучше **worse** хуже **more** больше (более) **more** больше (более) **less** меньше (менее) **further / farther** более далекий (дальше)	**the best** самый хороший **the worst** самый плохой **the most** самый большой (наибольший) **the most** самый большой (наибольший) **the least** меньше всего (наименьший) **the furthest / farthest** самый далекий

Способы сравнения

В английском языке кроме сравнительной и превосходной степеней имен прилагательных существуют следующие способы сравнения:

1. Для усиления сравнения употребляется слово **much**, которое ставится перед именем прилагательным в **сравнительной степени** и имеет значение *гораздо, намного.*

His computer is **much cheaper** than mine.	Его компьютер **намного (гораздо) дешевле** моего.
My flat is **much more expensive** than yours.	Моя квартира **намного (гораздо) дороже**, чем ваша.

2. Для сравнения двух предметов (явлений, лиц) одинакового качества употребляется конструкция **as…as**, которая имеет значение *такой же ... как, так же ... как.* Эта конструкция употребляется с прилагательным в положительной степени.

Saint Petersburg is **as big and beautiful as** Moscow.	Санкт Петербург – **такой же большой и красивый, как** Москва.

Конструкция **as … as** имеет противоположные формы – **not so … as**, **not as … as**, которые имеют значение *не такой ... как.*

My town is **not as beautiful** (**not so beautiful) as** London.	Мой город **не такой красивый, как** Лондон.

3. Для сравнения двух предметов (явлений, лиц) одинакового качества употребляется конструкция **the same … as**, которая имеет значение *такой же ... как.*

Her DVD player has **the same price as** ours.	Её DVD-плеер имеет **такую же** цену, **как** и наш.

Конструкция **the same … as** имеет противоположную форму – **different from,** которая имеет значение *не такой ... как, отличный от ...* .

Their car is **different from** ours a lot.	Их машина сильно **отличается от** нашей.

Unit 5.

TENSES OF THE ACTIVE VOICE

Времена английского глагола в действительном залоге

Синтаксический метаязык

Для изучения английского языка иногда используется язык-посредник (метаязык).

Символы языка-посредника:

S (subject) – подлежащее;

V (verb) – глагол-сказуемое;

$\mathbf{V_s}$ (verb + ending **-s**) – глагол с окончанием **-s**;

$\mathbf{V_{ed/2}}$ (verb in the Past Simple) – глагол в простом прошедшем времени;

$\mathbf{V_{ed/3}}$ (Participle II) – причастие II;

$\mathbf{V_{ing}}$ (Participle I) – причастие I.

Данные символы являются основой любого предложения, все остальные слова можно найти в словаре.

Существует мнение, что одна из трудностей усвоения английского языка заключается в наличии в нем большого количества видовременных форм. Это связано с тем, что характер действия в русском языке раскрывается обстоятельством времени, а в английском языке для этого существуют разные видовременные формы. Однако эти формы легко усваиваются, если хорошо понять четыре видовые характеристики действия, выражаемого английским глаголом.

$\mathbf{V_{(s)}}$	– регулярное действие, выражаемое временами группы **Simple**;
be + $\mathbf{V_{ing}}$	– длительное действие, выражаемое временами группы **Progressive**;
have + $\mathbf{V_{ed/3}}$	– завершенное действие, выражаемое временами группы **Perfect**;
have been + $\mathbf{V_{ing}}$	– действие, продолжающееся определенный момент времени, выражаемое временами группы **Perfect Progressive**.

Времена группы Simple (Indefinite)

Данные времена называются простыми (**Simple**) потому, что только они образуют утвердительные предложения без участия вспомогательных глаголов. Для времен остальных групп требуется вспомогательный глагол (**to be** или **to have**).

Времена группы **Simple** (иногда их называют **Indefinite**) означают обычное, закономерное, периодически повторяющееся действие, которое происходило, происходит или будет происходить. Точный момент времени не определен. Действие могло иметь место **вчера**, **в прошлый понедельник** (yesterday, last Monday), может происходить **дважды в неделю** или **каждый день** (twice a week, every day) или случиться **завтра**, **в следующую пятницу** (tomorrow, next Friday).

Формы простых времен представлены в таблице 13.

*Таблица 13 — **Времена группы Simple (Indefinite)***

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.* (He **go*es***…)	I **will go** to the cinema *tomorrow.*
Did + S + V?	**Do/Does + S + V?**	**Will + S + V?**
Did you **go** to the cinema *yesterday?* – **Yes**, I **did**. / **No**, I **didn't.**	**Do** you **go** to the cinema *every week?* – **Yes**, I **do**. / **No**, I **don't**. (**Does** he **go**…?) – **Yes**, he **does**. / **No**, he **doesn't.**	**Will** you **go** to the cinema *tomorrow?* – **Yes**, I **will**. / **No**, I **won't.**
S + did not + V Short form: **didn't**	**S + do/does not + V** Short forms: **don't, doesn't**	**S + will not + V** Short form: **won't**
I **didn't go** to the cinema *yesterday.*	I **don't go** (He **doesn't go**…) to the cinema *every week.*	I **won't go** to the cinema *tomorrow.*

I **went** to the cinema *yesterday*. — Я **ходил** в кино *вчера*.
I **go** to the cinema *every week*. — Я **хожу** в кино *каждую неделю*.
I **will go** to the cinema *tomorrow*. — Я **пойду** в кино *завтра*.

Времена группы Progressive (Continuous)

Продолженные времена **Progressive** (или **Continuous**) имеют общую формулу следующего вида: глагол **to be** плюс глагол с «инговым» окончанием – причастие I. Все они означают длительное действие, которое происходило, происходит или будет происходить **в точно указанный момент** в прошлом: **at 5 o'clock**, **when he came** (в 5 часов, когда он пришел); настоящем: **now**, **at the moment** (сейчас, в данный момент) либо будущем: **at 5 o'clock**, **when he comes (**в 5 часов, когда он придет). Все времена этой группы выражают незаконченное действие и, следовательно, переводятся глаголом несовершенного вида.

Формы продолженных времен представлены в таблице 14.

Таблица 14 — ***Продолженные времена (Progressive (Continuous) Tenses)***

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.*
Was/Were + S + V_{ing}?	**Am/Is/Are + S + V_{ing}?**	**Will + S + be + V_{ing}?**
Were you **doing** your homework *at 5 o'clock? / when he came*? – **Yes**, I **was**. / **No**, I **wasn't.**	**Are** you **doing** your homework *now*? – **Yes**, I **am**. / **No**, I**'m not.**	**Will** you **be doing** your homework *at 5 o'clock? / when he comes*? – Yes**,** I **will**. / No**,** I **won't**.
S + was/were not + V_{ing} Short forms: I (he she, it) **wasn't** we (you, they) **weren't**	**S + am/is/are not + V_{ing}** Short forms: I'**m not** he (she, it) **isn't** you (we, they) **aren't**	**S + will not be + V_{ing}** Short form: **won't**
I **wasn't doing** my homework *at 5 o'clock. / when he came.*	I**'m not doing** my homework *now.*	I **won't be doing** my homework at *5 o'clock. / when he comes.*

I **was doing** my homework *at 5 o'clock* (or: *when he came*).	Я **делал** домашнюю работу *в 5 часов* (или: *когда он пришел*).
I **am doing** my homework *now*.	Я **делаю** домашнюю работу *сейчас*.
I **will be doing** my homework *at 5 o'clock* (or: *when he comes*).	Я **буду делать** домашнюю работу *в 5 часов* (или: *когда он придет*).

Времена группы Perfect

Совершенные времена (**Perfect**) имеют общую формулу следующего вида: глагол **to have** плюс глагол в третьей форме — причастие II. Глагол **to have** спрягается и служит указателем, какой именно Perfect перед нами — Present, Past или Future. Они означают действие, **свершившееся к определенному моменту** в прошлом, настоящем и будущем, причем, всегда имеется результат, так или иначе связанный с настоящим. В отличие от продолженных времен все времена этой группы выражают законченное действие и, следовательно, переводятся глаголом совершенного вида.

В таблице 15 даны формы времен группы Perfect.

Таблица 15 — ***Совершенные времена (Perfect Tenses)***

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.*
Had + S + $V_{ed/3}$?	**Have/Has + S + $V_{ed/3}$?**	**Will + S + have + $V_{ed/3}$?**
Had you **written** the letter *by 5 o'clock? / before he came?* – **Yes**, I **had**. / **No**, I **hadn't.**	**Have** you *already* **written** the letter? – **Yes,** I **have. / No,** I **haven't.**	**Will** you **have written** the letter *by 5 'clock?/ before he comes?* – **Yes**, I **will**. / **No**, I **won't.**
S + had not + $V_{ed/3}$ Short form: **hadn't**	**S + *have*/*has* not + $V_{ed/3}$** Short forms: **haven't, hasn't**	**S + will not + have + $V_{ed/3}$** Short form: **won't have**
I **hadn't written** the letter *by 5 o'clock. / before he came.*	I **haven't written** the letter *yet.*	I **won't have written** the letter *by 5 o'clock. / before he comes.*

I **had written** the letter *by 5 o'clock* (or: *before he came*).	Я **написал** письмо *к 5 часам* (или: *до того как он пришел*).
I **have** *just* (*already*/*recently*/*lately*) **written** the letter.	Я *только что* (*уже*, *недавно*) **написал** письмо.
I **will have written** the letter *by 5 o'clock* (or: *before he comes*).	Я **напишу** письмо *к 5 часам* (или: *до того как он придет*).

Unit 6.

PASSIVE VOICE

Страдательный залог (Passive Voice)

Простые времена в страдательном залоге (Simple Tenses (Passive))

Основная формула – **be + $V_{ed/3}$**

Время	Модель перевода	Пример	Перевод
Настоящее	am / is / are + $V_{ed/3}$	The work **is done** every *day*.	Работа **выполняется** (ее **выполняют**) *каждый день*.
Прошедшее	was / were + $V_{ed/3}$	The work **was done** *yesterday*.	Работа **выполнялась** (ее **выполняли**) *вчера*.
Будущее	will be + $V_{ed/3}$	The work **will be done** *tomorrow*.	Работа **будет выполняться** (ее **будут выполнять**) *завтра*.

Продолженные времена в страдательном залоге (Progressive Tenses (Passive))

Основная формула – **be + being + $V_{ed/3}$**

Время	Модель перевода	Пример	Перевод
Настоящее	am / is / are + being + $V_{ed/3}$	The work **is being done** *now*.	Работа **выполняется** (ее **выполняют**) *сейчас*.
Прошедшее	was / were + being + $V_{ed/3}$	The work **was being done** *at 5 o'clock / when he came*.	Работа **выполнялась** (ее **выполняли**) *в 5 часов / когда он пришел*.
Будущее	Вместо отсутствующей формы **Future Progressive** употребляется форма **Future Simple**		

Совершенные времена в страдательном залоге (Perfect Tenses (Passive))

Основная формула – **have + been + $V_{ed/3}$**

Время	Модель перевода	Пример	Перевод
Настоящее	have / has + been + $V_{ed/3}$	The work **has** *just* **been done**.	Работа **выполнена** (ее **выполнили**) *только что*.
Прошедшее	had + been + $V_{ed/3}$	The work **had been done** *by 5 o'clock / before he came*.	Работа **была выполнена** (ее **выполнили**) *к 5 часам / до того как он пришел*.
Будущее	will have + been + $V_{ed/3}$	The work **will have been done** *by 5 o'clock / before he comes*.	Работа **будет выполнена** (ее **выполнят**) *к 5 часам / до того как он придет*.

Unit 7.

ATTRIBUTE GROUP

Атрибутивная группа (Attribute group)

Очень важная функция, которую выполняют существительные, – **функция определения**.

Дело в том, что существительных в роли определения к другому («главному») существительному, может быть несколько. В этом случае рекомендуется применять правило ряда, которое гласит:

Если после артикля (или другого определителя существительного) стоит ряд слов, чаще всего существительных в единственном числе и без предлога (предлоги обычно прерывают ряд!), то только последнее из них будет тем словом, к которому относится артикль и с которого надо начинать перевод этого ряда, мысленно ставя после него вопрос «какой?». Все остальные слова являются его определениями.

Рассмотрим это правило на примерах.

