Министерство сельского хозяйства Российской Федерации
ФГБОУ ВО «Красноярский государственный аграрный университет»

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АНГЛИЙСКИЙ ЯЗЫК

Рекомендовано Федеральным УМО по сельскому, лесному и рыбному хозяйству для использования в учебном процессе при подготовке бакалавров по направлению «Агроинженерия»

Красноярск 2023

ББК 81.432.1я73
А 23

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А 23 **Английский язык**: учебное пособие / Т.В. Агапова, Л.Ю. Айснер, Ю.А. Оленцова; Краснояр. гос. аграр. ун-т. – Красноярск, 2023. – 210 с.

Цель издания – помочь обучающимся овладеть общеупотребительной и профессиональной лексикой, сформировать навыки устной речи, аудирования и письма, обучить самостоятельно проверять уровень своих знаний при помощи выполнения тестов и заданий для самостоятельной работы. Особое внимание уделяется грамматическим явлениям, характерным для чтения и перевода текстов, и их тренировке.

Предназначено для бакалавров направления подготовки 35.03.06 – Агроинженерия, профиль «Электрооборудование и электротехнологии в агропромышленном комплексе».

ББК 81.432.1я73

ОГЛАВЛЕНИЕ

ВВЕДЕНИЕ

Учебное пособие «Английский язык» предназначено для обучающихся 1 курса бакалавриата (направление подготовки 35.03.06 – Агроинженерия, профиль «Электрооборудование и электротехнологии в агропромышленном комплексе»). Рекомендовано для студентов, изучавших английский язык в средней школе или средних профессиональных учебных заведениях и имеющих базовые знания английского языка.

Данное пособие построено на основе Федерального государственного образовательного стандарта высшего образования в соответствии с рабочей программой для направления подготовки 35.03.06 – Агроинженерия.

Цель данного учебного пособия – помочь обучающимся овладеть общеупотребительной и профессиональной лексикой, сформировать навыки устной речи, аудирования и письма, обучить самостоятельно проверять уровень своих знаний при помощи выполнения тестов и заданий для самостоятельной работы.

Учебное пособие состоит из 8 тематических уроков (*Units*). Все уроки имеют единую структуру построения, включающую слова, текст, текстовые упражнения, дополнительные упражнения, грамматические упражнения и тест. Пособие предполагает последовательную работу над уроками.

В учебном пособии представлены тексты для изучающего и ознакомительного чтения, система упражнений на словообразование, на снятие семантических и лексических трудностей. Тестовые задания предназначены для контроля усвоения лексико-грамматического материала, для проверки и оценки понимания содержания текста. Представленные в пособии тексты для самостоятельной работы обучающихся информативны, тематически связаны с основными текстами. К текстам для самостоятельной работы разработаны задания.

Тексты учебного пособия составлены на основе статей из зарубежных научных журналов с последующей адаптацией и сокращением их в учебных целях.

Особое внимание уделяется грамматическим явлениям, характерным для чтения и перевода текстов, и их тренировке. Учебное пособие снабжено словарем по специальности (см. прил.).

Реализация компетентностного подхода при работе с данным пособием позволяет актуализировать у обучающихся интерес к освоению новых знаний и обеспечивает высокое качество подготовки будущих специалистов. Результатом обучения является овладение компетенциями, которые дают возможность использовать различные формы и виды обучения, наиболее удачные для определенных групп обучающихся.

UNIT I. MY FAMILY

Grammar: to be, to have в настоящем, прошедшем, будущем времени. Личные, притяжательные, возвратные местоимения. Местоимения some, any. Множественное число существительных.

Vocabulary		
Nouns:		
mother (grandmother)	[ˈmʌðə]	мать (бабушка)
father (grandfather)	[ˈfaːðə]	отец (дедушка)
son (grandson)	[sʌn]	сын (внук)
daughter (granddaughter)	[ˈdɔːtə]	дочь (внучка)
wife	[waif]	жена
husband	[ˈhʌzbənd]	муж
aunt	[aːnt]	тетя
uncle	[ˈʌŋkl]	дядя
niece	[niːs]	племянница
nephew	[ˈnevjuː]	племянник
stepfather	[ˈstepfɑːðə]	отчим
stepbrother	[ˈstepbrʌðə]	сводный брат
stepsister	[ˈstepsɪstə]	сводная сестра
daughter-in-law	[ˈdɔːtərɪnlɔː]	невестка
son-in-law	[ˈsʌnɪnlɔː]	зять
department	[diˈpaːtmənt]	отдел
subject	[ˈsʌbdʒikt]	предмет
profession	[prəˈfeʃən]	профессия
seaside	[ˈsiːsaid]	морской курорт
hospital	[ˈhɔspitl]	больница
interest	[ˈintrist]	интерес
memory	[ˈmeməri]	память
Adjectives:		
tall	[tɔːl]	высокий
stout	[ˈstaut]	полный, тучный
good-looking	[ˌgudˈlukiŋ]	красивый
pretty	[ˈpriti]	хорошенький, милый
quiet	[ˈkwaiət]	спокойный, тихий
serious	[ˈsiəriəs]	серьезный
sociable	[ˈsəuʃəbl]	общительный
kind	[kaind]	добрый
bright	[brait]	яркий, смышленый
local	[ˈləukl]	местный

Verbs:		
call	[kɔ:l]	звать, называть
do well	[du: ˈwel]	хорошо учиться
stay	[stei]	оставаться
listen to	[ˈlisn tu:]	слушать
spend	[spend]	проводить, тратить
learn	[lə:n]	учиться
become	[biˈkʌm]	становиться
look after	[lukˈa:ftə]	заботиться, следить
Word combinations:		
English literature	[ˈɪŋglɪʃ ˈlɪt(ə)rətʃə]	английская литература
export department	[ˈekspɔ:t dɪˈpɑ:tmənt]	экспортный отдел
engineering firm	[endʒɪˈnɪərɪŋ fɜ:m]	проектная фирма
primary school	[ˈpraɪmərɪ sku:l]	начальная школа
look after the house	[lʊk ˈɑ:ftə ði: haʊs]	присматривать за домом

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

engineering	looking
good	department
primary	literature
export	school
English	firm

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
call	
	stay
look	
	export
subject	

Exercise 3. Match the words and their definitions:
Example: a man married to your mother – a father

1	your mother’s father	a	niece
2	your father’s sister	b	grandfather
3	your father’s brother’s son	c	granddaughter
4	your sister’s daughter	d	aunt
5	your daughter’s daughter	e	nephew

Exercise 4. Using 10 new words and expressions make a brief description of your family in English. Work in pairs and translate your partner's description into Russian:

Exercise 5. Read the text and answer the following questions:

1. Is the Brown family large? How many are they?
2. What is George Brown like? What does he do?
3. How old is Linda Brown? What does she do?
4. Is Marge a sociable girl? What does she usually do in the evenings?
5. How old is Bob? Why is he different from Marge?

The Browns' Family

The Browns live in London. George Brown is a tall, stout man of about forty. He is the head of the export department of a large engineering firm. Of course, he is a very busy man.

Linda, Mr Brown's wife, is thirty-six. She is a good-looking woman with brown hair and dark eyes. She works as a doctor in one of the London hospitals.

The Browns have three kids. Marge, which is short for Margaret, is their elder daughter. She is fifteen. Bob, which is short for Robert, is fourteen. And William or Billy as everybody calls him, is only seven.

Marge is a pretty, quiet, serious girl. She goes to a comprehensive school. She is doing very well at school. She is one of the top pupils in her class. Her favourite subject is English literature. She is fond of reading. She reads a lot. She is also fond of music and has a good collection of records. But Marge isn't very sociable. She stays at home most evenings. She reads, listens to music, watches television or helps her mother about the house.

Bob also goes to school. He is different from Marge. He spends too little time on his homework and too much time on sports. Bob's main interest is sports. He plays football very well. He wants to be a professional footballer. Bob is a member of the local junior team.

William is the baby of the family. He goes to primary school. His teachers say he is a bright boy. He can learn a lot in a short time. He has got a very good memory. Mr Brown thinks William can become a scien-

tist. He spends a lot of time with William. He likes to play with him and often tells him a lot of interesting things about physics.

Linda's mother, Grandma or Granny, as the children call her, lives with them. She is a kind sixty-year-old woman. She is retired and looks after the house and her daughter's family.

George's parents live in a little cottage in the seaside town of Chacewood. They love visitors and the Browns often visit them. The children are fond of their grandparents and are always happy to see them.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *George's parents live in London.*

– *Yes, I agree, it is true. George's parents live in London.*

– No, I can't agree, it is false, because George's parents live in a little cottage in the seaside town of Chacewood.

1. George is a doctor.
2. Linda, Mr George's wife, is a good-looking woman with brown hair and dark eyes.
3. The Browns have two kids.
4. Marge is a student.
5. Bob's main interest is sports.

Exercise 2. Choose the right variant:

1.Mary is your mother's mother. She is your...

a) mother; b) aunt; c) granny; d) sister.

2. Max is your uncle's son. He is your...

a) nephew; b) cousin; c) twin; d) grandson.

3. Sarah is your grandma's only daughter. Sarah is your...

a) mother; b) aunt; c) granny; d) sister.

4. Sam is your mother's son. He is your...

a) nephew; b) dad; c) brother; d) grandson.

5. Mirabel is your uncle's wife. She is your...

a) mother; b) aunt; c) granny; d) sister.

Exercise 3. Complete the following sentences:

1	Margaret is not in class, she	is married.
2	We are not busy today, we	are at school.
3	The children are not in the garden, they	is at home.
4	How are you? – Thank you, I …	have a lot of free time.
5	My brother isn't single, he …	am fine.