Ряд, состоящий только из двух слов, переводится следующим образом: поскольку второе (и последнее) слово является ключевым, перевод начинают именно с него. Существительное, стоящее перед ним, переводится

- определением:
  state emblem — **государственный** герб
- существительным в родительном падеже:
  wage rise — повышение **зарплаты**

или существительным с предлогом в соответствующем по смыслу падеже:

price control — контроль **за ценами**

Такой ряд, казалось бы, не должен вызывать особых затруднений. Но, как показала практика, в переводе именно такого ряда часто содержатся ошибки, так как существительное, играющее роль определения, либо переводится прилагательным, что далеко не всегда правильно, либо перевод начинается с первого слова, что тоже приводит к искажению смысла. Например:

simulation technique	метод моделирования (а не *моделирующий метод*)
measurement parameters	параметры измерения (но не *измерение параметров*)

Единственный способ избежать в этом случае ошибки – это всегда помнить, что если между двумя существительными нет предлога **of**, то второе из них – основное, определяемое (и с него надо начинать перевод), а первое является определением к нему. Сравните:

regulation speed	скорость регулировки
НО:	
regulation of speed	регулировка скорости.

Часто ряд состоит из трех слов, среднее из которых может быть причастием, герундием или прилагательным. Перевод такого ряда, как обычно, следует также начинать с последнего слова и продолжать в строго обратном порядке, причем при переводе должна быть соблюдена грамматическая форма среднего слова, например:

the rock-feeding system	система, подающая горную воду
a water-cooled conveyer	конвейер, охлаждаемый водой
the job scheduling problem	проблема планирования работ
Newton's important works	известные работы Ньютона

Перевод определения, в составе которого имеется прилагательные, вызывает некоторые трудности, поэтому следует помнить следующее.

- Если среднее слово в таком ряду выражено прилагательным, которое как бы **заключает в себе предлог**, например, **free** – свободный (от), то при переводе следует вводить этот предлог.

an oxygen **free** gas	газ, **свободный от** кислорода.

- Имеет значение место, которое занимает прилагательное: если оно стоит в ряду **первым**, то оно обычно относится к последнему (ключевому) слову.

The **important** measurement **parameters** are presented in Table 1.	Эти **важные параметры** измерения представлены в таблице 1.

Встречаются очень сложные ряды, включающие различные глагольные формы. Однако во всех случаях определяемым словом будет последнее.

A natural (*adjective*) language (*noun*) oriented (*participle II*) question (*noun*) answering (*gerund*) system (*noun*)	система (какая?) ответа на вопросы, ориентированная на естественные языки.

Unit 8.

COMPLEX SENTENCES

Сложные предложения (Complex Sentences)

Сложные предложения подразделяются на сложносочиненные и сложноподчиненные. Сложносочиненное предложение состоит из двух или нескольких простых, самостоятельных предложений, которые соединяются сочинительными союзами **and**, **but**, **or** и др. или бессоюзной связью.

My boss phoned yesterday, **but** he didn't leave a message.

Сложноподчиненное предложение состоит из главного предложения и одного или нескольких придаточных, которые поясняют главное. Придаточное предложение может соединяться с главным подчинительными союзами и союзными словами или без союзов.

I was working so hard **that** I forgot what time was.

I know he has done everything he had promised.

Любой член предложения может быть заменен придаточным предложением. Поэтому придаточные предложения подразделяются на придаточные подлежащие, сказуемые, дополнительные, определительные и обстоятельственные.

Необходимо отличать придаточное предложение от главного и от причастного или инфинитивного оборота.

1. Придаточные предложения в большинстве случаев вводятся союзами или союзными словами. Наиболее употребительные союзы: **that**, **who**, **which**, **when**, **where**, **how**, **if**, **though**, **although**, **after**, **because**, **before**, **till**, **until**, **as soon as**, **as if**, **as though**, **in case**, **provided**.

2. Придаточное предложение в отличие от зависимого оборота всегда имеет в своем составе подлежащее и сказуемое.

3. Придаточные предложения, зависимые от главного предложения, могут сами иметь придаточные, зависимые от них предложения.

Придаточные подлежащие
(Subject Clauses)

Придаточные подлежащие стоят перед сказуемым и вводятся союзами и союзными словами **that**, **what**, **who**, **where** и др.

What you say is not quite clear.	**То, что вы говорите**, не совсем ясно.
Who will do it depends on the circumstances.	**Кто будет это делать**, зависит от обстоятельств.

Перевод придаточного подлежащего, вводимого союзом **whether**, следует начинать с перевода глагола-сказуемого (стоящего справа от этого союза), который выносится в начало предложения с добавлением к нему частицы **ли**, например:

Whether these two phenomena are related has to be discovered.	**Связаны ли между собой эти два явления**, ещё предстоит выяснить.

Придаточные сказуемые
(Predicate Clauses)

Придаточные сказуемые в предложении являются смысловой частью сказуемого главного предложения, стоят после глагола-связки **to be** и могут вводиться теми же союзами и союзными словами, что и придаточные подлежащие: **that**, **what**, **who** и др.

Обратите внимание на способы перевода глагола-связки, который предшествует придаточному сказуемому.

The difficulty of distance education **is** that it demands great efforts from the students.	Трудность дистанционного образования **заключается в том**, что оно требует от студентов большого напряжения.

В роли глагола-связки может использоваться глагол **to remain** (оставаться), например:

The question **remains** whether these data are reliable.	**Остается выяснить**, являются ли эти данные надежными.

Придаточные дополнительные (Object Clauses)

Придаточные дополнительные следуют за сказуемым и вводятся

- союзами **that**, **if**, **whether**, причем на место последних при переводе ставится сказуемое (стоящее справа) с частицей **ли**:

Everybody knows **that** one must work regularly to master a foreign language.	Всем известно, **что** надо работать регулярно, чтобы овладеть иностранным языком.
I am not sure **if (whether)** he will take part in this conference.	Я не уверен, примет **ли** он участие в конференции.

- союзными словами **who**, **whom**, **whose**, **which**, **that**, **when**, **where**, **why**:

They ask **when** they should deliver the apparatus.	Они спрашивают, **когда** они должны доставить аппарат.

Придаточные дополнительные могут соединяться с главным предложением и бессоюзной связью.

I think we will complete our research in time.	Я думаю, **(что)** мы завершим свое исследование вовремя.

Придаточные определительные (Attribute Clauses)

Придаточные определительные могут служить определениями к любому члену предложения, выраженному существительным. Они всегда стоят **справа** от определяемого слова и не отделяются запятой. Они вводятся разными союзами и союзными словами **who, whom, whose, which**, **that**.

He was the first **who** referred to her work.	Он был первым, **кто** сослался на её работу.

Придаточные определительные могут соединяться с главным предложением и без союзного слова, которое нужно использовать при переводе.

The text **(which)** the student is reading is about latest achievements in computer science.	Текст, который читает этот студент, – это текст о последних достижениях в информатике.

Придаточные обстоятельственные (Adverbial Clauses)

Придаточные обстоятельственные указывают на обстоятельства, при которых совершается действие. Они подразделяются на придаточные места, времени, цели, условия и т.д. и поэтому могут вводиться многими союзами.

Придаточные места действия вводятся союзом **where** (где, куда, там, где).

Where there is a will there is a deed.	**Там, где** есть желание, там есть дело.

Придаточные времени действия вводятся союзами: **when** (когда), **as** (по мере того как), **while** (в то время как), **before** (до того как), **after** (после того как), **as soon as** (как только), **as long as** (пока), **till** (**until**) (до тех пор, пока … не).

Problems cannot be solved **until** they are accurately defined.	Проблемы не могут быть решены **до тех пор, пока** они **не** будут точно определены.

Уступительные придаточные вводятся союзами: **though (although)**, **while** (хотя), **whereas** (несмотря на то, что), **even if** (даже если).

Although the new method can be used to study these systems we shall use the old one.	**Хотя** новый метод может быть реализован для изучения этих систем, мы все же будем использовать старый.

Придаточные цели вводятся союзами: **that** (чтобы), **in order (that)** (для того, чтобы), **lest** (чтобы … не) к глаголу. С этими глаголами сказуемое стоит в сослагательном наклонении.

Two different sources were used **lest** there be interference.	Использовались два различных источника, **чтобы не** было взаимовлияния.

Придаточные следствия вводятся союзом: **so that** (так чтобы).

They gathered together round the table **so that** they could review the procedures they now follow.	Они собрались за круглым столом, **(так) чтобы** обсудить методы, которые они используют сейчас.

Придаточные причины вводятся союзами**: as** (так как), **since** (поскольку, так как), **for** (ибо, потому что, так как), если **for** стоит в

начале предложения и после запятой, **because** (потому что).

I went away **because** there was no one in the classroom.	Я ушел, потому что в классе никого не было.

Придаточные условия вводятся союзами**: if** (если), **unless** (если … не), **provided that (providing that)** (при условии, если), **given** (если дано / имеется), **even though** / **if** (даже если), **but / not for** (если бы не). Их можно разделить на три типа.

- **Реальное (выполнимое) условие** может относиться к любому времени и переводится **изъявительным наклонением**.

If the temperature is low, the reaction will proceed slowly.	**Если** температура будет низкой, реакция будет проходить медленно.

- **Маловероятное условие** может относиться к настоящему или будущему времени. Переводится **сослагательным наклонением**.

We would test the device if we got it.	Мы бы проверили этот прибор, если бы получили его (*но это маловероятно*).

- **Нереальное (невыполнимое) условие** относится к прошедшему времени. Переводится **сослагательным наклонением**.

We would have tested the device if we had got it.	Мы бы проверили этот прибор, если бы получили его. (*Но мы его не получили, поэтому не проверили.*)

В условных предложениях второго и третьего типа могут употребляться глаголы **might** (возможно, вероятно) и **could** (мог бы).

He **could (might) complete** the test if he had time.	Он мог бы закончить (*возможно, закончил бы*) тест, если бы у него было время (*сегодня, завтра*).
or:	или:
He **could (might) have completed** the test if he had had time.	Он мог бы закончить тест (*вчера*), если бы у него было время. (*Но у него не было времени, поэтому он не закончил тест.*)

Unit 9.

PARTICIPLE

Причастие (Participle)

Причастие (**Participle**) представляет собой одну из так называемых неличных форм глагола (**Verbals**), к которым также относятся герундий и инфинитив. Неличные формы образуются от глагола, имеют одинаковое с ним лексическое значение, но, в отличие от глагола, не изменяются по лицам, числам, не могут служить в предложении сказуемым. Они представляют собой ряд застывших неизменных глагольных форм, указывающих лишь на относительное время действия (настоящее, прошедшее) и его характер (активный, пассивный). Кроме глагольных свойств они имеют свойства некоторых других частей речи (имени существительного, имени прилагательного, наречия) и, следовательно, могут выполнять их функции в предложении.

Причастие I (Participle I)

Причастие I (**Participle I**) **–** неличная форма глагола, обладающая свойствами глагола, прилагательного и наречия. Оно образуется от основы глагола с помощью окончания **-ing** (to drink – drink**ing**, to run – runn**ing**, to write – writ**ing**) и участвуют в образовании времен групп Progressive (He is running) и Perfect Progressive (I have been writing). Причастие I соответствует формам причастия и деепричастия в русском языке.

Вид	**Действительный залог**	**Страдательный залог**
Неперфектный (несовершенный)	translating coming	being translated –
Перфектный (совершенный)	having translated having come	having been translated –

Как и глагол, причастие I имеет формы вида (перфекта) и залога. Для причастий, образованных от переходных глаголов, имеется 4 формы, от непереходных – 2.

Функции причастия I в предложении

Причастие I в функции определения обычно переводится на русский язык действительным причастием.

This is an out-of-date **translating** system.	Это устаревшая **транслирующая** система.
The girl **translating** the article is my sister.	Девушка, **переводящая (которая переводит)** статью, – моя сестра.

Однако существуют некоторые особенности перевода причастия в функции обстоятельства.

Неперфектное причастие I действительного залога Simple Participle I Active обозначает действие, параллельное действию, выраженному глаголом-сказуемым. Перед причастием в функции обстоятельства часто стоят союзы **when** или **while**.

***While* translating** the article the student consulted the dictionary.

Такие словосочетания переводятся на русский язык различными способами:

- Деепричастным оборотом с опущением союза

Переводя статью, студент пользовался словарем.

- Предлогом ***при*** + существительное

При переводе статьи студент пользовался словарем.

- Придаточным предложением, которое начинается с союзов *когда, в то время как.* В качестве подлежащего этого предложения употребляется существительное, стоящее за этим оборотом, или заменяющее его личное местоимение

Когда студент переводил статью, он пользовался словарем.

Перфектное причастие I действительного залога Perfect Participle I Active обозначает действие, предшествующее действию, выраженному глаголом-сказуемым, и переводится:

- деепричастием совершенного вида

Having translated the article I went to the University.	**Переведя** статью, я пошел в университет.

- либо придаточным предложением

Having come home I wrote a letter to my friend.	**Когда я пришел домой**, я написал письмо другу.

Неперфектное причастие I страдательного залога Simple Participle I Passive переводится на русский язык глаголом-сказуемым придаточного предложения в **настоящем времени**, если сказуемое английского предложения имеет форму настоящего времени.

The property depends on the materials **being used**.	Это свойство зависит от материалов, **которые используются**.

Но оно может переводиться глаголом-сказуемым в **прошедшем времени**, если сказуемое английского предложения стоит в прошедшем времени.

Being invited to the conference he left for Moscow.	**Так как его пригласили на конференцию**, он уехал в Москву.

Перфектное причастие I страдательного залога Perfect Participle I Passive переводится придаточным предложением, которое начинается с союзов *когда, после того как*:

Having been translated the article was sent to the journal.	**Когда** (или: **после того как**) статью перевели, ее послали в журнал.

Причастие II

Причастие II, третья основная форма глагола, имеет одну неизменяемую форму со страдательным значением и обозначает действие, которое испытывает на себе лицо или предмет. Оно соответствует в русском языке причастию страдательного залога. Причастие II правильных глаголов образуется прибавлением к инфинитиву окончания **-ed** (to finish – finish**ed**), форму причастия II неправильных глаголов следует знать наизусть.

Причастие II используется, главным образом, для образования аналитических форм:

1) страдательного залога;
2) перфектных форм.

Подобно причастию I, причастие II обладает свойствами глагола, прилагательного и наречия. Как и глагол, оно обозначает действие. Однако, в отличие от русского языка, где форма причастия настоящего или прошедшего времени совершенного или несовершенного вида указывает на время совершения действия и его завершенность или незавершенность, в английском языке существует только одна форма

причастия II. В зависимости от контекста, причастие II может соответствовать разным формам страдательного причастия в русском языке.

The book **discussed** (*yesterday*) at the lesson deals with science.	Книга, **обсужденная** (*вчера*) на уроке, связана с проблемами науки.
The book **discussed** now is very interesting.	Книга, **обсуждаемая** сейчас, очень интересна.

Функции причастия II

В зависимости от выполняемой функции причастие II переводится на русский язык причастиями настоящего и прошедшего времен, глаголами в соответствующем времени и залоге, придаточными предложениями.

Функция	Пример	Перевод
Определение а) перед определяемым словом б) после определяемого слова	A **written** letter was on the table. The device **used*** is very reliable.	Написанное **письмо было на столе.** **Используемый** прибор (*или*: прибор, **который используется**) – очень надежный.
Часть сказуемого а) составного глагольного сказуемого б) простого глагольного сказуемого	This problem remains **unsolved**. The article was **translated** by my colleague.	Эта проблема остается **нерешенной**. Статья была **переведена** моим коллегой.
Обстоятельство (причастный оборот)	**(When) given some time to think** he always answered well.	**Когда ему давали подумать**, он всегда отвечал хорошо.

* Одиночное причастие II в роли определения, стоящее после определяемого слова, при переводе на русский язык следует или поставить перед определяемым словом, или перевести придаточным предложением после определяемого слова.

Unit 10.

GERUND

Герундий (Gerund)

Герундий – это неличная форма глагола, сочетающая в себе свойства глагола и существительного. Герундий выражает действие, представляя его как название процесса. Он образуется от основы глагола с помощью окончания **-ing.** Формы глагола, подобной герундию, в русском языке нет.

Характерные приметы герундия:

- не имеет при себе артиклей;
- не имеет множественного числа;
- может иметь прямое дополнение;
- перед ним может стоять притяжательное местоимение;
- может определяться наречием.

Внешне похожее на герундий **отглагольное существительное**, напротив:

- может иметь артикли и множественное число;
- может определяться прилагательным;
- никогда не имеет при себе прямого дополнения.

Герундий, как и глагол, называет действие и имеет категории перфекта и залога. Герундий, образованный от переходных глаголов, имеет 4 формы: а от непереходных – 2.

Формы герундия

Вид	Действительный залог	Страдательный залог
Неперфектный (несовершенный)	translating going	being translated –
Перфектный (совершенный)	having translated having gone	having been translated –

Функции герундия

Функция	Пример	Перевод
Подлежащее	**Reading** English papers is necessary for every engineer. His **having read** this article helped him with his diploma work.	**Чтение / читать** по-английски необходимо каждому инженеру (*отглагольное существительное или неопределенная форма глагола*) **То, что он прочел** эту статью, помогло ему с дипломной работой. (*придаточное предложение*)
Часть составного сказуемого	His favourite occupation is **reading**.	Его любимое занятие – **чтение** / **читать** (*отглагольное существительное или неопределенная форма глагола*)
Дополнение а) прямое б) предложное*	 He likes **reading**. He is thinking of **reading** his report at the conference.	 Он любит **чтение** / **читать**. (*отглагольное существительное или неопределенная форма глагола*) Он думает **прочитать** свой доклад на конференции (*неопределенная форма глагола*)
Определение**	I like his way ***of*** **reading**.	Мне нравится его манера **чтения** / **читать** (*отглагольное существительное или неопределенная форма глагола*)
Обстоятельство***	***After*** **reading** the article he made a short summary of it. (ср. **having read** – причастие I) ***By*** **reading** much we learn much.	**Прочитав статью,** / **После чтения статьи** он кратко изложил ее содержание (*деепричастие или существительное с предлогом*) Много **читая**, мы многое узнаем (*деепричастие*)

* После глаголов с послелогами: **to depend on**, **to insist on**, **to object to**, **to think of** и др.

** Перед герундием всегда ставится предлог **of**.

*** Перед герундием ставится один из следующих предлогов: **after**, **before**, **on**, **at**, **in**, **for**, **by**, **without** и др.

Unit 11.

INFINITIVE

Инфинитив (Infinitive)

Инфинитив – неличная форма глагола, которая отвечает на вопрос «что делать?» и формальным признаком которой является частица **to**.

Чаще всего инфинитив употребляется после глагола в личной форме или после модального глагола (без частицы **to**).

I like **to play** tennis.	Я люблю **играть** в теннис.
I can **play** tennis well.	Я могу хорошо **играть** в теннис.

В английском языке инфинитив имеет следующие формы временной отнесенности и залога.

Simple Infinitive выражает действие, происходящее одновременно с действием глагола-сказуемого или непосредственно следующее за ним.

He is glad **to help** his friend.	Он рад **помочь** своему другу.
He is glad **to be helped**.	Он рад, что ему **помогают**.

Progressive Infinitive означает действие, происходящее одновременно с действием глагола-сказуемого.

He is glad **to be helping** his friend.	Он рад, что **помогает** своему другу (сейчас).

Perfect Infinitive выражает действие, которое произошло раньше действия, выраженного глаголом-сказуемым.

He is glad **to have helped** his friend.	Он рад, что **помог** своему другу.
He is glad **to have been helped.**	Он рад, что ему **помогли**.

В английском языке распространены структуры типа:

He *seems* **to know** English.	Он, *кажется*, **знает** английский язык.

На русский язык такие предложения переводятся простым предложением с вводными словами типа: *кажется, по-видимому, случайно, очевидно.*

The child *seems* **to be sleeping** now.	Ребенок, *кажется*, сейчас **спит**.

Функции инфинитива в предложении

Функция	Пример	Перевод
Подлежащее	**To translate** articles is difficult.	**Переводить** статьи трудно.
Часть составного сказуемого: а) после глагола **to be** б) после модального глагола в) после вспомогательного глагола	His task was **to translate** the article in time. He can **translate** articles. He will **translate** this article next week.	Его задача состояла в том, чтобы **перевести** статью вовремя. Он может **переводить** статьи. Он будет **переводить** эту статью на следующей неделе.
Дополнение: а) после глагола б) после прилагательного	He likes **to translate** technical articles. I am glad **to have translated** this article.	Он любит **переводить** технические статьи. Я рад, что **перевел** эту статью
Определение: а) после слов **the first, the last** и т.д. б) после существительного (инфинитив выражает действие, которое должно произойти в будущем)	He was the first **to translate** the article. Here is the article **to translate**. Here is the article **to be translated**.	Он первый **перевел** эту статью. Вот статья **для перевода**. Вот статья, **которую нужно перевести**. (*определительное придаточное предложение*)
Обстоятельство цели: а) в конце предложения б) в начале предложения	He went home **to translate** the article. **To translate** articles you must know English well.	Он пошел домой, чтобы **переводить** статью. Чтобы **переводить** статьи, вы должны хорошо знать английский язык. (*придаточное предложение*)

UNIT 12.

VERBALS

Неличные формы (Verbals)

Функции инфинитива и герундия в предложении

В предложении инфинитив часто выполняет те же функции, что и герундий.

Однако имеется отличие в употреблении герундия и инфинитива.

Для обозначения **часто повторяющегося действия** или деятельности используется **герундий**.

He never forgets **doing** his homework.	Он никогда не забывает делать домашнюю работу.

Для обозначения **однократного действия** употребляется **инфинитив**.

He forgot **to do** his homework.	Он забыл сделать домашнюю работу.

Инфинитив	**Герундий**	**Перевод**
Подлежащее		
To study English is difficult.	**Studying** English is difficult.	Трудно **изучать** английский язык.
Часть сказуемого		
My aim is **to study** English.	My aim is **studying** English.	Моя цель – **изучать** английский язык.
Дополнение		
I like **to study** English.	I like **studying** English.	Мне нравится **изучать** английский язык.
Определение (чаще с предлогом *of*)		
There are a lot of ways **to study** English.	There are a lot of ways ***of* studying** English.	Существует много способов **изучать** английский язык.
Обстоятельство цели (с предлогом *for*)		
I am going to London **to study** English.	I am going to London ***for* studying** English.	Я поеду в Лондон (чтобы) **изучать** английский язык.

Функции герундия и причастия

Герундий имеет формы, одинаковые с причастием I, но выполняет различные с ним функции.

Функция	Герундий	Причастие
Подлежащее	**Driving** a car is a profession. **Водить** машину – это профессия.	–
Часть составного сказуемого	His hobby is **driving**. Его хобби – **вождение** / **водить** машину.	He is **driving** to Moscow (now). Он **едет** на машине в Москву (сейчас).
Дополнение	He writes articles *about* **driving**. Он пишет статьи о **вождении** (**о том, как водить машину**).	–
Определение	His plan *of* **driving** to Moscow is not good. Его план **поехать** в Москву на машине (за рулем) не очень хороший.	The man **driving** a car is our chief engineer. Человек, **управляющий** машиной (за рулем), – наш главный инженер.
Обстоятельство	*Before* **driving** a car one must learn to do it properly. **Прежде чем водить машину**, нужно как следует научиться этому.	**Driving** a car a man tries to keep steady speed and watch the car in front of him. **Управляя** машиной, человек старается держать постоянную скорость и наблюдать за автомобилем впереди него.

Unit 13.

PARTICIPLE CONSTRUCTIONS

Абсолютный оборот с причастием I (Absolute Participle I Construction)

Абсолютный причастный оборот (**Absolute Participle I Construction**) имеет собственное подлежащее, выраженное существительным в общем падеже или личным местоимением в форме именительного падежа. На русский язык этот оборот переводится придаточным обстоятельственным предложением, начинающимся союзами *так как, когда, после того как*. Он всегда отделен запятой от остальной части предложения.

My brother translating the article, we couldn't go to the disco.	**Так как мой брат переводил статью**, мы не могли пойти на дискотеку.

Употребление формы **Perfect Participle I** обозначает, что выраженное ею действие предшествует действию глагола-сказуемого.

My brother having translated the article, we went to the disco.	**Когда брат перевел статью**, мы пошли на дискотеку.

Предложение с независимым причастным оборотом, стоящим в конце предложения, чаще всего переводится на русский язык сложносочиненным предложением с союзами *причем, а, и, но*. Глагол-связка **being** иногда опускается, однако при переводе следует использовать глагол *быть, являться* или другой, подходящий по смыслу.

The cars at that time were very small, **the engine (being) placed under the seat.**	Автомобили были в то время очень маленькими, **причем двигатель находился под сиденьем**.

Некоторые независимые причастные обороты, выражающие сопутствующие обстоятельства, иногда начинаются предлогом **with**, который на русский язык не переводится.

With the experiments having been carried out, we started some new investigations.	**После того как опыты были закончены**, мы начали новые исследования.