Exercise 4. Find English equivalents in the text:

Example: кроме меня – besides me.

1) проводить время;
2) присматривать за домом (вести хозяйство);
3) хорошо учиться;
4) быть членом местной команды;
5) жить на морском побережье.

Exercise 5. Arrange the word combinations in the order in which they are presented in the text:

	William, Mr Brown's son
	Robert, Mr Brown's son
	George Brown
	Margaret, Mr Brown's daughter
	Linda, Mr Brown's wife

Additional exercises

Exercise 1. Read and translate the dialogue:

Dialogue

Kate: What is your name and where are you from?

Marry: I am Marry and I'm from Australia.

Kate: What are you and how old are you?

Marry: I'm a student and I'm nineteen.

Kate: Have you got a brother or a sister? Is he (she) elder or younger than you?

Marry: Yes, I have a sister. Her name is Ann. She is elder than me; she is twenty-six years old.

Kate: Where does she live?

Marry: She lives in the USA, in New York.

Kate: What does she do?

Marry: She is a doctor and works at the district hospital.

Kate: Is your sister married? Is her family large?

Marry: Yes, she is married and has two children – a boy and a girl.

Kate: Does your sister often visit you?

Marry: Unfortunately we don't get to see each other very often.

Kate: What do your parents do?

Marry: My parents are retired. They live in Sydney on the Pacific Ocean.

Kate: Do you often visit them?

Marry: Every year at Christmas we gather at my parents' house and spend this holiday together.

Exercise 2. Choose the correct response:

What is your name and where are you from?	She lives in New York.
Where does she live?	My parents are retired.
Have you got a brother or a sister?	She is a doctor and works at the district hospital.
What do your parents do?	I have a sister.
What does she do?	I am Marry and I'm from Australia.

Exercise 3.Work in pairs. Make up your own dialogue.

Exercise 4. Act out the following situations and make up the dialogues:

1. Now you are at your friend's place. You are talking to one of his kids. You ask him the usual questions grown-up people ask children.
2. You are at your colleague's place. You are talking about various things and gradually the conversation turns to your families.
3. This is a photo of you and your class-mates. Now they are all grown up. Some are well-known specialists, others are not. Some of them are married, some are not. You and your friend are looking at the photo of 10th A and talking of your former class-mates.

Exercise 5. Translate into English:

Можно я расскажу вам о себе и своей семье? Меня зовут Виктор Николаев. Я инженер. Я работаю в торговой фирме в отделе экспорта. Я собираю различную информацию о новой продукции и работаю с заказчиками.

Я женат и у меня двое детей. Моя жена Светлана – красивая очаровательная женщина. Она на 3 года моложе меня. Светлана работает в школе. Она учительница английского языка. Она очень любит свою работу. Английский язык – ее главный интерес. Она проводит много времени на работе, а в доме много книг на английском языке.

Мой старший сын Антон – студент. Он химик и собирается стать ученым. Химия его любимый предмет, но он интересуется также иностранными языками. Большую часть времени он проводит в лаборатории или библиотеке. Антон серьезный, спокойный молодой человек, правда, не очень общительный. Жаль, что он не занимается спортом, хотя любит смотреть хоккей по телевизору.

Мой младший сын Петр совсем другой. Ему 14 лет. Он учится в 8 классе. Его хобби – футбол. Он хороший спортсмен, но не очень хороший ученик.

Grammar exercises

Exercise 1. Complete the description of Mary, her family and friends. Use the words from the box:

'm (am) 'm not (am not) 's (is) isn't (is not) 're (are) aren't (are not)

1. Hello, I … Mary.
2. My favourite sport … basketball, but I … a good player because I … very tall.
3. This … my brother, John. He … interested in sport.
4. Jane and Joseph … our friends. They … at work today because it's a holiday.
5. It … Joseph's birthday today – he … 20 years old.

Exercise 2. Fill in the blanks with a past form of *be:*

1. A thief stole a computer and printer from an office on campus Saturday at 10:00.
2. Sandy … in the parking lot across from the office, standing next to her car.
3. She saw him for only a few minutes, but she … sure she could identify him.
4. The police officers … happy to have a witness, but they … sure how much Sandy saw from the parking lot.
5. Sandy … positive she could answer the detectives' questions.

Exercise 3. Complete sentences with *is* or *are:*

1. There … 30 students in our group.
2. There … a park in the city centre.
3. There … a big market near my house.
4. There … two teachers in the room.
5. There … one song on this CD.

Exercise 4. Correct the sentences:

Example: There are four continents. *No, there aren't. There are five.*

1. There are three planets in the solar system.
2. There are red and black blood cells.
3. There is one element in water, hydrogen.
4. There are fifty centimeters in one meter.
5. There are more speakers of Italian than of English.

Exercise 5. Fill in the blanks with *have* or *has:*

1. We ... a fine flat.
2. My neighbour ... a car.
3. They ... four children.
4. I ... no English books.
5. You ... a good dictionary.

Exercise 6. Replace the nouns in italic by the personal pronouns:

1. *The boys* are playing tennis.
2. I saw *the boys* in our yard.
3. Put *the phone* on the table.
4. *The phone* is on the table.
5. *Her husband* went to the hospital.

Exercise 7. Paraphrase the following sentences:

Example: This is my coat. – This coat is mine.

1. This is our school.
2. This is my note-book.
3. This is your desk.
4. This is his bicycle.
5. This is her bag.

Example: Your room is large. Jane's room is larger. – Jane's room is larger than yours.

1. My watch is good. Your watch is better.
2. My pen is bad. His pen is worse.
3. Their house is old. Our house is older.
4. His camera is expensive. Nick's camera is more expensive.
5. Her story is interesting. Her friend's story is more interesting.

Exercise 8. Choose the correct form of the pronoun:

1. The person (who, whom) I vote for must have an experience.
2. Everybody left some food on (their, his, her) plate.
3. Mary and (I, me) would rather go to the movies.
4. John (he, himself) went to the meeting.
5. You'll stick (you, your, yourself) with the pins if you are not careful.

Exercise 9. Insert *some* or *any*, making the appropriate compounds if it is necessary:

1. She wanted . . . stamps but there weren't … in the machine.
2. Is there … one here who speaks Chinese?
3. I'd like to buy … new clothes but I haven't … money.
4. They can't have … more strawberries; I want … to make jam.
5. Have you … idea who could have borrowed a bicycle?

Exercise 10. Give the plural of the following nouns if possible:

roof, machinery, name, wife, day, information, country, shelf, industry, life, potato, Negro, dress, wish, reliability, rose, page, photo, zero, loaf, equipment, cliff, pollution, tunnel, woman, sheep, address, sandwich, mouse, money, news, hair.

Test yourself

Choose the correct response:

1. And what is your friend?

a) He is a sailor.
b) He is nice.
c) He is my brother.
d) He is an engenier.

2. Sorry, I am late.

a) It’s all right.
b) Not at all.

c) You are not right.
d) Welcome.

3. What is your nephew's name?
a) He is David.
b) His name is David.
c) He is my nephew.
d) This is David.

4. What does he do?
a) It's a student.
b) He studies English.
c) He is a student.
d) He does his homework.

5. How many brothers have you got?
a) I have got one brother.
b) There is one brother.
c) One brother.
d) I am a brother.

6. How old is he?
a) Fifteen.
b) Fifteen years.
c) He is fifteen.
d) He is fifteen years old.

7. Good morning, Jack.
a) Hello, Mr Green.
b) Good morning, Mr Green.
c) How do you do?
d) Nice to see you.

8. Have a nice weekend!
a) Thank you. All right.
b) You too.
c) Thank you. The same to you.
d) Glad to see you.

9. Does he have three sisters?

a) No, he hasn’t.
b) No, he doesn’t.
c) Yes, he does.
d) Yes, he have.

10. My neighbour ... a car.

a) hasn’t
b) doesn’t
c) has
d) isn’t

UNIT II. MY UNIVERSITY

Grammar: Времена активного залога Past, Present, Future Simple. Типы вопросов. Указательные местоимения. Местоимения many, much, few, a few, little, a little.

Vocabulary

Nouns:		
term	[tə:m]	семестр
department	[diˈpa:tmənt]	отделение, кафедра
professor	[prəˈfesə]	профессор
docent	[ˈdəusnt]	доцент
doctor of Sciences	[ˈsaiənsiz]	доктор наук
master of Sciences	[ˈma:stə]	кандидат наук
graduate	[ˈgrædjuit]	выпускник
post-graduate	[ˌpəʊstˈgrædʒʊɪt]	аспирант
training	[ˈtreiniŋ]	обучение, подготовка, образование
occupation	[ˌɔkjuˈpeiʃ(ə)n]	профессия, занятие, род
hall of residence / hall	[ˌhɔ:lɒvˈrezidəns]	студенческое общежитие
curriculum	[kəˈrikjuləm]	учебный план, курс обучения
skill	[skil]	мастерство, опыт
Adjectives:		
academic	[ˌəkæˈdemik]	академический
vocational	[vəuˈkeiʃ(ə)nəl]	профессиональный
skilled	[skild]	опытный
complete	[kəmˈpli:t]	полный, законченный
Verbs:		
attend	[əˈtend]	посещать
train	[trein]	обучать, готовить
equip	[iˈkwip]	оборудовать, оснащать
provide	[prəˈvaid]	снабжать, обеспечивать
borrow	[ˈbɔrəu]	брать, занимать, одалживать
graduate from	[ˈgrædjueit]	окончить (колледж, университет)
Word combinations:		
first (second, third, fourth, fifth) year student	[fɜ:st jɪə ˈstju:dənt]	студент первого (второго, третьего, четвертого, пятого) курса

full-time student	[ˌfʊlˈtaim]	студент очного отделения
part-time student	[ˌpɑːtˈtaim]	студент вечернего отделения
correspondent student	[ˌkɔriˈspɔnd(ə)nt]	студент заочного отделения
learning programme	[ˈlɜːnɪŋ ˈprəʊgræm]	программа (форма) обучения
correspondence learning programme	[ˌkɔriˈspɔnd(ə)ns]	программа (форма) заочного обучения
distance learning programme	[ˈdɪstəns]	программа (форма) дистанционного обучения
up-to-date equipment	[ˌʌptəˈdeit iˈkwipmənt]	современное оборудование
sports facilities	[fəˈsilitiz]	спортивные сооружения
grant a scholarship	[ˈskɔləʃip]	давать (присуждать) стипендию
take an exam	[ˌteikænigˈzæm]	сдавать экзамен
pass an exam	[ˌpa:sænigˈzæm]	сдать экзамен
defend a graduation paper	[diˈfend]	защитить дипломную работу
carry out tests (experiments)	[ˈkæri aʊt]	проводить опыты (эксперименты)
teaching staff	[ˈti:ʧiŋ ˈstɑːf]	преподавательский состав