Абсолютный оборот с причастием II (Absolute Participle II Construction)

Абсолютный оборот с причастием II (**Absolute Participle II Construction**) состоит из двух частей. Первая выражена личным местоимением в именительном падеже или существительным в общем падеже, которое обозначает лицо, претерпевающее действие, выраженное причастием II, т.е. второй частью конструкции.

В предложении этот оборот употребляется в функции различных обстоятельств и на русский язык переводится соответствующими обстоятельственными предложениями.

(*When*) the project finished, we stopped the experiment.	**Когда проект был закончен**, мы остановили эксперимент.

Unit 14.

GERUND CONSTRUCTION

Герундиальный оборот (Gerund construction)

Герундиальный оборот – это сочетание притяжательного местоимения или существительного в притяжательном или общем падежах с герундием. Такой оборот переводится обычно придаточным предложением с союзами *что, то, что, о том, чтобы,* причем герундий в русском предложении становится сказуемым этого придаточного предложения. Притяжательное местоимение (или существительное в притяжательном падеже) становится подлежащим придаточного предложения.

Вид и залог	Пример	Перевод
Неперфектный вид, действительный залог	I know of **his translating** the article.	Я знаю, что **он переводит** статью.
Перфектный вид, действительный залог	I know of **his having translated** the article.	Я знаю, что **он перевел** статью.
Неперфектный вид, страдательный залог	I know of **the article being translated**.	Я знаю, что **статью переводят**.
Перфектный вид, страдательный залог	I know of **the article having been translated**.	Я знаю, что **статью перевели**.

Unit 15.

INFINITIVE CONSTRUCTIONS

Инфинитивные обороты (Infinitive constructions)

Сложное дополнение (Complex Object)

В английском языке суждение, мнение, предположение о чем-либо или о ком-либо можно выразить двумя способами:

1) сложноподчиненным предложением с дополнительным придаточным предложением

We know (***that***) **he is** a good programmer.	Мы знаем, что он хороший программист.

2) простым предложением со сложным дополнением (**Complex Object**), состоящим из местоимения в объектном падеже или существительного в общем падеже и инфинитива

We know **him to be** a good programmer.	Мы знаем, что он хороший программист.

На русский язык Complex Object переводится придаточным дополнительным предложением с союзами *что, чтобы, как.* Существительное или местоимение становится подлежащим, а инфинитив – сказуемым русского придаточного предложения.

I hope **her to come**. (= I hope **that she will come**.)	Я надеюсь, **что она придет**.

«Вводящими» чаще всего бывают глаголы, выражающие:

- **желание и намерение**: *to want, to wish, to desire, to intend, to mean*;
- **умственное восприятие**: *to know, to think, to consider, to believe, to suppose, to expect, to imagine*;
- **приказ, разрешение, просьбу**: *to order, to ask, to allow, to have, to make*;
- **физическое восприятие**: *to see, to watch, to observe, to notice* (после этих глаголов инфинитив употребляется без частицы **to**);
- **чувства и эмоции**: *to like, to love, to hate, to dislike.*

Сложное подлежащее (Complex Subject)

В английском языке мнение или предположение группы неопределенных лиц о чем-либо или о ком-либо можно также выразить двумя способами:

1) сложноподчиненным предложением

It is known that he is a good programmer.	Известно, что он хороший программист.

2) простым предложением со сложным подлежащим (**Complex Subject**), которое состоит из подлежащего и инфинитива

He is known **to be** a good programmer.	Известно, что он хороший программист.

«Вводящие» глаголы употребляются в страдательном залоге и выражают:

- **умственное восприятие**: *to think, to consider, to know, to expect, to believe*;
- **физическое восприятие**: *to see, to hear*;
- **предположение**, **сообщение**: *to suppose, to report, to prove, to turn out, to appear, to seem, to say.*

Complex Subject употребляется также с выражениями: **to be (un)likely** (вероятно, маловероятно, вряд ли), **to be certain, to be sure** (обязательно, наверняка).

Julia *is sure* **to come back** in time.	**Джулия** *обязательно* **вернется** вовремя.

«Вводящие» глаголы **to seem** (казаться), **to prove**, **to turn out**, **to appear** (оказываться), **to happen (**случаться) употребляются в действительном залоге.

He *seems* **to know** English.	*Кажется*, **он знает** английский язык.

При переводе «вводящие» глаголы передаются неопределённо-личным предложением, первый член конструкции переводится подлежащим русского предложения, инфинитив – сказуемым предложения.

Инфинитивный оборот с предлогом *for*
(Infinitive Construction with *for*)

Функция инфинитива	Пример	Перевод
Подлежащее	**For me to translate** this text is difficult.*	**Мне трудно перевести** этот текст.
Дополнение	We waited **for him to come**.	Мы ждали, **пока он придет**.
Обстоятельство	I'll reread the rule **for you to understand**.	Я прочитаю правило снова, **чтобы вы его поняли**.

Инфинитивный оборот с предлогом **for** представляет собой сочетание предлога **for** с существительным в общем падеже или местоимением в объектном падеже и инфинитива. Инфинитив показывает, какое действие должно быть совершено лицом, обозначенным существительным или местоимением. Этот оборот переводится на русский язык придаточным предложением обычно с союзом *что, чтобы.*

В предложении данный оборот выполняет такие же функции, что и инфинитив.

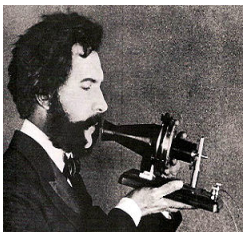
*Этот оборот может употребляться в функции сложного подлежащего с вводным **it**: It's difficult **for me to translate** this text.

TEXTS
FOR SELF-STUDY
TRAINING

Text 1

HISTORY OF TELEPHONE

To be read after Text A (Unit 1)



Alexander Graham Bell was born on March 3, 1847, in Edinburgh, Scotland. His father, Alexander Melville Bell, was an expert on the mechanics of the voice and on elocution (the art of public speaking). After studying at the University of Edinburgh and University College, London, England, Bell became his father's assistant. He taught the deaf to talk by adopting his father's system of visible speech.

In 1871, Alexander went to Boston to teach at the School for the Deaf, the first such school in the world. To help deaf children, Bell experimented in the summer of 1874 with a human ear, magnets, smoked glass, and other things. He conceived the theory of the telephone: that an electric current can be made to change its force just as the pressure of air varies during sound production. That same year he invented a telegraph that could send several messages at once over one wire, as well as a telephonic-telegraphic receiver.

Bell supplied the ideas; his assistant Thomas Watson created the equipment. Working with tuned reeds and magnets to make a receiving instrument and sender work together, they transmitted a musical note on June 2, 1875. Bell's telephone receiver and transmitter were identical: a thin disk in front of an electromagnet (a magnet created by an electric current).

On February 14, 1876, Bell's attorney filed for a patent, or a document guaranteeing a person the right to make and sell an invention for a set number of years. The U.S. Patent Office granted Bell the patent for the "electric speaking telephone" on March 7. It was the most valuable single patent ever issued. It opened a new age in communications technology.

Bell continued his experiments to improve the telephone's quality. The first two-way outdoor conversation was between Boston and Cambridge by Bell and Watson. In 1877 the first telephone was installed in a private home; a conversation took place between Boston and New York using telegraph lines; in May the first switchboard (a central machine used to connect different telephone lines), devised by E. T. Holmes in Boston, was a burglar alarm connecting five banks; and in July the first organization to make the

telephone a commercial venture, the Bell Telephone Company, was formed. That year Bell introduced the telephone to England and France.

The Bell Company built the first long-distance line in 1884, connecting Boston and New York. Bell and others organized The American Telephone and Telegraph Company in 1885 to operate other long-distance lines. By 1889 there were 11,000 miles of underground wires in New York City.

Bell was also involved in other activities that took much of his time. The magazine *Science* was founded in 1880 because of Bell's efforts. As National Geographic Society president from 1896 to 1904, he contributed to the success of the society and its publications. Aviation was Bell's primary interest after 1895. He aided physicist and astronomer Samuel Langley, who experimented with heavier-than-air flying machines; founded the Aerial Experiment Association (1907).

Bell died in Canada, on August 2, 1922. His contribution to the modern world and its technologies was enormous.

Words and expressions to the text

elocution	*ораторское искусство, риторика, публичная речь*	**to issue**	*выдавать (документ)*
deaf	*глухой*	**two-way outdoor conversation**	*двухсторонняя внешняя связь*
to adopt	***зд.*** *заимствовать*	**switchboard**	*коммутатор*
visible speech	*видимая речь (система фонетической транскрипции Белла)*	**to devise**	*выдумывать, изобретать*
smoked glass	*дымчатое стекло*	**burglar alarm**	*охранная сигнализация*
to conceive	*дать начало чему-л.*	**venture**	*(рискованное) предприятие, фирма*
at once	*одновременно*	**long-distance line**	*междугородная линия связи*
to vary	*меняться, изменяться*	**underground wire (cable)**	*подземный кабель*

to supply	*поставлять*	**to be involved in**	*участвовать*
to tune reeds	*настраивать язычковые музыкальные инструменты*	**to aid**	*оказывать помощь, поддержку*
to file for a patent	*подавать заявку на патент*	**contribution**	*вклад (во что-л.); содействие (чему-л.)*
to grant a patent	*выдавать патент*		

Ex. 1. Arrange these sentences in order to make a logical paragraph about the history of telephone.

1. In 1877, the first telephone was installed in a private home; the first switchboard was a burglar alarm connecting five banks; and the Bell Telephone Company was formed.
2. The first two-way outdoor conversation was between Boston and Cambridge by Bell and Watson on October 9, 1876.
3. Bell and others organized The American Telephone and Telegraph Company in 1885 to operate other long-distance lines.
4. The Bell Company built the first long-distance line in 1884, connecting Boston and New York.
5. Bell was also involved in other activities; he founded the magazine *Science* and the Aerial Experiment Association, he held the position of National Geographic Society president.
6. Alexander Graham Bell was born on March 3, 1847, in Edinburgh, Scotland.
7. On February 14, 1876, Bell got a patent for the “electric speaking telephone” that opened a new age in communications technology.
8. After studying at the University he taught the deaf to talk by adopting his father’s system of visible speech.
9. Bell died in Canada on August 2, 1922.
10. He invented a telegraph that could send several messages at once over one wire, as well as a telephonic-telegraphic receiver.

Text 2

WHO INVENTED RADIO?

To be read after Text B (Unit 1)

The methods of radio engineering are now used in various fields of science and technology. At present there is no branch of science where some kind of radio equipment is not used. Distant areas of the Universe are studied with the help of radio. Spacecrafts are guided by radio. Radio devices have made it possible to obtain the information about the mysterious and amazing phenomena taking place in far-away Galaxies as well inside atomic nuclei. But there is no answer to the question "Who invented radio?" yet.

Beginning in the early 1890s, a Russian physicist A.S. Popov made experiments along the lines of Hertz's research. In 1894-95 he built his first radio receiver. He presented it to the Russian Physical and Chemical Society in May 7, 1895. The paper on his findings was published the same year (December 15, 1895). Popov recorded, at the end of 1895 that he was hoping for distant signaling with radio waves.

In the years that followed, Popov worked on his design. His receiver sensed lightning strikes at distances of up to 30 km, thus functioning as a lightning detector. In late 1895, Popov built a version of the receiver that was capable of automatically recording lightning discharges. Popov's system was eventually extended to function as a wireless telegraph, with a Morse key attached to the transmitter. There is some dispute regarding the first public test of this design. It is frequently stated that Popov used his radio to send a Morse code message over a distance of 250 m in March 1896 (three months before Marconi's patent was filed). However, contemporary confirmations of this transmission are lacking. It is more likely that said experiment took place in December 1897.

In 1900, a radio station was established under Popov's instructions to provide two-way communication by wireless telegraphy between the Russian naval base and the crew of the battleship General-Admiral Apraksin. By February 5 messages were being received reliably. The wireless messages were relayed over the distance of about 25 miles.

An Italian electrical engineer Guglielmo Marconi read about the experiments that Hertz did in the 1880s. It was at that time that Marconi began to understand that radio waves could be used for wireless

communications. His early apparatus was a development of Hertz's laboratory apparatus into a system designed for communication purposes. At first Marconi used a transmitter to ring a bell in a receiver in his attic laboratory. He then moved his experiments out-of-doors to communicate further. He transmitted radio signals for about a mile at the end of 1895. By 1896, Marconi introduced to the public a device in London, asserting it was his invention. His demonstrations of the use of radio for wireless communications, equipping ships with life saving wireless communications, establishing the first transatlantic radio service, and building the first stations for the British short wave service, have marked his place in history.

In 1902, Marconi transmitted from his station in Glace Bay, Canada, across the Atlantic and in 1903 sent a message of greeting from Theodore Roosevelt, the President of the United States, to King Edward VII of the United Kingdom, marking the first transatlantic radio transmission originating in the United States. Later Marconi founded the Marconi Company. In order to establish his monopoly, he had given instructions to his operators only to exchange wireless signals with other stations also manned by Marconi's operators, and it was this action of a private company which stirred up most opposition.

In 1903 the International Conference on Radio took place in Berlin. One of the reasons for calling this conference was to stop the attempt of Marconi to monopolize radio. In the Final Protocol of the Berlin Conference it was stated that "Coast stations should receive and transmit telegrams originating from or destined for ships at sea without distinction as to the system of radio used by latter". In spite of the very elementary state of radio in 1903, this principle and the others of the Final Protocol became the basis for the regulation of radio communication.

Words and expressions to the text

field	*область, отрасль*	**research**	*научное исследование*
branch	*отрасль, область*	**to relay**	*транслировать, передавать*
to obtain	*получать*	**to develop**	*развивать, разрабатывать*
phenomenon	*явление*	**to design**	*конструировать, предназначать*

to take place	*происходить*	**to establish**	*устанавливать, создавать*
nucleus (*pl.* **nuclei**)	*ядро*	**to send**	*посылать, передавать*
to present (*v*)	*представлять*	**message**	*сообщение*
present (*adj.*)	*настоящий, современный*	**in spite of**	*несмотря на*
to record (*v*)	*записывать*	**state**	*состояние, государство, штат*
record (*n*)	*запись, пластинка*		

Notes to the text

said experiment	*упомянутый эксперимент*
it was …that	*именно*
in order to	*для того чтобы*

Ex. 2. Read the following statements and decide if they are true (T) or false (F).

1. Popov presented his radio receiver in 1900.
2. The receiver functioned as a lightning detector.
3. Popov sent a Morse code message over a distance of 25 miles in 1896.
4. Marconi demonstrated his device in London in 1896.
5. Marconi was the first who sent a message of greeting from the United Kingdom to the USA.
6. Marconi's company exchanged wireless signals with all the other stations.
7. The International Conference on Radio was held to stop Marconi's monopoly.

Ex. 3. Read the text again and answer the questions.

1. Where is radio used today?
2. What experiments did Popov make?
3. When did he present his radio receiver?
4. How did Popov's invention function?
5. When did Popov send his first message?
6. Why was the radio station built in Russia in 1900?
7. What did Marconi do to build his apparatus?

8. Where was the first message across the Atlantic sent from?
9. How did Marconi try to monopolize radio?
10. Was his attempt successful? Why?
11. What is the basic principle for the regulation of radio communication?
12. Who invented radio?

Text 3

SATELLITE TELEVISION

To be read after Text A (Unit 4)

Television is a widely used telecommunication medium for transmitting and receiving moving images, either monochromatic (black and white) or color, usually accompanied by sound. "Television" may also refer specifically to a television set, television programming or television transmission. The word is derived from mixed Latin and Greek roots, meaning "far sight".

Commercially available since the late 1930s, the television set has become a common communications receiver in homes, business and institutions, particularly as a source of entertainment and news. Since the 1970s the availability of video cassettes, laserdiscs, DVDs have resulted in the television set frequently being used for viewing recorded as well as broadcast material.

Until 2000s broadcast TV programs were generally recorded and transmitted as an analog signal, but in recent years public and commercial broadcasters have been progressively introducing digital television broadcasting technology.

The first satellite television signal was relayed from Europe to the Telstar satellite over North America in 1962. The world's first commercial communication satellite, called Intelsat, was launched into synchronous orbit on April 6, 1965.

Satellite television, like other communications relayed by satellite, starts with a transmitting antenna located at an uplink facility. Uplink satellite dishes are very large, as much as 9 to 12 meters in diameter. The increased diameter results in more accurate aiming and increased signal strength at the satellite. The uplink dish is pointed toward a specific satellite and the uplinked signals are transmitted within a specific frequency range, so as to be received by one of the transponders tuned to that frequency range aboard

that satellite. The transponder "retransmits" the signals back to Earth but at a different frequency band (a process known as translation, used to avoid interference with uplink signal), typically in the C-band (4-8 GHz) or Ku-band (12-18 GHz) or both. The leg of the signal path from the satellite to the receiving Earth station is called the downlink.

The downlinked satellite signal, quite weak after traveling the great distance, is collected by a parabolic receiving dish. A satellite dish is just a special kind of antenna designed to focus on a specific broadcast source. The standard dish consists of a parabolic surface and a central feed horn. To transmit a signal, a controller sends it through the horn, and the dish focuses the signal into a relatively narrow beam. The dish on the receiving end can not transmit information; it can only receive it. The receiving dish works in the exact opposite way of the transmitter.

The central element in the feed horn is the low noise blockdown converter, or LNB. The LNB amplifies the signal bouncing off the dish and filters out the noise. The LNB passes the amplified, filtered signal to the satellite receiver inside the viewer's house. The end component in the entire satellite TV system is the receiver. The satellite receiver demodulates and converts the signals to the desired form.

Words and expressions to the text

medium	*среда; средний*	**power**	*мощность, энергия*
image	*образ, изображение*	**to launch**	*запускать*
to accompany	*сопровождать*	**facilities**	*оборудование, аппаратура*
sound	*звук*	**uplink**	*линия связи "Земля – спутник"*
band	*полоса пропускания, диапазон*	**feed horn**	*рупорный облучатель антенны*
source	*источник*	**downlink**	*линия связи "спутник – Земля"*
to result in	*вести к ч-л; приводить к ч-л.*	**strength**	*сила, напряженность*
frequently	*часто*	**transponder**	*ответчик*
to affect	*влиять, воздействовать*	**to tune**	*настраивать*

Ex. 4. Read the following statements and decide if they are true (T) or false (F).

1. Moving images in TV are usually accompanied by sound.
2. In 1990s digital signal was used to record and transmit broadcasting TV program.
3. The first communication satellite was launched into orbit in 1962.
4. The transponder retransmits the signals to Earth at the same frequency band.
5. The path of the signal from the satellite to the receiving Earth station is called downlink.
6. A satellite dish is used to focus on a specific broadcast source.
7. The dish on the receiving end can both transmit and receive information.

Ex. 5. Read the text again and answer the questions.

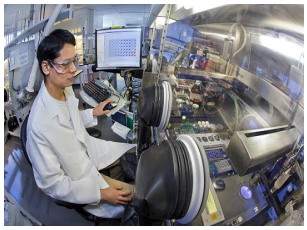
1. What does the word "television" mean?
2. When was communication satellite Intelsat launched into orbit?
3. What is uplink facility?
4. What is the downlink?
5. What is C-band transmission affected by?
6. What is a satellite dish designed for?
7. What does it consist of?
8. How does the transmitting dish operate?
9. Are there any obstacles between the satellite and the dish?
10. What is the LNBC?
11. Does the satellite receiver amplify the signal?

Text 4

A ROBOT CALLED WANDA

To be read after Text B (Unit 4)

No longer attributable to human error – Berkeley Lab scientists have established a revolutionary nanocrystal-making robot, capable of producing nanocrystals with staggering precision. This one-of-a-kind robot provides colloidal nanocrystals with custom-made properties for electronics, biological labeling and luminescent devices.



This robotic engineer is named WANDA (Workstation for Automated Nanomaterial Discovery and Analysis) and was developed in collaboration with Symyx Technologies at the Molecular Foundry, a U.S. Department of Energy User Facility located at Berkeley Lab. By automating the synthesis of these nanocrystals, WANDA circumvents the issues facing traditional techniques, which can be laborious and are difficult to reproduce from one laboratory to the next. What's more, WANDA's synthetic prowess can help researchers sift through a large, diverse pool of materials for specific applications. Such a combinatorial approach has been used for decades in the pharmaceutical industry and now is being applied to nanomaterials at the Foundry.

"WANDA makes nanocrystals of exceptional quality – every time – optimized for different applications," said Delia Milliron, Director of the Inorganic Nanostructures Facility at the Molecular Foundry. "We're providing these to users and now just starting to use WANDA to discover new nanocrystal compositions with advantageous properties."

WANDA's liquid-handling robotics prepare and initiate reactions by injecting nanocrystal precursor chemicals into an array of reactors. After a series of reactions is complete, the structural and optical properties of these nanocrystals can be screened rapidly, also using automated methods. WANDA is housed inside a nitrogen-filled chamber, designed to keep oxygen and water from interacting with reactive precursor chemicals and freshly formed nanocrystals. Since this robot is controlled by software protocols, novice users can direct WANDA to perform complex workflows that traditionally require extensive chemistry experience.

Milliron and her coauthors at the Foundry and University of California, Berkeley, have directed WANDA to produce and optimize a diverse set of nanomaterials under conditions analogous to those employed in traditional flask-based chemistry. Starting with widely studied and practically useful nanomaterials – such as cadmium selenide quantum dots, whose size can be adjusted to emit different colors of visible light – the team showed how WANDA can optimize the size, crystal structure and luminescence properties of different nanocrystals.

"This technology will change the way nanoscience research is performed," said Emory Chan, a senior scientific engineering associate at the Molecular Foundry. "Not only does WANDA enable the optimization and mass

production of nanoparticles our users need, but this robot also facilitates experiments that give us a deeper understanding into the chemistry and physics of nanoscale materials."

A paper reporting this research titled, "Reproducible, high-throughput synthesis of colloidal nanocrystals for optimization in multidimensional parameter space," appears in the journal Nano Letters and is available in Nano Letters online. Co-authoring the paper with Chan and Milliron are Chenxu Xu, Alvin Mao, Gang Han, Jonathan Owen and Bruce Cohen.

This work was supported by DOE's Office of Science.

The Molecular Foundry is one of the five DOE Nanoscale Science Research Centers (NSRCs), premier national user facilities for interdisciplinary research at the nanoscale. Together the NSRCs comprise a suite of complementary facilities that provide researchers with state-of-the-art capabilities to fabricate, process, characterize and model nanoscale materials, and constitute the largest infrastructure investment of the National Nanotechnology Initiative.

Words and expressions to the text

attributable	*приписываемый*	**workflow**	*автоматизированный поток деятельности*
staggering precision	*потрясающая точность*	**to require**	*требовать*
custom-made properties	*заданные свойства*	**a set of**	*ряд, набор*
robotic engineer	*робот-специалист*	**under conditions**	*при условиях*
collaboration	*сотрудничество*	**flask-based chemistry**	*лабораторная химия*
circumvent	*обойти, обмануть*	**dot**	*точка*
laborious	*трудоемкий, тяжелый*	**to adjust**	*регулировать*
prowess	*доблесть, отвага*	**to emit**	*излучать*
to sift	*просеивать, анализировать*	**visible light**	*видимый свет*

diverse	*разнообразный*	**nanoparticle**	*наночастица*
approach	*метод, подход*	**to facilitate**	*облегчать*
composition	*структура, состав*	**nanoscale**	*наномасштаб*
advantageous	*преимущественный*	**reproducible**	*вопроизводимый*
to initiate	*начинать, стимулировать*	**multidimentional**	*многомерный*
to inject	*вводить*	**facility**	*аппаратура, средство, приспособление*
precursor	*предшествующий, предварительный*	**state-of-the-art**	*современный*
array	*множество, массив*	**capability**	*способность*
to screen	*производить проверку*	**to fabricate**	*собирать*
to house	*помещать*	**investment**	*инвестиции*
chamber	*камера*	**technique**	*технология, метод*
to interact	*взаимодействовать*	**nanocrystal-making robot**	*робот, создающий нанокристаллы*
novice	*новичок*	**exceptional**	*исключительный*

Ex. 6. Complete the sentences with the appropriate words from the box.

under conditions properties required techniques collaboration facilitate sift injecting screened exceptional

1. This robotic engineer was developed in ... with Symix Technologies.
2. Wanda circumvents the issues facing traditional ..., which can be laborous and are difficult to reproduce from one laboratory to the next.
3. This method can help researchers ... through a large diverse pool of materials for specific applications.

4. Nanocrystals are made of ... quality optimized for different applications.
5. WANDA's robotics prepare and initiate reactions by ... nanocrystal precursor chemicals into an array of reactions.
6. The advantage of this method is that nanocrystals can be ... rapidly
7. No chemical experience is ... for novice users.
8. A set of nanocrystals can be produced ... analogous to those used in traditional flask-based chemistry.
9. WANDA can optimize the size, crystal structure and luminescence ... of different nanocrystals.
10. This robot can ... experiments and give us a deeper understanding into the chemistry and physics of nanoscale materials.