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

master of	student
up-to-date	learning programme
end-of-term	equipment
distance	Sciences
first year	tests and examinations

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
teacher	
	move
	assist
translation	
usage	

Exercise 3. Match the words and their definitions:

Example: a man married to your mother – a father

1	an institution of higher education and research which awards academic degrees in several academic disciplines	a	term
2	a test of a student's knowledge or skill in a particular subject	b	university
3	a portion of an academic year, the time during which an educational institution holds classes	c	exam
4	all the different courses of study that are taught in a school, college, or university	d	graduation paper
5	integral parts of the study process	e	curriculum

Exercise 4. Using 10 new words and expressions make a brief description of your University in English. Work in pairs and translate your partner's description into Russian.

Exercise 5. Read the text and answer the following questions:

1. When was the university founded?
2. How many institutes does the university have? What are they?
3. What are the laboratories like?
4. Where do the students live?
5. What are the periods of study for the academic programmes? When do the students take their end-of-term tests and exams?

Krasnoyarsk State Agrarian University

The university I go to was founded in September, 1953 and had three departments: Mechanization, Animal Husbandry and Agronomy departments. Since that time it has been grown significantly. Now it offers a wide range of academic courses, enabling students to be successful in the current job market.

At present, the university has 7 institutes: Agro ecological Technologies, Applied Biotechnology and Veterinary Medicine, Economy and Management AIC, International Management and Education, Engineering Systems and Power Engineering, Food Processing, Law, Land Surveying, Cadastres and Environmental Engineering. The total enrollments include the students of the day department, evening department and correspondence department.

The university is proud of its teaching. 368 teachers work at it: 72 doctors of Sciences and 214 masters of Sciences.

There are a lot of laboratories at the university. They are fitted with up-to-date equipment and instruments to provide a high level of training. They are of great help to the students.

The university library provides the students with access to thousands of learning resources in print and online. They can borrow course books, manuals and literature on the subjects they are interested in.

The students studying away from home are accommodated in the halls of residence.

The academic year runs from September to June, and it is divided into two terms: the winter term and the summer term. The system of Higher Education is being reformed now, as far as it is divided into Bachelor's and Master's Degree.

According to the university curriculum the students have lessons in general and special subjects, quite necessary for their future profession. The students take end-of-term tests and examinations twice a year. If the students who don't pay for their studies pass them successfully, they are granted monthly scholarships. During the terms, the students have to attend lectures and seminars, carry out laboratory tests and do practical work.

Every year a lot of young specialists graduate from the university. They work at different enterprises, plants, offices.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *The academic year runs from September to June.*

– Yes, I agree, it is true. The academic year runs from September to June.

– No, I can't agree, it is false, because the academic year runs from September to January and from February to June.

1. The university I go to was founded in September, 1963.
2. During the terms, the students have to attend lectures and seminars, carry out laboratory tests and do practical work.
3. There are a lot of laboratories at the university.
4. At present, the university has 10 institutes.
5. If the students who don't pay for their studies pass them successfully, they are granted monthly scholarships.

Exercise 2. Choose the right variant:

1. At present, the university has … institutes

a) seven; b) five; c) nine; d) six.

2. The laboratories are fitted with … .

a) modern equipment and instruments; b) up-to-date equipment and instruments; c) new equipment and instruments; d) equipment and instruments.

3. The academic year is divided into … terms.

a) one; b) four; c) three; d) two.

4. The students take end-of-term tests and examinations twice a …

a) year; b) semester; c) week; d) month.

5. During the terms the students have to attend … .

a) lectures and seminars; b) different enterprises, plants, offices; c) laboratories; d) libraries.

Exercise 3. Complete the following sentences:

1	All the students are …	granted scholarships
2	A lot of young specialists are …	suited to different styles of learning
3	The university library is …	proud of its teaching
4	The university is …	of great help to the students
5	The laboratories are …	demanded after graduating from the university

Exercise 4. Find English equivalents in the text:

Example: современное оборудование – up-to-date equipment

1) учебная программа;

2) учебный год;

3) общежитие;

4) степень бакалавра;

5) степень магистра.

Exercise 5. Arrange the word combinations in the order in which they are presented in the text:

	The university curriculum
	The laboratories of the University
	The history of the University
	The teaching staff of the University
	The Institutions of the University

Additional exercises

Exercise 1. Read and translate the dialogue:

Nick: Pete, I'd like to ask you about your study at university.

Pete: What are you interested in? I am ready to answer all your questions. Do you want to enter my university?

Nick: Yes, I do. I want to know more about your university and then I will choose which course to take. How long does an academic course last?

Pete: It lasts for four years.

Nick: What academic courses does the university offer?

Pete: You may choose any of the following courses: electrical engineering, mechanical engineering, agronomy, veterinary medicine, food processing and others.

Nick: What subjects are the most important ones for a future electrician?

Pete: First of all you must be good at mathematics, physics and electrical engineering.

Nick: Oh, it is really very interesting. Have you studied them yet?

Pete: No, but I am studying them now.

Nick: Ok, Pete, thank you very much.

Pete: Not at all. I'll be glad to see you among the students of our university.

Exercise 2. Complete the following sentences:

1	I am a first-year student of…	lessons in general and special subjects.
2	The students studying away from home …	with access to thousands of learning resources in print and online.
3	My favourite subjects are…	Krasnoyarsk State Agrarian University.
4	Every day I usually have…	electrical engineering and mechanical engineering.
5	The university library provides the students …	are accommodated in the halls of residence.

Exercise 3. Work in pairs. Make up your own dialogue.

Exercise 4. Act out the following situations and make up the dialogues:

Situations

You meet your friend and talk about:

a) his/her first year of study at university;
b) his/her qualifications he (she) will obtain after graduating.

Exercise 5. Translate into English:

1. Много лет назад в нашем университете было всего 3 факультета.
2. Сейчас университет предлагает большой выбор академических курсов.
3. Университет гордится своим профессорско-преподавательским составом.
4. Лаборатории оснащены современным оборудованием.
5. Академический год состоит из двух семестров: зимнего и летнего.

Grammar exercises

Exercise 1. What does *have* mean in these sentences? Use the words from the box:

drink eat play receive spend

1. Mark never has breakfast.
2. We've just had a game of tennis.
3. My father has a cup of cocoa every evening.
4. We've just had three weeks in Morocco.
5. Claire had lots of presents on her birthday.

Exercise 2. Write positive or negative sentences:

1. Coffee / come from Brazil.
2. Hillary Clinton / speak Russian.
3. Italy / make pasta.
4. The Trans-Siberian railway / go from Moscow to Vladivostok.
5. The President of South Africa / live in London.

Exercise 3. Put the questions to the words in italics:

1. The children go to bed *at ten o'clock*.
2. His son knows *English* well.

3. My father reads *newspapers* in the evening.
4. It *snows* in winter.
5. *My sister* learns many poems by heart.

Exercise 4. Change the following into the past simple:

1. I often see them in the park.
2. We don't know his address.
3. He gets up, washes, dresses, has breakfast and goes to school.
4. Does the doctor speak English?
5. We understand the rule.

Exercise 5. Complete the sentences about you:

1. In 199…, …
2. When I was 10, …
3. Yesterday, I …
4. Last week, I …
5. Last summer, I …

Exercise 6. Complete the sentences with the past simple form of the verb in brackets. Then decide if each sentence is true or false:

1. Greek actors (wear) masks and special boots.
2. Spartan children (take) baths only two or three times a year.
3. The philosopher Socrates (drink) poison and died.
4. Alexander the Great's army (go) as far as China.
5. The Roman Emperor Caligula's name (mean) 'Happy Soldier'.

Exercise 7. Replace the verbs in italic by ones in the past simple tense:

1. Pete *wants* to learn Italian.
2. My relatives *live* in a small town.
3. The teacher *asks* questions about the text.
4. The pupils *answer* all the questions.
5. We often *celebrate* this holiday here.

Exercise 8. Seven of the sentences (including the example) contain historical errors. Guess which ones are wrong and rewrite them with a negative past simple form:

Example: Alexander the Great married Cleopatra.
Alexander the Great didn’t marry Cleopatra.

1. Nelson Mandela became President of South Africa in 1994.
2. Leonardo da Vinci invented the Internet.
3. Confucius the Chinese philosopher died in 1900.
4. Marco Polo stayed in China for five years.
5. The ancient Romans used steam engines in their battles.