Ex. 7. Match each robot type with the appropriate definition.

1. Mobile robot	a) Machine capable of independent operation following a predetermined series of behaviours.
2. Cyborg	b) Flexible machine capable of moving and communicating with humans.
3. Automation	c) Humanoid having both organic and inorganic structures, with some physiological similarity to humans.
4. Flexible machine	d) Mobile robot of human proportions.
5. Android/Humanoid	e) Versatile, programmable automation.e.g. an assembly robot.

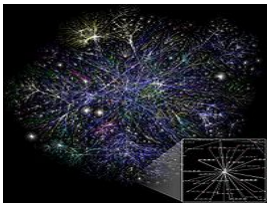
Ex. 8. Read the text again and answer the questions.

1. Why is WANDA called a revolutionary robot?
2. What industries does the robot provide nanocrystals for?
3. In what industries has a combinatorial approach been used for decades?
4. Where is WANDA housed?
5. How is this robot controlled?
6. Who can easily direct WANDA?
7. What material did they start working with?
8. What will this technology change?
9. What conditions does it work under?
10. What features of nanocrystals can Wanda optimize?

Text 5

THE DIFFERENCE BETWEEN THE INTERNET AND THE WORLD WIDE WEB

To be read after Text A (Unit 7)



Many people use the terms Internet and World Wide Web (aka. the Web) interchangeably, but in fact the two terms are not synonymous. The Internet and the Web are two separate but related things.

What is The Internet?

The Internet is a massive network of networks, a networking infrastructure. It connects millions of computers together globally, forming a network in which any computer can communicate with any other computer as long as they are both connected to the Internet. Information that travels over the Internet does so via a variety of languages known as protocols.

What is The Web (World Wide Web)?

The World Wide Web (WWW) is a part of the Internet, a way of accessing information over the medium of the Internet. But it's not a collection of networks. Rather, it is the information that is connected or linked together like a web. WWW is a system of interlinked hypertext documents somewhere on the Internet. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them by using hyperlinks. Using concepts from earlier hypertext systems, English engineer and computer scientist Sir Tim Berners Lee, now the Director of the World Wide Web Consortium, wrote a proposal in March 1989 for what would eventually become the World Wide Web. He was later joined by Belgian computer scientist Robert Cailliau while both were working at CERN in Geneva, Switzerland. In 1990, they proposed using "HyperText [...] to link and access information of various kinds as a web of nodes in which the user can browse at will", and released that web in December.

The World-Wide Web (W3) was developed to be a pool of human knowledge, which would allow collaborators in remote sites to share their ideas and all aspects of a common project. If two projects are independently

created, the two bodies of information could form into one cohesive piece of work.

The Web uses the HTTP protocol, only one of the languages spoken over the Internet, to transmit data. Web services, which use HTTP to allow applications to communicate, use the Web to share information. The Web also utilizes browsers, such as Internet Explorer or Firefox, to access Web documents called Web pages that are linked to each other via hyperlinks.

The Web is just one of the ways that information can be disseminated over the Internet. The Internet, not the Web, is also used for e-mail, which relies on SMTP, Usenet news groups, instant messaging and FTP. So the Web is just a portion of the Internet, albeit a large portion, but the two terms are not synonymous and should not be confused.

Words and expressions to the text

interchangeably	*взаимозаменяемо*	**at will**	*по (своему) желанию*
access	*доступ (к данным в сети*	**to release**	*опубликовывать; передавать (информацию) для публикации*
to access	*иметь доступ, получить доступ*	**collaborator**	*соавтор*
to navigate	*передвигаться, двигаться*	**body of information**	*объем информации, блок данных*
concept	*принцип, понятие; концепт*	**cohesive**	*связанный, образующий единое целое*
proposal	*предложение, план*	**to utilize**	*использовать*
eventually	*в итоге, со временем*	**to disseminate**	*распространять, передавать*
hypertext	*гипертекст (в виде сети связанных слов и фраз)*	**confuse**	*смешивать, путать*

Notes to the text

aka (also known as)	*также известный под именем или кличкой*
rather	*зд. наоборот*

a web	*1) паутина; 2) перен. сеть, система, инфраструктура*
Robert Cailliau	*Роберт Кайо (родился 26 января 1947) совместно с сэром Тимом Бернерсом-Ли изобрёл технологию Всемирной паутины (World Wide Web).*
node	*узел [сети], устройство, подключенное к компьютерной сети (компьютер, файл-сервер, принтер и т. д.), имеющее сетевой адрес (т. е. адресуемая точка сети)*
pool	*пул, совместно используемый (динамически распределяемый) ресурс; общий фонд*
albeit = "all though it to be (that)"	*хотя и*

Ex. 9. Match the English terms with their Russian definitions.

1. World Wide Web Consortium	a. протокол передачи гипертекста
2. CERN (Conseil Europeen pour la Recherche Nucleaire)	b. простой протокол электронной почты, протокол SMTP (основной протокол электронной почты в интернете)
3. HTTP (Hypertext Transfer [Transport] Protocol)	c. пользовательская сеть, сеть Usenet (распределенная система электронных досок объявлений, упорядоченная по группам новостей этой сети)
4. SMTP (Simple Mail Transfer Protocol)	d. Консорциум по разработке и распространению стандартов и протоколов для WWW-системы,
5. Usenet (User Network)	e. протокол передачи файлов (используемый в интернете протокол передачи файлов между хост-компьютерами)
6. FTP (File Transfer Protocol)	f. Европейская организация по ядерным исследованиям, CERN

Ex. 10. Choose the words from the box to guess their meaning using the context.

user	e-mail	hardware	file	the Internet	software

1. some information held on disk: data, programs, text _____
2. an international computer network providing e-mail and information from computers in educational institutions, government agencies, and industry, accessible to the general public via modem links _____
3. an individual or group making use of the output of a computer system _____
4. a general term for any computer program(s) _____
5. the computer equipment and its peripherals
6. messages sent between users of computer systems, where the system is used to hold and transport messages _____

Ex. 11. Choose the correct question for the following answers.

1. The Internet is a massive network of networks, a networking infrastructure which connects millions of computers together globally.
   a) How many computers does the Internet connect?
   b) What is the Internet?
   c) How does the Internet connect computers?
2. The World Wide Web (WWW) is the information that is connected or linked together like a web.
   a) What does the WWW stand for?
   b) What is the WWW linked to?
   c) What is the World Wide Web?
3. With a web browser, one can view web pages that may contain text, images, videos, and other multimedia and navigate between them by using hyperlinks.
   a) What do web pages contain?
   b) How can one view web pages and navigate between them?
   c) Are there any multimedia on the Internet?

4. The World-Wide Web (W3) was developed to be a pool of human knowledge, which would allow collaborators in remote sites to share their ideas and all aspects of a common project.
    a) What was the World-Wide Web developed to be?
    b) When was the World-Wide Web developed?
    c) What do the collaborators do?
5. The Web is just a portion of the Internet, albeit a large portion, but the two terms are not synonymous and should not be confused.
    a) Is the Web the same as the Internet?
    b) Is the Web a part of the Internet?
    c) Are the two terms synonymous?

Text 6

WHAT IS NANOTECHNOLOGY?

In its original sense, nanotechnology refers to the projected ability to construct items using techniques and tools being developed today to make complete, highly advanced products.

When Eric Drexler popularized the word 'nanotechnology' in the 1980's, he was talking about building machines on the scale of molecules, a few nanometers wide – motors, robot arms, and even whole computers, far smaller than a cell. Drexler spent the next ten years describing and analyzing these incredible devices. As nanotechnology became an accepted concept, the meaning of the word shifted to denote the simpler kinds of nanometer-scale technology. The U.S. National Nanotechnology Initiative was created to fund this kind of nanotech; their definition includes anything smaller than 100 nanometers with novel properties.

Nanotechnology is often referred to as a general-purpose technology. That's because in its mature form it will have significant impact on almost all industries and all areas of society. It offers better built, longer lasting, cleaner, safer, and smarter products for the home, for communications, for medicine, for transportation, for agriculture, and for industry in general.

Like electricity or computers, nanotech will offer greatly improved efficiency in almost every sphere of life. But as a general-purpose technology, it will be dual-use, meaning it will have many commercial uses and it also will have many military uses – making far more powerful weapons and tools of surveillance. Thus it represents not only wonderful benefits for humanity, but also grave risks.

A key understanding of nanotechnology is that it offers not just better products, but a vastly improved means of production. A computer can make copies of data files – essentially as many copies as you want at little or no cost. It may be only a matter of time until the manufacture of products becomes as cheap as the copying of files. That's the real meaning of nanotechnology, and why it is sometimes seen as "the next industrial revolution".

In practical terms, most people will encounter nanotech through an apparently simple device called a nanofactory that may sit on your desktop. Packed with miniature chemical processors, computing, and robotics, it will produce a wide-range of items quickly, cleanly, and inexpensively, all controlled by a touch screen. Nanotechnology not only will allow making many high-quality products at very low cost, but it will allow making new nanofactories at the same low cost and at the same rapid speed.

How soon will all this come about? Conservative estimates usually say 20 to 30 years from now, or even later. CRN is concerned that it may occur much sooner, quite possibly within the next decade. This is because of the rapid progress being made in enabling technologies, such as optics, nanolithography, mechanochemistry and 3D prototyping. If it does arrive that soon, we may not be adequately prepared, and the consequences could be severe.

Words and expressions to the text

projected	*прогнозируемое*	**encounter**	*сталкиваться*
ability	*умение*		
highly advanced product	*Высокотехнологичный продукт*	**apparently**	*очевидно, несомненно*
novel properties	*новые свойства*	**to sit**	*зд. быть расположенным, находиться*
impact	*сильное воздействие; влияние*	**robotics**	*робототехника*
lasting	*долговечный; прочный*	**touch(-sensitive) screen**	*сенсорный экран*
smart	*интеллектный, с искусственным интеллектом*	**to be concerned**	*быть заинтересованным в чём-л.*

dual-use	*двойное назначение*	**enabling technology**	*эффективная технология, высокоэффективная технология*
surveillance	*наблюдение; контроль*	**nanolithography**	*субмикронная литография, нанолитография*
benefit	*выгода; польза; прибыль; преимущество*	**adequately**	*в достаточной мере; компетентно*
grave risk	*большой, высокий риск*	**severe**	*жесткий; суровый тяжелый*
in practical terms	*с практической точки зрения*		

Notes to the text

Eric Drexler	Ким Эрик Дрекслер (родился 25 апреля 1955 г. в Окленде, Калифорния) – американский инженер, известный как популяризатор молекулярных нанотехнологий.
U.S. National Nanotechnology Initiative	американская Национальная Нанотехнологическая Инициатива
mature	зрелый (*о рынках, отраслях экономики и т. д., достигших высокого уровня развития и характеризующихся низким потенциалом для дальнейшего роста*)
computing	обработка данных, работа с применением компьютера, компьютеризация, ***проф***. компьютинг
CRN (Center for Responsible Nanotechnology)	Центр Надежных Нанотехнологий

Ex. 12. Complete the following sentences with the expressions from the box.

general-purpose technology	key understanding	processors
National Nanotechnology Initiative	nanometer-scale technology	
nanofactory		

1. As nanotechnology became an accepted concept, the meaning of the word shifted to denote the simpler kinds of … .
2. The U.S. … was created to fund this kind of nanotech; their definition includes anything smaller than 100 nanometers with novel properties.
3. Nanotechnology is often referred to as a … .
4. A … of nanotechnology is that it offers not just better products, but a vastly improved means of production.
5. In practical terms, most people will encounter nanotech through an apparently simple device called a … that may sit on your desktop.
6. Packed with miniature chemical … , computing, and robotics, it will produce a wide-range of items quickly, cleanly, and inexpensively, all controlled by a touch screen.

Ex. 13. Read the text again and answer the questions.

1. What does nanotechnology refer to in its original sense?
2. When did Eric Drexler popularize the word ‘nanotechnology’?
3. What was the U.S. National Nanotechnology Initiative created to do?
4. What is nanotechnology often referred to?
5. Why will nanotech be dual-use?
6. What is a key understanding of nanotechnology?
7. What will nanotechnology allow?

Ex. 14. Discuss the nanotech products you have heard of or read about.

ADDITIONAL EXERCISES

TO BE, TO HAVE, THERE TO BE

1. From the academic point of view this seminar course was of no interest to theoretical physicists.
2. We had a hope that these investigations would fill the gap in our understanding of the mechanism.
3. There is some information on viruses in my recent article but there isn't any data.
4. There is a wide range of complicated problems which should be decided soon.
5. There are some innovative methods which should be taken into consideration. 20.
6. There are some misunderstandings on the problem that must be solved very quickly.
7. I completely agree with some new approaches but I am sure there exist some evident problems and it is early to make a conclusion yet.
8. The success of the experiment depends on some data, the most important of which is the installation of some modern equipment in the laboratory.

TENSES OF THE ACTIVE AND PASSIVE VOICE

1. From the experimental point of view such a study seems quite feasible.
2. His project for further research met with enthusiastic support from everyone.
3. To close this section, we shall discuss the principal conclusions from the work and possible applications of the obtained results.
4. The papers were followed by interesting discussions.
5. A brief account will be given of the available data and interpretations concerning this mechanism.
6. We are now looking for an optimal solution, since there is a choice.
7. In the last few decades much of the data in various areas of physics has been analyzed quite well in terms of quantum theory.
8. Recent experiments concerning these phenomena have focused considerable attention on getting reliable data.

9. We have recently attempted a study of the feedback mechanism and have found some direct evidence against that widely spread conception.
10. The recent advancements in instrumentation have facilitated the solution of this problem which in the past was only approached by hit and miss methods.
11. New entertainment devices have been developed, such as video recorders and CD players.
12. The development of ICs led to a great increase in the use of electronics in everyday items.
13. Telephone uses electronics to provide automatic dialing and answer phone facilities.
14. The positive terminal of the capacitor is connected to the output of the amplifier.
15. A resistor is used to add resistance to a circuit.
16. Carbon resisters are made of compressed graphite.
17. These values meet all the needs of circuit designers.
18. The musicians play in a recording studio. Each voice and instrument is recorded using different microphones.
19. The widespread use of television remote control units has turned people into couch potatoes.
20. Pulsed signals are used to prevent interference from any constant infra-red background noise.
21. Metal detectors were developed for military purposes to locate hidden explosives.
22. Magnetic switches are being used on windows and doors now.
23. The effectiveness of a metal detector depends on the size and position of the object and how far beneath the ground it is buried.
24. Special detectors are used to screen passengers for concealed weapons at airports.
25. The method is currently being computationally evaluated.
26. By the time you come they will have been living here for 20 years.
27. The new device will have been tested by the end of the week.
28. In summer many students will be sent to a big plant for industrial training.

COMPLEX SENTENCES

Object Clauses

1. We were aware of the fact that the problem required fundamental study.
2. We expected that the new conference regulations would stimulate informal discussion and exchange of ideas.
3. They admitted that even after the research was completed, the nature of these changes would still remain open to the question.
4. We were aware that a mistake had been made in the experimental design.
5. He reported two years later that his original idea had been erroneous.
6. We showed in our previous paper that a certain balance had been achieved between the experiment and the theory.
7. We believe that this case is an exception to the general rule.
8. We think that this problem is a great challenge to a theorist.

Attribute Clauses

1. I have mentioned a few cases to which the theory applies.
2. You are asking a question to which no answer can be given at present.
3. I can describe the conditions under which the experiment was conducted.
4. There is no doubt where the defect is localized.
5. There is no evidence when this mechanism comes into action.
6. We have no information on what factors might be involved.
7. We have no explanation why this value should be so large.
8. The report which I presented at the conference has been discussed for two hours.

Adverbial Clauses

1. We have made some progress in the understanding of these regularities, although some critical aspects of the problem still remain unclear.
2. They'll be able to upgrade their research if they concentrate on theoretical studies.
3. This problem will be solved if we cooperate.
4. We'll save time if we take the right line in this discussion.
5. This substance dissolves in water if it is heated.

6. We can make preliminary conclusions in spite of the fact that the work is not completed.
7. We would have a better result of the experiment if we used the modern equipment.
8. The data accuracy would be higher if we combined the two methods.
9. What would happen if certain experimental conditions were not satisfied?
10. It would be natural to ask how the problem is solved in this case.
11. It would be useful for you to choose between the two methods as they are both inaccurate.
12. We would have discussed your suggestion if we had had the plan of your research work.
13. I wouldn't have answered the questions if I hadn't read the article the day before.
14. We would have obtained the better results if we had used this method in combination with X-ray analyses.
15. If the equipment of the laboratory hadn't been so primitive and old we would have already finished the project.

Conditionals I and II

1. If it were possible, we would begin this work at once.
2. If he had had all the necessary books, he would have made his report in time.
3. If there were no computers, space flights would be impossible.
4. If drivers were more attentive while driving, there would be fewer –accidents on the road.
5. If the car is above the speed pre-set by the police, the camera takes a picture of the vehicle.
6. Had there been no earth's gravitation, the satellites would have moved through airless space in a straight line at a uniform speed.
7. If you don't use virus-check programs, you can get a virus.
8. If there was a power cut while you were using a computer, you might lose data.
9. If you install a faster processor, your computer can process data faster.
10. If you forgot your password, you wouldn't be able to access your PC.
11. If you press the delete key, it will delete the character to the right of the cursor.

12. If you use a search engine, you may find information on the WEB more quickly.
13. If you double-click on an icon, you will open up a program or a folder.
14. If the weather is too bad for flying, passenger airplanes don't leave airports

Revising Complex Sentences

1. Robotics devices within blood vessels refer to computer-controlled mechanical devices that are small enough to be inserted into human veins and arteries that carry the blood around the body.
2. Virtual reality games are computer games that use a simulated three-dimensional environment that surrounds the user.
3. An intranet is an internal network webpage system that operates using the same protocols as the Internet.
4. Robotic pets demonstrate that simple processes can result in complex behavior.
5. An application programmer is a person who writes applications programs.
6. A system analyst is a person who designs or modifies information systems to meet user's requirements.
7. A computer virus is a program that can reproduce itself.
8. When/If the scanner finds a match for your fingerprints, the keyboard is unlocked.
9. All the user notices is a slight time delay while the file is opened.
10. Hackers try to find out passwords so they can penetrate a system.
11. If you need certificates, whose certificates should they be?
12. It is your responsibility to make sure that your certification is kept up to date.
13. We learned that the results reported by these scientists were erroneous.
14. All this implies that the data was correct.
15. The authors were able to prove that no serious error had affected the measurements.
16. Data communication systems are computer systems that transmit data over communication lines such as telephone lines or coaxial cables.

17. Barcodes in the packaging of groceries will soon be replaced with radio-frequency tags that can be read at a distance and with greater reliability.
18. The conventional camera uses film unlike the digital camera.
19. An obvious solution would be the creation of underground tunnels that would allow for high speed travel.
20. Motor racing is so fiercely competitive that designers are always trying new ideas to give their cars the edge in performance.
21. It is difficult to prove programs were stolen when copies are made because the originals are still in the hands of the original owner.
22. A computer virus is a very small program routine that infects a computer system and uses its resources to reproduce itself.
23. The principles Ford used to make Model T are used in motor manufacturing to this day.
24. The building our students live in is not far from the university.
25. For a long time Bell couldn't get the results he was looking for.
26. The problem this article deals with is connected with the subject we study.
27. The plant this material is produced at is in the Urals.
28. It is difficult to imagine the world we live in without radio, television and telephone.
29. The magazine a very interesting article is published in is available in our library.
30. At first it was not clear whether new telephone and teletype communication with ships via six satellites was economical and reliable or not.
31. It is known that many cities throughout the world suffer from air pollution.
32. The new methods of research the engineers had used at the plant greatly improved their work.
33. The inventor demonstrated the machine he had worked at.
34. As the warm air rises, cooler air takes its place.
35. Noise, which is any unwanted signal, can be a problem with amplifiers.
36. It was stated the conclusion was correct.

PARTICIPLE

Absolute Participle Constructions

1. Data being accessed randomly, semiconductor memories are called random access memory (RAM).
2. Primary storage having similarity to a function of the human brain, the storage is also called memory.
3. Computer system architecture being organized around the primary storage unit, all instructions must pass through it.
4. For this reason most computer systems use electronic memory for primary storage, electromechanical memory being used for secondary storage.
5. The steam engine having been invented 1825, a self-propelled vehicle was built.
6. Some new devices having been obtained, the researches could make more complex experiment.
7. It being late, we decided to stop the experiment.
8. The program having been written, the students had to attend some extra lectures.
9. The important decision having been made, the head of the company had to refuse some new ideas.
10. No new information being received, I am asked to cancel the meeting.
11. The article written, he could take part at the conference.
12. The device tested, we used it to make some important calculations.
13. The questions asked, the students started translating the article without a dictionary.
14. The themes of the course projects given, we went to the library.
15. The choice made, all the other variants were rejected.
16. The equipment installed in the laboratory, the members of the delegation signed the documents.
17. The new method discussed, the engineers decided to continue the project later.
18. The difficulties recognized, the authorities of the faculty changed some points of the academic plan.
19. The task properly carried out, they were given a new one.
20. The conference held in Moscow, we discussed a number of important scientific problems at the meeting of our faculty.

GERUND

Functions

1. This warning will keep us from making the same mistake.
2. The problem of introducing this principle in research brings about much difficulty.
3. The procedure of awarding scientific degrees has been much criticized lately.
4. One should avoid giving too general definitions of these phenomena.
5. Lack of active contacts among scientists results in duplicating some investigations.
6. New technical developments have occurred for processing educational data and for organizing instructional material in the classroom.
7. The chemist is usually inclined to regard the appearance of this product as signifying that the reaction is over.
8. It is worthwhile reconsidering this case as well as adding another even more impressive example.
9. Up to the present time, several writers have succeeded in finding exact solution of the fundamental differential equation in certain particular cases.
10. Today we cannot help witnessing a tendency in science to direct the collective efforts of a research team at the achievement of a common goal.
11. The inductance of a coil depends on several factors, the chief among them being the number of turns and the cross-sectional area of the coil.
12. Breaking a magnet does not separate the north and south poles, for each part is now a complete magnet.

Gerund Construction

1. My Physics teacher insisted on my passing the exam together with other students.
2. I feel satisfied of our having taken part in the main scientific contest of the year.
3. We have known of his having won the President Grant.
4. He approved of my writing a description of the experiment results.
5. Everybody has heard of Professor Smith's retiring.

6. The dean of the faculty didn't mind the competition with the other faculties being announced.
7. There is no possibility of his entering the university next year.
8. I know of his having been offered the post of the director of the big financial company.
9. All the students insisted on the results of the test being commented.
10. In spite of the gases having been compressed they returned to their original volume as soon as the applied force stopped acting.

INFINITIVE

Functions

1. Lasers to be placed on Earth satellites will transform solar radiation into laser beams.
2. To illustrate the use of the technique described in this article two examples are now presented.
3. A linear differential equation results from the assumptions to be made.
4. The difficulties to be resolved in the first place concern the theoretical aspects of the experiments to be carried out.
5. The data to be reported here point to the possibility of a feedback mechanism, but this is to be checked.
6. It is of importance to know the basic principle to be observed in the design and use of optical equipment.
7. To specify the model in this field will require advances both in mathematics and physics.
8. The theory to be developed only aims at verifying the above discussions but is not sufficiently detailed to give a complete description.
9. We know physical changes to be caused by heat.
10. Furthermore, one need not even know how to make the reaction in question occur.

Complex Subject

1. A computer centre is expected to be installed at the University next year.
2. Business application of computers may not appear to be as difficult as scientific problems, although some people consider them to be more intricate.

3. More limitations are likely to exist on the freedom to change the input and output, that on the freedom to modify processing methods.
4. We expect a computer to work for at least several hours without a fault.
5. A machine which carried out its internal arithmetic in binary notation is likely to be especially suitable for scientific and mathematical applications.
6. The result of a computation is said to involve error if the result differs by only a small percentage from the solution.
7. These experiments are likely to throw some light on this complicated problem.
8. This hypothesis has been found to disagree with experimental evidence.
9. The relativity theory appeared to be a turning point in physical thinking.
10. Lasers have proved to be indispensable in many fields of research.
11. Electronic equipment is likely to find an over growing applications.
12. Hot springs are believed often to be due to the presence of magma near the surface.
13. The atmosphere has been proved to extend several hundred kilometers above earth.
14. Rutherford began a series of investigations of radioactive elements which were known to disintegrate, and showed that the radiations emitted were of three kinds.
15. The radiation spectra have been shown by previous studies to be quite complex.

Complex Object

1. We didn't want anybody to stop the experiment.
2. Everybody noticed him to be proud of the results received.
3. The authorities of the company expect the contract to be signed immediately.
4. I heard his name to be mentioned among the members of the students' research team.