Exercise 9. Change the following into the Future Simple:

1. I spend my summer holidays in the country.
2. She agrees with him.
3. We speak English perfectly.
4. My brother is married.
5. I saw him at university.

Exercise 10. Complete the sentences with *this, that, these, those:*

1. I don't like living in … country.
2. Could you bring … thing to me, please?
3. Who are … attractive men over there?
4. Listen – you will like … funny story.
5. Wait – I can't walk fast in … new shoes.

Test yourself

Choose the correct response:

1. The university I go to provides …

a) part-time courses;
b) full-time courses;
c) full-time and correspondence courses;
d) correspondence courses.

2. The students enjoy studying at university thanks to …

a) teachers;
b) full-time courses;
c) canteen;
d) students.

3. The library provides …

a) academic activities;
b) materials for study;

c) up-to-date equipment;
d) pictures.

4. The canteen is the most popular place for …
a) student discussions;
b) having a large spacious area;
c) greenery all round;
d) have meals.

5. The academic year is divided into …
a) two terms;
b) three terms;
c) one term;
d) four terms.

6. The students studying away from home live …
a) with the friends;
b) in the halls of residence;
c) alone;
d) in the hostel.

7. The students who study well …
a) go home;
b) have a long vacation;
c) are granted scholarships;
d) don’t pay the study

8. The system of Higher Education is reformed into …
a) Bachelor’s Degree;
b) Bachelor’s and Master’s Degree;
c) Master’s Degree;
d) Post-graguate course.

UNIT III. MY CITY

Grammar: Времена активного залога Past, Present, Future Continuous. Степени сравнения прилагательных и наречий. Артикли. Числительные.

Vocabulary

Nouns:		
fortress	[ˈfɔ:trəs]	крепость
confluence	[ˈkɔnfluəns]	слияние
merchant	[ˈmə:tʃənt]	купец
century	[ˈsentʃuri]	век, столетие
lore	[lɔ:]	знания
exhibition	[ˌeksiˈbiʃən]	выставка
branch	[ˈbra:ntʃ]	ветвь, отрасль; филиал, отделение
enterprise	[ˈentəpraiz]	предприятие
sight	[sait]	вид, зрелище, достопримечательности
tributary	[ˈtribjutəri]	приток
chapel	[ˈtʃæpəl]	часовня, церковь
bridge	[bridʒ]	мост
reservation	[ˌrezəˈveiʃən]	заповедник
Adjectives:		
whole	[həul]	весь, целый
outstanding	[ˌautˈstændiŋ]	выдающийся
ancient	[ˈeinʃənt]	древний, старинный
scientific	[ˌsaiənˈtifik]	научный
educational	[ˌedjuˈkeiʃənəl]	образовательный
(non)-ferrous	[ˈferəs]	(цветной) черный (металл)
main	[mein]	главный, основной
powerful	[ˈpauəful]	мощный
municipal	[mjuˈnisipl]	муниципальный, городской
artificial	[ˌa:tiˈfiʃəl]	искусственный
marvelous	[ˈma:vələs]	чудесный
numerous	[ˈnju:mərəs]	многочисленный
craggy	[ˈkrægi]	скалистый
adroit	[əˈdrɔit]	ловкий
true	[tru:]	истинный

Verbs:		
amaze	[əˈmeiz]	изумлять, поражать
stretch	[stretʃ]	простираться, тянуться
include	[inˈklu:d]	включать, заключать, содержать в себе
construct	[kənˈstrʌkt]	строить, сооружать
preserve	[priˈzə:v]	сохранять, охранять, оберегать
produce	[prəˈdju:s]	производить, выпускать
belong	[biˈlɔŋ]	принадлежать, относиться к чему-то
depict	[diˈpikt]	изображать
award	[əˈwɔ:d]	награждать, присуждать
appear	[əˈpiə]	показываться, появляться
surround	[səˈraund]	окружать
attract	[əˈtrækt]	привлекать
carve	[ka:v]	резать, вырезать
Word combinations:		
to pay attention to smth	[pei əˈtenʃn]	обращать внимание на что-либо
to date back to	[deit bæk tu:]	относиться к, восходить к, вести начало
to go without saying	[gəʊ wiˈðaʊt ˈseiiŋ]	само собой разумеется
(not) by chance	[bai tʃa:ns]	(не) случайно
to put into operation	[pʊt ˈintə ɒpəˈreiʃn]	вводить в эксплуатацию
from time immemorial	[frɒm taim imiˈmɔ:riəl]	с незапамятных времен
a great number	[ə greit ˈnʌmbə]	много, большое количество
no wonder	[ˈwʌndə]	неудивительно

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

leading	places
educational	center
professional	institutions
historical	theatres
cultural	branch

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
merchant	
	date
painter	
	study
singer	

Exercise 3. Match the words and their definitions:
Example: a man married to your mother - a father

1	fortress	a	an area of land in which wild animals are protected
2	river	b	a castle or other large strong building, or a well-protected place, which is intended to be difficult for enemies to enter
3	taiga	c	a natural flowing watercourse
4	reservation	d	a gravity dam
5	hydroelectric power-tation	e	the very large area of wet land in the far northern parts of the world that is covered with conifer trees

Exercise 4. Using 10 new words and expressions make a brief description of your city in English. Work in pairs and translate your partner's description into Russian.

Exercise 5. Read the text and answer the following questions:
1. Who and when founded Krasnoyarsk?
2. Why is Krasnoyarsk a cultural center of Siberia?
3. What is the leading branch of industry in Krasnoyarsk?
4. What kinds of sports are loved by people of Krasnoyarsk?
5. What can you say about the reservation "Stolby"?

Krasnoyarsk

The fortress near Krasny Yar was built in August of 1628. The Cossacks headed by Andrei Dubensky paid attention to the place of confluence of the two rivers – the Yenisey and the Kacha. The beauty of these places amazed them – steppes, mountains and the taiga stretched for miles around. The status of the city was got by Krasnoyarsk in 1690.

Krasnoyarsk is a cultural center of Siberia. In its history there are many outstanding names. Among them you can see a painter Vassily

Surikov, a merchant-bibliophile Gennady Yudin, an opera singer Dmitry Khvorostovsky, a two times Olympic champion in wrestling Ivan Yarigin.

There are five professional theatres in the city: the House of Opera and Ballet, a drama theatre, a musical theatre, a puppet theatre and a theatre of young spectators. There are concert halls, the Organ Hall, a circus, the museum of local lore, the Surikov house-museum, a large exhibition complex and others.

Krasnoyarsk is included into the list of historical places in the Russian Federation. On the city territory there are some memorials dating back to the archeology of the Stone Age such as Afontova Hill, Bugach, Gremyachy Log and others.

Krasnoyarsk is one of the largest Siberian scientific centers. There are many schools and higher educational institutions in the city. Among them there are such universities as Siberian Federal University, Siberian State University of Science and Technologies, Institute of Arts, Agrarian, Teacher Training and Medical universities and others.

The leading branch of industry in Krasnoyarsk is non-ferrous metallurgy. More than 30 heavy, light, alloyed, rare-earth metals and elements are produced in the city, and the most important ones are aluminum, platinum and gold. The largest industrial enterprise is the Krasnoyarsk Aluminum Plant.

The main sight of Krasnoyarsk is the Yenisey. This great Siberian river takes more than 500 large tributaries. The most powerful in Eurasia hydroelectric power-stations were built there: the Sayno-Shushenskaya (1980) and the Krasnoyarsk Hydroelectric Power-station (1972).

Krasnoyarsk bridges also belong to the main sights of the city. The railway bridge was built in 1899 by the engineer-mechanic E.K. Knorre. It was awarded a gold medal at the world exhibition in Paris in 1900. In 1961 a municipal bridge whose length is 2100 meters was put into operation. But the Oktyabrsky road-transport bridge built in 1986 is more grandiose. It is 41 meters in width and its length is more than 5 kilometers.

Krasnoyarsk is a city of mass and professional sports. Such kinds of sports as wrestling and Greco-Roman one, judo, ice-hockey, rugby and motorcycle races on the ice are loved by the people of Krasnoyarsk.

Next to the city there is a wonderful reservation “Stolby” attracting numerous tourists. It was organized in 1925. Here there are craggy rocks numbering 47000 hectares. They are about one hundred. For million years rains and winds, the cold and the sun were carving fantastical figures from these wild rocks. From time immemorial the reserve has been the favourite resting place of the Krasnoyarsk citizens.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *Krasnoyarsk was founded in 1728.*

– *Yes, I agree, it is true. The academic year runs from September to June.*

– No, I can't agree, it is false, because Krasnoyarsk was founded in 1628.

1. Five professional theatres function in the city.
2. The leading branch of industry in Krasnoyarsk is shipbuilding.
3. Krasnoyarsk is a city of mass and professional sports.
4. The municipal bridge was awarded a gold medal at the world exhibition in Paris in 1900.
5. "Stolby" was organized in 1925.

Exercise 2. Choose the right variant:

1. The … near Krasny Yar was built in August of 1628.
a) city; b) fortress; c) village; d) town.
2. Krasnoyarsk is a … center of Siberia.
a) modern; b) scientific; c) educational; d) cultural.
3. Krasnoyarsk is included into the list of historical places in the … .
a) Russian Federation; b) world; c) Siberia; d) Eurasia.
4. The leading branch of industry in Krasnoyarsk is … metallurgy.
a) non-ferrous; b) machine-building; c) heavy; d) light.
5. Krasnoyarsk … also belong to the main sights of the city.
a) theatres; b) bridges; c) buildings; d) libraries.