Infinitive Construction with *for*

1. For such data to find application in further work their validity must be left in no doubt.
2. For the long-term experiments to be realizable various aspects of the problem must be taken into account
3. For such suggestions to be of practical use they must be based on observation and experience.
4. For this method to become applicable to our experiment the following alterations should be made.
5. The suggestion is both attractive and interesting but the work is not sufficiently advanced for any definite opinion of its validity to be formed.

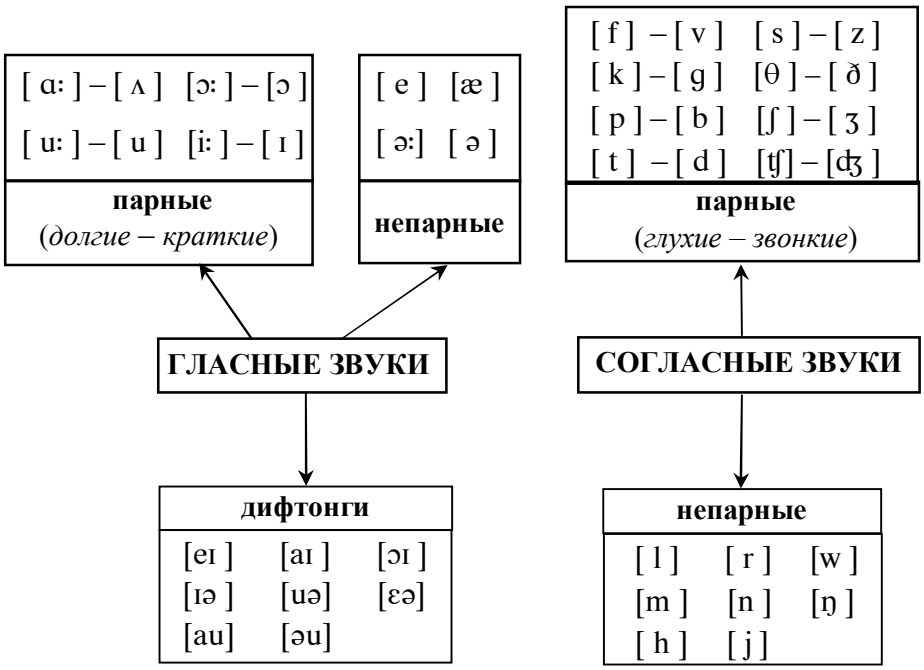
APPENDICES

ПРИЛОЖЕНИЕ 1

Английский алфавит

A a	[eɪ]	**N n**	[en]
B b	[biː]	**O o**	[əu]
C c	[siː]	**P p**	[piː]
D d	[diː]	**Q q**	[kjuː]
E e	[iː]	**R r**	[ɑː]
F f	[ef]	**S s**	[es]
G g	[ʤiː]	**T t**	[tiː]
H h	[eɪʧ]	**U u**	[juː]
I i	[aɪ]	**V v**	[viː]
J j	[ʤeɪ]	**W w**	[`dʌbljuː]
K k	[keɪ]	**X x**	[eks]
L l	[el]	**Y y**	[waɪ]
M m	[em]	**Z z**	[zed]

Знаки транскрипции



Правила чтения

Тип слога	A a	E e	I i	O o	U u	Y y
Открытый слог (оканчивается на гласную или **e** немую)	[eɪ] *case*	[ɪ] *she*	[aɪ] *line*	[əu] *zone*	[juː] *rude*	[aɪ] *my*
Закрытый слог (оканчивается на согласную)	[æ] *tank*	[e] *bet*	[ɪ] *bit*	[ɔ] *lot*	[ʌ] *cut*	[ɪ] *myth*
Гласная + **r** и гласная + **r** + согласная	[ɑː] *car park*	[əː] *her term*	[əː] *sir third*	[ɔː] *or born*	[əː] fur *burn*	[əː] Cyrd
Гласная + **r** + гласная	[ɛə] *vary*	[ɪə] *here*	[aɪə] *tire*	[ɔː] *story*	[juə] *pure*	[aɪə] *tyre*

ПРИЛОЖЕНИЕ 2

Основные способы словообразования

Аффиксация (суффиксация и префиксация)

Основные суффиксы существительных

Суффиксы	Примеры	Перевод
-er **-or**	to read – reader to elect – elector	читать – читатель избирать – избиратель
-ant **-ent**	to assist – assistant to study – student	помогать – помощник изучать – студент
-ian	academy – academician	академия – академик
-ist	to type – typist	печатать – машинистка
-tion **-ation** **-sion** **-ssion**	to connect – connection to organize – organization to collide – collision to admit – admission	соединять – соединение организовывать – организация сталкиваться – столкновение допускать – допущение
-age	to clear – clearage	очищать – очистка
-ment	to fulfil – fulfilment	выполнять – выполнение
-ure	to press – pressure	давить – давление
-ance **-ence**	to appear – appearance to depend – dependence	появляться – появление зависеть – зависимость
-ing	to begin – beginning	начинать – начало
-ness	dark – darkness	темный – темнота
-ity **-th**	active – activity wide – width	активный – активность широкий – ширина
-dom **-ism** **-hood** **-ship**	free – freedom real – realism child – childhood friend – friendship	свободный – свобода действительный – реализм ребенок – детство друг – дружба

Основные суффиксы прилагательных

Суффиксы	Примеры	Перевод
-ant **-ent** **-ive**	to tolerate – tolerant to differ – different to act – active	терпеть – терпимый различаться – непохожий, другой, отличный (от) действовать – активный
-ful **-al**	use – useful centre – central	польза – полезный центр – центральный
-ic **-ous**	history – historic advantage – advantageous	история – исторический преимущество – выгодный
-y **-ly**	dirt – dirty day – daily	грязь – грязный день – ежедневный
-less (переводится приставкой *без-*, *с-*)	noise – noiseless	шум – бесшумный
-ish	old – oldish	старый – староватый

Основные суффиксы глаголов

Суффиксы	Примеры	Перевод
-en **-ify**	strength – to strengthen simple – to simplify	сила – усиливать простой – упрощать
-ize **-ate**	real – to realize active – activate	настоящий – осуществлять активный – активизировать

1.1. Form nouns adding the suffixes *-er, -or, -tion* to the given words.

To operate, to receive, to produce, to transmit, to invent, to discover, to visit, to convert, to regulate, to accumulate, to react, to use, to oscillate, to record, insulate, receive, accelerate, communicate, act, revolt, classify, conduct, transmit, investigate, apply, emit.

1.2. Form nouns adding the suffixes -ment or -ity to the given words.

To develop, to achieve, active, able, complex, to move, dense, electric, to measure, to improve, to manage, intense, intense, conductive, capable, to require, special, flexible.

1.3. Form adjectives adding the suffixes *-ant, -ent, -ive, -ful, -al, -ic, -ous to* the given words.

Economics, collection, industry, importance, electricity, illustration, technology, physics, difference, history, advantage, experiment.

1.4. Form nouns adding the suffixes *a) –less; b) –ness.* Translate the words.

a. Home, power, hope, sense, weight, shape, use, wire, noise, help, harm, life.
b. Effective, useful, bright, soft, thick, weightless, shapeless, empty.

1.5. Complete the table.

Verb	Noun	Adjective/ Participle
reflect	reflection	reflecting
manufacture	…	manufactured
…	…	long
…	preparation	…
magnetize	…	
…	…	reproduced
…	track	…
amplify	…	…
…	…	driven
convert	…	…
feed		fed
…	continuation	…
respond	…	…

1.6. Read and translate the derivatives paying attention to the suffixes.

1. **to transform** – transformer, transformation
2. **to demonstrate** – demonstration, demonstrative
3. **to calculate** – calculation, calculator
4. **to add** – additional, addition
5. **to differ** – different, difference, differential
6. **to compute** – computer, computation
7. **to use –** usage, user

1.7. Translate the following words. Point out verbs.

1. memory	memorize	memorial
2. wide	width	widen
3. separation	separable	separate
4. realize	real	reality
5. creation	creative	create
6. classify	classification	classical
7. action	active	activate

1.8. Give the English equivalents of the words in bold.

1. **устанавливать** – installment, installation, install
2. **стабилизировать** – stabilizer, stability, stabilize
3. **упрощать** – simplify, simple, simplification
4. **регулировать** – regular, regulation, regulate
5. **генерировать** – generation, generate, general

1.9. Read the following words and decide to what parts of speech they belong to.

Information, digital, television, conversation, conventional, protection, carrier, typically, inexpensive, versatility, data, relatively, conduction, equipment, interference, resistance, regenerator.

1.10. Read and translate the words paying attention to the suffixes.

Greatly, lecturer, atmospheric, successful, improvement, inventor, radiation, equipment, economic, powerful, development, operation, atomic, agreement, regulation, instruction, communication, generation, separately,

production, industrial, researcher, radioactivity, measurement, interaction, elimination, seriously, symbolic, ecological, organizer, possible, differently, impossibility, rapidly, importance, technologically, economist, automatically, universal, manufacturer, productivity, operation, substitution, greatly, increasingly, dependent, independence, independently, correspondence, resistive, intensity, simplify, classification, magnetize, diversity, replacement, affectively, variable, variety, completely, impressive, conversation, conventional, carrier, typically, addition, equipment.

1.11. Form nouns, adjectives or adverbs and fill in the blanks. Read and translate the sentences.

PHYSICS

1. It is … impossible to be in two places at once.
2. … is an expert dealing with matter and energy.
3. Mechanical laws and Newtonian … are very important for creating virtual systems.
4. The equivalent of clip art for virtual reality designers might be … systems.

POSSIBILITY

5. What will make the virtual reality design system of tomorrow …?
6. Is there any … of your taking part in virtual reality conference this year?
7. If we throw an object, it flies across the room, … hitting another object and causing a complex chain of events as objects crash into each other.

SUCCESS

8. Virtual reality can have great … in many ways, especially in experimenting.
9. Recent … tests of the world's largest simulator enable scientists to do research in education, management and industry.
10. Astronauts have … simulated Space Shuttle landing.

POTENTIAL

11. Virtual laboratory helps researchers simulate … complicated flight situations.
12. Our country has great … raw resources.
13. It has not realized its full … yet.

Префиксы с отрицательным значением

Префиксы	Примеры	Перевод
un- не- без (с)-	known – unknown limited – unlimited	известный – неизвестный ограниченный – безграничный
il- **im-** не- **in-** без (с)- **ir-**	logical – illogical polite – impolite accuracy – inaccuracy regular – irregular	логичный – нелогичный вежливый – невежливый точность – неточность регулярный – нерегулярный
non- не- без- (с)-	conductor – non-conductor	проводник – непроводник (изолятор)
dis- раз- не-	to connect – to disconnect ability – disability	соединять – разъединять способность – неспособность
anti- анти-	war – antiwar	военный – антивоенный
mis- означает «неверно»	to print – to misprint	печатать – сделать опечатку

Префиксы с разными значениями

Префиксы	Примеры	Перевод
super- сверх-	man – superman	человек (мужчина) – сверхчеловек (супермен)
over- пере-, над-	to heat – to overheat	нагревать – перегревать
sub- ниже-, под- и др.	dean – subdean system – subsystem	декан – заместитель декана система – подсистема
en- (*для образования глагола*)	large – to enlarge	большой – увеличить
post- после- **pre-** до-, заранее-	war – post(-)war heat – preheat	война – послевоенный нагреть – предварительно нагреть

re- снова, еще раз	to write – to rewrite to use – to reuse to elect – to re-elect (*пишется через дефис*)	писать – переписывать использовать – снова использовать избирать – переизбирать
semi- полу-	conductor – semiconductor	проводник – полупроводник
inter- меж(ду)- , взаимо-	change – interchange	обмен – взаимообмен

1.12. Form adjectives adding the prefix un- to the following adjectives and translate them.

Complicate, completed, human, stable, limited, like, satisfactory, natural, discovered, important.

1.13. Form words with negative prefixes *un-, in-, ir-, il-, dis-, non-.*

Importance, reliability, flexibility, ability, easy, expensive, advantage, relevant, conductor, suitable, regular, logical, connect, legal, print, limited.

1.14. Form verbs using prefixes *en-, re-, dis-, mis-, pre-, over-, under-, de-.*

Large, case, arrange, tell, agree, appear, understand, determine, load, estimate, stabilize, heat.

1.15. Point out the words with negative prefixes.

1. semiconductor	recharge	non-conductive
2. misinform	interchange	overheat
3. misunderstanding	submarine	enlarge
4. reuse	non-stop	important
5. ultrasonic	antifreeze	superconductivity
5. postwar	inexpensive	enlarge

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