Exercise 3. Complete the following sentences:

1	The Cossacks headed by Andrei Dubensky …	many professional theatres.
2	Krasnoyarsk has many outstanding names …	paid attention to the place of confluence of the two rivers.
3	Krasnoyarsk is a cultural center of Siberia, it has …	the main sight of Krasnoyarsk.
4	The Yenisey is …	was organized in 1925.
5	A wonderful reservation "Stolby" …	a painter V. Surikov, a merchant-bibliophile G.Yudin and many others.

Exercise 4. Find English equivalents in the text:

Example: современное оборудование – up-to-date equipment

1) исторический центр;
2) выдающиеся имена;
3) дом-музей;
4) лидирующая отрасль;
5) инженер-механик.

Exercise 5. Arrange the word combinations in the order in which they are presented in the text:

	Outstanding names of Krasnoyarsk
	The main sights of Krasnoyarsk
	The history of the city
	The leading branch of industry
	historical places

Additional exercises

Exercise 1. Read and translate the dialogues:

Asking about the way

A.: Excuse me!

B.: Yes?

A.: Can you tell me the way to the post office, please?

B.: Certainly. Take the first street on the left, then the second on the right.

A.: First on the left, second on the right …

B.: That's right.

A.: Thanks a lot.

***

A.: Excuse me. How can I get to the railway station, please?

B.: Go down this road, then take the second street on the left.

A.: Is it far from here?

B.: Oh, no. It's just five minutes walk.

A.: Thank you very much.

***

A.: Excuse me. Where is the nearest bank here?

B.: It's round the corner over there, opposite the supermarket.

***

A.: Excuse me, how can I get to the theatre?

B.: Er… which theatre?

A.: The drama theatre.

B.: You go through the shopping center and then I think you turn left… but ask again.

A.: OK, thank you.

A.: Can you tell me the way to the drama theatre?

C.: I'm sorry. I don't know. I'm a stranger here.

A.: Oh, OK.

A.: Excuse me, which way is the drama theatre?

D.: Turn left at the corner, then go straight on until you come to the traffic lights and it's on your left.

A.: Left at the corner, straight on, the traffic lights. Thanks.

A.: Excuse me, the drama theatre?

E.: Go up to the traffic lights and you'll see it across the road on your left.

A.: Fine. Thanks.

A New-comer in St. Petersburg

New-comer: Excuse me, could you tell me the way to the "Druzhba" hotel? I'm a stranger here; I've just arrived in St. Petersburg.

Passer-by: It's quite a long way from here.

New-comer: Yes, I know, but my friends advised me to put up at this hotel.

Passer-by: Your friends are right; it is one of the best hotels. You may go by underground there. It's the quickest way to get there, though you'll have to change on to a bus in Lev Tolstoy Square or walk.

New-comer: What bus shall I change on to?

Passer-by: The 65 bus will take you to Popov Street. It is only one stop from the underground station.

New-comer: Thank you very much. Is it impossible to get there by tram or trolley-bus? I haven't seen anything of St. Petersburg yet and I've heard so much about this beautiful city!

Passer-by: You can get on the 10 trolley-bus. It will take you as far as Palace Square where you may get off. When you have admired the wonderful view around you, take the 25 bus.

New-comer: Where shall I get off the "Druzhba" hotel?

Passer-by: In Popov Street, but you'd better ask the conductor to put you down.

New-comer: Thank you very much.

Exercise 2. Choose the correct response:

1	How can I get to the railway station, please?	It's round the corner over there.
2	Where is the nearest bank here?	The 65 bus will take you to Popov Street.
3	Can you tell me the way to the drama theatre?	In Popov Street, but you'd better ask the conductor to put you down.
4	What bus shall I change on to?	Turn left at the corner and you'll see the drama theatre.
5	Where shall I get off the "Druzhba" hotel?	Go down this road.

Exercise 3. Work in pairs. Make up your own dialogue.

Exercise 4. Act out the following situations and make up the dialogues:

Situations

a) You are a new-comer in this city. You ask a passer-by how to get to the cinema, the supermarket, the hospital or other places.

b) A new-comer asks you how to get to the bus stop, the airport, the central square or other places.

Exercise 5. Translate into English:

1. Наш город был основан казаками во главе с Андреем Дубенским в августе 1628 года на месте слияния Енисея и Качи в окружении тайги, гор и степей.

2. В истории Красноярска есть такие выдающиеся имена, как художник Суриков, купец-библиофил Юдин, оперный певец Хворостовский, олимпийский чемпион Ярыгин.

3. Красноярск является культурным центром, где функционируют пять профессиональных театров, органный зал, цирк, краеведческий музей, музей Сурикова, выставочный комплекс и другие достопримечательности.

4. Красноярск – крупный образовательный центр, включающий в себя Красноярский государственный аграрный университет, Сибирский федеральный университет, Сибирский государственный университет науки и технологий, Институт искусств и другие.

5. Самая главная достопримечательность Красноярска – заповедник «Столбы»; с незапамятных времен заповедник – это любимое место отдыха жителей города.

Grammar exercises

Exercise 1. Complete the sentences. Use the verbs in brackets in the present continuous:

1. David (not work) at the moment. He is at a restaurant.
2. Sally (have) a shower? – No, she (wash) her hair.
3. You (not watch) the TV at the moment. Why don't you switch it off?
4. Is Ann in the kitchen? No, she (cut) the grass.
5. Ben and Patty are in London on holiday. They (stay) at a small hotel near Hyde Park.

Exercise 2. Complete these sentences using one of these verbs: *get, become, change, rise, improve, fall, increase:*

1. The number of people without jobs … at the moment.
2. He is still ill but he … better slowly.
3. These days food … more and more expensive.
4. The world … . Things never stay the same.
5. The cost of living … . Every year things are dearer.

Exercise 3. Choose the correct form:

1. Look outside! *It's raining!/It rains!*
2. *It's raining/It rains* quite often in Britain.
3. *I'm going/I go* to bed now. Goodnight.
4. Usually, *I'm going/I go* to bed at around 11.30 every night.
5. Where's Brian? – *He's cooking/He cooks* the dinner.

Exercise 4. Put the verb into the correct form, past continuous or past simple:

Example: While Tom was cooking (cook) the dinner, the phone rang (ring).

1. George … (fall) off the ladder, while he … (paint) the ceiling.
2. … (Tina / wash) her car when I phoned her?
3. Alex … (watch) TV when I … (arrive).

4. Tom … (take) a photograph of me while I … (not / look).
5. We … (not / go) fishing because it … (rain).

Exercise 5. Put the verbs in brackets into the future continuous:

1. This time next month I (sit) on a beach.
2. When you arrive I probably (pick) fruit.
3. In a few days time we (fly) over the Pacific Ocean.
4. I (wait) for you when you come out.
5. When you next see me I (wear) my new trousers.

Exercise 6. Make sentences with will be –ing:

Example: I'm going to watch television from 9 till 10 o'clock this evening. So at 9.30 I *will be watching television.*

1. Tomorrow afternoon I'm going to play tennis from 3 o'clock until 4.30. So at 4 o'clock tomorrow I … .
2. Jim is going to study from 7 o'clock until 10 o'clock this evening. So at 8.30 this evening he … .
3. We are going to clean the flat tomorrow. It will take from 9 until 11 o'clock. So at 10 o'clock tomorrow morning … .
4. People are going to fly to Mars for their holidays in a hundred years' time. So in 3022 they … .
5. My friend is going to visit an exhibition the day after tomorrow. So at 4 o'clock the day after tomorrow he …. .

Exercise 7. Give the comparative and the superlative degree of the following adjectives:

Easy, bright, bad, hot, crazy, wide, lovely, warm, brave, good, active, productive, far, happy, nervous, fine, fat, profitable, dirty, old, beautiful, thin, intelligent.

Exercise 8. Answer the questions, using the proper degree of comparison:

1. Who is (popular) singer in your country?
2. Who is (beautiful) actress in your country?
3. Who is (rich) person in the world?
4. What is (expensive) thing you have ever bought?
5. What is (stupid) thing you have ever done?

Exercise 9. Put the verb into the correct form. Use the future continuous or future perfect:

1. Don't phone between 7 and 8. … (we / have) dinner then.
2. Phone me after 8 o'clock. … (we / finish) dinner by then.
3. Tomorrow afternoon we're going to play tennis from 3 until 4.30. So at 4 o'clock, … (we / play) tennis.
4. Do you think … (you / still / do) the same job in ten years' time?
5. If you need to contact me, … (I / stay) at the Lion Hotel until Friday.

Exercise 10. Complete the sentences using *a, an* or *the:*

1. … Queen of England lives in Buckingham Palace in London.
2. Who is … best footballer in … world?
3. What is … name of this village?
4. Jane is … very nice person. You must meet her.
5. … earth moves round … sun.

Test yourself

Choose the correct response:

1. When was Krasnoyarsk founded?
a) at the beginning of the 17^{th} century;
b) at the end of the 17^{th} century;
c) in the 18^{th} century;
d) in the 16th century.

2. Vassily Surikov is …
a) a sportsman;
b) a singer;
c) a painter;
d) an artist.

3. What is the leading branch of Krasnoyarsk industry?
a) ship-building;
b) chemistry;
c) non-ferrous metallurgy;
d) aircraft construction.

4. How many tributaries does Enisey have?
a) more than 500;
b) more than 400;
c) more than 600;
d) more than 100.

5. The Sayano-Shushenskaya hydroelectric power station is …
a) the biggest in Europe;
b) the most powerful in Eurasia;
c) depicted on ten-ruble banknotes;
d) the smallest in Eurasia.

6. When was the municipal bridge built?
a) in 1976;
b) in 1961;
c) in 1986;
d) in 1968.

7. When was the reservation “Stolby” founded?
a) in 1925;
b) in 1905;
c) in 1950;
d) in 1968.

8. What makes the development of tourism in Krasnoyarsk?
a) numerous guests;
b) nature;
c) theatres.

9. What is the favourite resting place of Krasnoyarsk citizens?
a) the circus;
b) Afontova Hill;
c) the reserve;
d) the zoo.

10. Krasnoyarsk is situated on the both banks of the river …
a) Volga;
b) Thames;
c) Yenisey;
d) Lena.

UNIT IV. GREAT BRITAIN

Grammar: Времена активного залога Past, Present, Future Perfect; Past, Present, Future Perfect Continuous.

Vocabulary

Nouns:		
climate	[ˈklaimət]	климат
fog	[fɒg]	туман
coast	[ˈkəust]	морской берег, побережье
island	[ˈailənd]	остров
enterprise	[ˈentəpraiz]	предприятие
influence	[ˈinflʊəns]	влияние
shipyard	[ˈʃipja:d]	верфь, судостроительный завод
basin	[ˈbeisn]	залежь
coal basins	[kəʊl ˈbeisnz]	залежи угля
monarchy	[ˈmɔnəki]	монархия
constitutional monarchy	[ˌkɔnstiˈtju:ʃnəl]	конституционная монархия
sovereign	[ˈsɔvrin]	монарх
neighbourhood	[ˈneibəhud]	соседство
quality	[ˈkwɔliti]	качество
quantity	[ˈkwɔntiti]	количество
tool	[tu:l]	инструмент
machine tool	[məˈʃi:n tu:l]	металлорежущий станок
bridge	[bridʒ]	мост
workshop	[ˈwə:kʃɔp]	мастерская
fortress	[ˈfɔ:tris]	крепость
palace	[ˈpælis]	дворец
prison	[ˈprizn]	тюрьма
jewels	[ˈdʒu:əlz]	драгоценности
treasure	[ˈtrəʒə]	сокровище
luxury	[ˈlʌkʃəri]	роскошь
mummy	[ˈmʌmi]	мумия
Adjectives:		
cool	[ku:l]	прохладный
mild	[maild]	мягкий
similar	[ˈsimələ]	подобный, схожий
huge	[hju:dʒ]	огромный
empty	[ˈempti]	пустой

notable	[ˈnəutəbl]	примечательный, известный
enormous	[iˈnɔ:məs]	огромный
commercial	[kəˈmə:ʃəl]	коммерческий
financial	[faiˈnænʃəl]	финансовый
splendid	[ˈsplendid]	великолепный
Verbs:		
divide	[diˈvaid]	делить, разделять
comprise	[kəmˈpraiz]	включать
consist of	[kənˈsist]	состоять из
separate	[ˈsepəreit]	отделять
Word combinations:		
cotton industry	[kɒtn ˈindəstri]	хлопковая промышленность
iron and steel industry	[ˈaiən]	металлургическая промышленность
ship-building industry	[ˈʃipˌbildiŋ]	кораблестроительная промышленность
textile industry	[ˈtekstail]	текстильная промышленность
the House of Commons	[ˈkɔmənz]	палата общин
the House of Lords	[ðiː haʊs ɒv lɔːdz]	палата лордов
Geographical names:		
English Channel	[ˈiŋgliʃ ˈtʃænl]	Английский канал (Ла-Манш)
Strait of Dover	[ˈstreitəv ˈdəuvə]	Па-де-Кале
Lowland Britain	[ˈləuləndˈbritn]	низменная часть Великобритании
Highland Britain	[ˈhailəndˈbritn]	гористая часть Великобритании
the Pennines	[ˈpenainz]	Пеннинские горы
Lake District	[ˈleik ˈdistrikt]	Озерный край
Lowlands of Scotland	[ˈləʊləndz]	Шотландская низменность
Glasgow	[ˈgla:zgəu]	Глазго
Manchester	[ˈmæntʃistə]	Манчестер
Liverpool	[ˈlivəpu:l]	Ливерпуль
Newcastle	[ˈnju:ˌka:səl]	Ньюкасл
Cardiff	[ˈka:dif]	Кардифф
Sheffield	[ˈʃefi:ld]	Шеффилд
Birmingham	[ˈbə:miŋəm]	Бирмингем
Belfast	[ˌbelˈfa:st]	Белфаст
Tower of London	[ˌtauərəvˈlʌndən]	Тауэр, старинная крепость на берегу реки Темзы
Westminster Abbey	[ˌwestminstərˈæbi]	Вестминстерское аббатство

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

English	Sea
North	monarchy
Gulf	Parliament
constitutional	Channel
British	Stream

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
play	
	separate
limit	
	influence
order	

Exercise 3. Match the words and their definitions:

Example: the body of salty water that covers approximately 71 percent of the Earth's surface – a sea

1	island	a	a line that forms the boundary between the land and the ocean or a lake
2	channel	b	an isolated piece of habitat that is surrounded by a dramatically different habitat, such as water
3	coast	c	a group of human beings with some predefined criterion in common, such as location, race, ethnicity, nationality, or religion
4	population	d	the state of the atmosphere, describing for example the degree to which it is hot or cold, wet or dry, calm or stormy, clear or cloudy
5	weather	e	a landform consisting of the outline (banks) of the path of a narrow body of water

Exercise 4. Using 10 new words and expressions make a brief description of some English speaking country in English. Work in pairs and translate your partner's description into Russian.

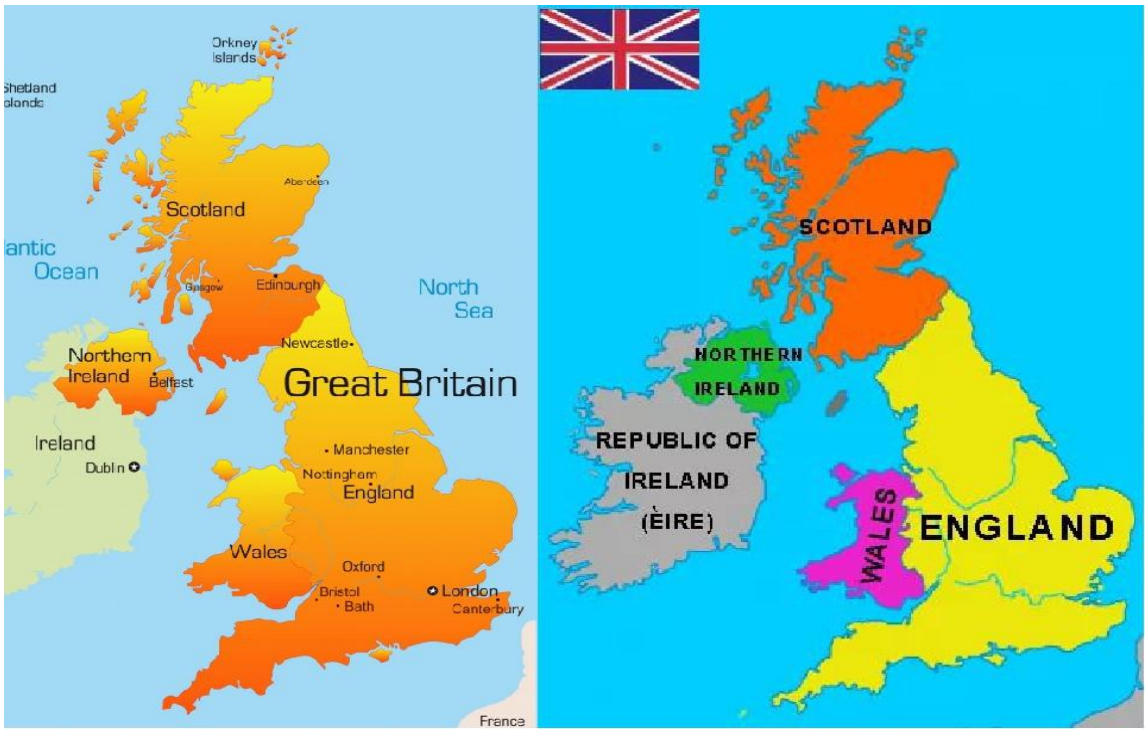
Exercise 5. Read the text and answer the following questions:

1. What are the names of two main islands in the United Kingdom?
2. What parts is Great Britain divided into?
3. What are the main coal areas?
4. Is Britain rich in natural resources?
5. Why is the United Kingdom one of the world's industrial countries?

The United Kingdom of Great Britain and Northern Ireland

The United Kingdom of Great Britain and Northern Ireland is situated on the Northwest coast of Europe. The UK consists of four parts. They are England, Scotland, Wales and Northern Ireland. The UK lies on the British Isles. The two main islands are Great Britain and Ireland. They are separated from the continent by the English Channel and the Strait of Dover. The west coast of the country is washed by the Atlantic Ocean and the Irish Sea, the east coast is washed by the North Sea. The population of the United Kingdom of Great Britain and Northern Ireland is nearly 68,7 million.

Geographically Great Britain is divided into Lowland Britain and Highland Britain. Lowland Britain comprises Southern and Eastern Britain. Highland Britain includes Scotland, Wales, the Pennines and the Lake District. The highest mountain, Ben Nevis, is in Scotland.



The flora of the British Isles varies very much. The fauna is similar to that of the north-west of Europe. Britain is not very rich in natural resources. The main coal areas are the South Wales fields, the Lowlands of Scotland, the Yorkshire field and others.

The climate of Great Britain is mild. The Atlantic Ocean and the warm waters of Gulf Stream influence the weather of the British Isles. Summers are cool and rainy. There is a lot of fog and rain in autumn and in winter. There are a lot of rivers in Great Britain. The Severn is the longest river; the Thames is the most important one.

The United Kingdom is one of the world's industrial countries. Big cities such as London, Glasgow, Manchester, Liverpool and others have enterprises of nearly all branches of industry. The biggest centers of iron and steel industry are Newcastle, Cardiff, Glasgow and Sheffield. Electric motors, machine tools, textile machinery, locomotives and automobiles are produced in Birmingham, Sheffield and London. The shipbuilding industry is of great importance for Britain. Many countries place orders for new ships with the British shipyards in Glasgow, Belfast and Newcastle. The most important branches of the textile industry are woolen and cotton industries. The main center of the cotton industry is Manchester.

The capital of the country is London. English is the official language. Great Britain is a constitutional monarchy. The powers of the monarch are limited by Parliament. The British Parliament consists of the Sovereign, the House of Lords and the House of Commons. The United Kingdom of Great Britain and Northern Ireland plays an important role in world politics.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *The United Kingdom of Great Britain and Northern Ireland is situated on the Northwest coast of Europe.*

- Yes, I agree, it is true. The United Kingdom of Great Britain and Northern Ireland is situated on the Northwest coast of Europe.

– No, I can't agree, it is false, because the United Kingdom of Great Britain and Northern Ireland is situated on the Southwest coast of Europe.

1. The west coast of the country is washed by the Atlantic Ocean and the Irish Sea.

2. The population of the United Kingdom of Great Britain and Northern Ireland is nearly 15 million.

3. Britain is very rich in natural resources.

4. The United Kingdom is one of the world's industrial countries.
5. There are a lot of rivers in Great Britain.

Exercise 2. Choose the right variant:

1. The climate of Great Britain is … .
a) tropical; b) mild; c) temperate; d) continental.
2. The United Kingdom is one of the world's … countries.
a) industrial; b) agricultural; c) business; d) cultural.
3. … is the official language.
a) Russian; b) French; c) Spanish; d) English.
4. Great Britain is a constitutional …. .
a) republic; b) country; c) monarchy; d) state.
5. The UK consists of … parts.
a) three; b) four; c) seven; d) two.

Exercise 3. Complete the following sentences:

1	The UK consists of …	Lowland Britain and Highland Britain.
2	The two main islands are …	England, Scotland, Wales and Northern Ireland.
3	Great Britain is divided into …	Scotland, Wales, the Pennines and the Lake District.
4	Highland Britain includes …	the South Wales fields, the Lowlands of Scotland, the Yorkshire field and others.
5	The main coal areas are …	Great Britain and Ireland.

Exercise 4. Find English equivalents in the text:

Example: современное оборудование – up-to-date equipment

1) Дуврский пролив;
2) Английский канал;
3) Северо-западное побережье;
4) Объединенное Королевство;
5) Высокогорная Британия.

Exercise 5. Arrange the words and the word combinations in the order in which they are presented in the text:

	Climate
	Industries
	Political system
	Geographical position
	Mountains, rivers and lakes

Additional exercises

Exercise 1. Read and translate the dialogue:

One day before going to London Boris decided to visit his friend Paul who had been to London for several years. He wanted to ask Paul about places of interest in London.

B.: Where would you advise me to go in London first of all?

P.: As for me I would first go to the British Museum.

B.: Is the British Museum large?

P.: It'll take you not less than the whole day to have a good look around it. But you should visit other places. Have you heard of Big Ben?

B.: Certainly, I have. It is the clock.

P.: Big Ben is really not a clock but the bell on which the hours are struck. Besides Big Ben, there are four Little Bens, which strike before Big Ben.

B.: Where is the residence of the Monarch?

P.: In Buckingham Palace. They have the Changing of the Guard in front of the palace every morning at 11 o'clock. Go there.

B.: What else will you advise me to see in London?

P.: Trafalgar Square and Hyde Park are the places where the mass meetings and demonstrations are held. Hyde Park is the largest park in London. Then visit the Tower of London and St. Paul's Cathedral!

B.: I've read something about the Tower.

P.: Now there is a museum where the crown, jewels and other treasures are kept.

B.: You didn't say a word about the shops in London.

P.: The West End is the part of London where you'll find most of the shops.

B.: Thank you very much.

P.: Not at all. I wish you a pleasant trip to London.

Exercise 2. Choose the correct response:

1	Where would you advise me to go in London first of all?	It is the clock on which the hours are struck.
2	Is the British Museum large?	In Buckingham Palace.
3	Have you heard of Big Ben?	I would first go to the British Museum.
4	Where is the residence of the Queen?	Trafalgar Square and Hyde Park.
5	What else will you advise me to see in London?	It'll take you not less than the whole day to have a good look around it.

Exercise 3. Work in pairs. Make up your own dialogue.

Exercise 4. Act out the following situations and make up the dialogues:

Situations

a) You came to London to see your friends there. You ask them which places of interest to see in London.

b) You tell your classmates about your holidays in London.

Exercise 5. Translate into English:

1. Великобритания состоит из четырех частей: Англия, Шотландия, Уэльс и Северная Ирландия.

2. Западное побережье страны омывается Атлантическим океаном и Ирландским морем, восточное побережье омывается Северным морем.

3. Соединенное Королевство – одна из промышленно развитых стран мира: крупнейшими металлургическими центрами являются Ньюкасл, Кардифф, Глазго и Шеффилд.

4. Великобритания – конституционная монархия, однако полномочия монарха ограничены парламентом.

5. Британский парламент состоит из Монарха, Палаты лордов и Палаты общин.

Grammar exercises

Exercise 1. You are asking someone about things he has done in his life. Use the words in brackets to make your questions:

Example: (you ever / be / to Italy?). Have you ever been to Italy?

1. (you ever / be / to South America?) … ?
2. (you / do / the shopping?) … ?
3. (you / live / in this town all your life?) … ?
4. (how many times / you / be / in love?) … ?
5. (you ever / travel / abroad?) … ?

Exercise 2. Put the verbs in brackets into the correct tense: the present perfect or past simple:

1. I (buy) a new house last year, but I (not sell) my old house yet, so at the moment I have two houses.
2. When I was a child, I (not like) sport.
3. My friend is a writer. He (write) many books.

4. Her boss (look) up as she (come) in. “You (be) late every morning this week,” he (growl).

5. Victoria (have) a baby two weeks ago.

Exercise 3. In this exercise you have to say how long something has been happening:

Example: It is raining now. It began raining two hours ago.

It *has been raining* for two hours.

1.Mark is repairing a car. He began repairing three hours ago. He … for three hours.

2. I’m learning Spanish. I started learning Spanish in August. I … since August.

3. Ann is looking for a job. She began looking six months ago. She … for six months.

4. Mary is making pudding. She started making it an hour ago. She … for an hour.

5. George smokes. He started smoking five years ago. … for five years.

Exercise 4. Now you have to ask questions with how long:

Example: It is raining. *How long has it been raining?*

1. My foot is hurting. How long … ?
2. Mike plays chess. How long … ?
3. Jim sells washing machines. How long … ?
4. Tom is living in High Street. How long … ?
5. Ann studies English. How long … ?

Exercise 5. Put the verb into the correct form, present perfect (I have done) or present perfect continuous (I have been doing):

Examples: I *have lost* (lose) my key. Can you help me look for it?

You look tired. *Have you been working* (you / work) hard?

1. Look! Somebody … (break) that window.
2. I … (read) the book you gave me but I … (not / finish) it yet.
3. “Sorry I’m late”. “That’s all right. I … (not / wait) long”.
4. Hello! I … (clean) the windows. So far I … (clean) five of them and there are two more to do.
5. There’ s a strange smell in here. … (you / cook) something?

Exercise 6. Peter arrived late at different places yesterday. What had happened when he arrived at each place?

Example: his train / already / leave the station

When he arrived at the station, his train had already left.

1. the play / already / start.
2. it / already / close.
3. they / sell / the furniture he wanted.
4. his girlfriend / go out.
5. the game / nearly / finish.

Exercise 7. Put one verb in each sentence into the past perfect and the other verb into the past simple:

Example: Mario *felt* (feel) very nervous when he first drove in Britain because he *hadn 't driven* (not drive) on the left before.

1. Andrew (do) the test before, so he (find) it very easy.
2. When I (arrive) at the party, Tom already (go) home.
3. I (not laugh) at the joke because I (hear) it before.
4. We (leave) the restaurant when we (have) dinner.
5. The house (be) dirty because they (not clean) it for weeks.

Exercise 8. Complete the sentences with the past simple or past perfect form of the verb in brackets:

When I (try) to use my laptop, I realized the battery (run) down. I (turn) the computer off, but forgot that I (not save) my work. I only remembered I (not pay) the bill when my Internet connection (stop) working. When I (receive) the e-mail, I couldn't understand who (send) it. When I (check) the instructions, I understood what I (do) I knew I (receive) a virus when I (run) the anti-virus program. As soon as I (download) the document, I knew I (make) a mistake. I could see what (go) wrong as soon as I (look) inside the printer. I knew I (press) the wrong key when nothing (happen). When the screen (go) blank, I couldn't understand how it (happen).

Exercise 9. Put the verbs in brackets into the future perfect tense:

1. By the time he leaves this place, he (spend) all his money.
2. I hope you (not forget) all this by tomorrow.
3. Yes, I make jam every week. I (make) about 80 kilos by the end of the summer.
4. By this time they (be) married for 25 years.
5. When he reaches Land's End he (walk) 1,500 miles.

Exercise 10. Use will have done:

Example: Tom and Ann are going to the cinema. The film begins at 7.30 and it is already 7.20. And it will take them 20 minutes to get there. When they get there, (the film / already / start) *the film will have already started.*

1. Jim always goes to bed at 11 o'clock. Tom is going to visit him at 11.30 this evening. When Tom arrives, (Jim / go / to bed) … .

2.Tom is on holiday. He has very little money and he is spending too much too quickly. Before the end of his holiday, (he / spend / all his money) … .

3. Chuck came to Britain from the US nearly three years ago. Next Monday it will be exactly three years since he arrived. Next Monday (he / be / here / exactly three years) … .

4. Mike is going to the airport. The flight is at 11.00 and it is already 10.00. And it will take him 50 minutes to get there. When he gets there, (the boarding / already / finish) … .

5. Nick comes to the university at 12.00. The lessons start at 12.15. And the way to the university will take 20 minutes. When he gets there, (the lessons / already / start) … .

Test yourself

Choose the correct response:

1. What is the status of Great Britain?

a) Republic;
b) parliamentary monarchy;
c) United Kingdom;
d) Federation.

2. What ocean is Great Britain washed by?

a) the Pacific Ocean;
b) the Indian Ocean;
c) the Atlantic Ocean;
d) the Arctic Ocean.

3. What separates Great Britain from the continent?

a) the English Channel;
b) the Irish Sea;
c) the Atlantic Ocean;
d) the Pacific Ocean.

4. What is the climate of Great Britain?
a) cool and temperate;
b) mild and humid;
c) desert and hot;
d) warm and rainy.

5. The longest river of Great Britain is …
a) the Severn;
b) the Thames;
c) the Danube;
d) the Seine.

6. What is the age of London?
a) over 1000 years;
b) over 2000 years;
c) about 500 years;
d) about 700 years.

7. What is the City?
a) financial and business centre of London;
b) industrial place of London;
c) the name of the skyscraper;
d) business centre of London.

8. What place is the geographical centre of London?
a) Soho;
b) Docklands;
c) Trafalgar Square;
d) City.

9. What is the symbol of luxury and wealth in London?
a) Westminster;
b) the City;
c) the West End;
d) the East End.

10. What is the official language in Great Britain?
a) French;
b) Spanish;
c) English;
d) Russian.

UNIT V. WHAT IS ENERGY?

Grammar: Сложное подлежащее. Сложное дополнение. Модальные глаголы. Причастие прошедшего времени.

Vocabulary

Nouns:		
energy	[ˈenədʒi]	энергия
motion	[ˈməʊʃn]	движение
waterfall	[ˈwɔːtəfɔːl]	водопад
object	[ˈɒbdʒikt]	объект
turbine	[ˈtɜː.bain]	турбина
example	[ɪgˈzɑːmpl]	пример
battery	[ˈbætri]	батарея, аккумулятор
scientist	[ˈsaiəntist]	ученый
inventor	[inˈventə]	изобретатель
current	[ˈkʌrənt]	течение, ток
Adjectives:		
current	[ˈkʌrənt]	текущий
heat	[hiːt]	тепловой
mechanical	[miˈkænikəl]	механический
electrical	[iˈlektrikl]	электрический
chemical	[ˈkemikl]	химический
atomic	[əˈtɒmik]	атомный
potential	[pəˈtenʃl]	потенциальный
kinetic	[kiˈnetik]	кинетический
solar	[ˈsəʊlə]	солнечный
generally	[ˈdʒenrəli]	вообще, обычно, в большинстве случаев
necessary	[ˈnesəsəri]	необходимый, вынужденный
Verbs:		
use	[juːz]	использовать
turn	[tɜːn]	поворачивать
produce	[prəˈdjuːs]	производить, выпускать
serve	[sɜːv]	служить, обслуживать
decrease	[diˈkriːs]	снижаться
Word combinations:		
hydroelectric station	[ˌhaidrəʊiˈlektrik ˈsteiʃn]	гидроэлектростанция
source of energy	[ˌsɔːsəvˈenədʒi]	источник энергии
continue to grow	[kənˈtinjuː təˈgrəʊ]	продолжать расти

melted metal	[ˈmeltid ˈmetəl]	расплавленный металл
electromagnetic generator	[iˌlektrəʊmægˈnetik ˈdʒenəreitə]	электромагнитный генератор

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

hydroelectric	grow
source of	metal
continue to	generator
melted	station
electromagnetic	energy

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
work	
	change
falling	
	limit
need	

Exercise 3. Match the words and their definitions:

Example: a machine designed to convert one or more forms of energy into mechanical energy – a motor

1	energy	a	a point in a river or stream where water flows over a vertical drop or a series of steep drops
2	turbine	b	a device that provides electrical power
3	waterfall	c	the quantitative property that is transferred to a body or to a physical system
4	battery	d	a flow of electric charge through a medium
5	current	e	a rotary mechanical device that extracts energy from a fluid flow and converts it into useful work

Exercise 4. Using 10 new words and expressions make a brief description of various forms of energy in English. Work in pairs and translate your partner's description into Russian.

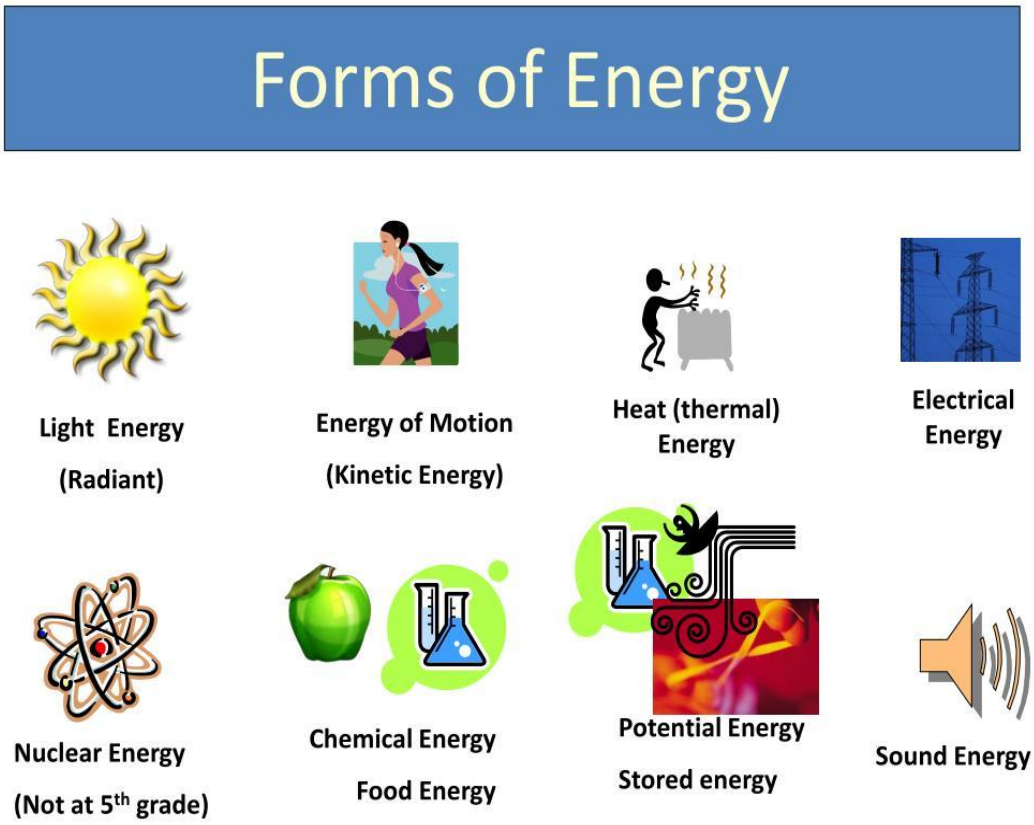
Exercise 5. Read the text and answer the following questions:

1. What are the main forms of energy?
2. What is the difference between potential and kinetic energy?
3. What is the energy of falling water used to?
4. Why do people need more and more energy?
5. How can people employ solar energy directly to produce useful energy?

Energy

In the languages of science energy is the ability to do work. There are various forms of energy, such as heat, mechanical, electrical, chemical, atomic and so on.

One might also mention the two kinds of mechanical energy – potential and kinetic. Potential energy is the energy of position while kinetic energy is the energy of motion.



It is well known that one form of energy can be changed into another. A waterfall may serve as an example. Water falling from its raised position energy changes from potential to kinetic energy. The energy of falling water is generally used to turn the turbines of hydroelectric stations. The turbines in their turn drive the electric generators, the latter producing electric energy. Thus, the mechanical energy of falling water is turned into electric energy. The electric energy, in its turn, may be transformed into any other necessary form.

When an object loses its potential energy, that energy is turned into kinetic energy. Thus, in the above-mentioned example when water is falling from its raised position, it certainly loses its potential energy, that energy changing into kinetic energy.

Generally speaking, the sources of energy usually employed to produce current are either chemical as in the battery, or mechanical, as in the electromagnetic generator. Chemical sources of current having a limited application, the great quantities of electric energy generated today come from various forms of mechanical energy.

The rising standards of modern civilization and growing industrial application of the electric current result in an increasing need of energy. Every year people need more and more energy. People need it to do a lot of useful things that are done by electricity.

However, the energy sources of the world are decreasing while the energy needs of the world are increasing. These needs will continue to grow as more motors and melted metals are used in industry and more electric current is employed in everyday life. As a result, it is necessary to find new sources of energy.

The sun is an unlimited source of energy. However, at present, only a little part of solar energy is being used directly. How can people employ solar energy directly to produce useful energy? This is a question which has interested scientists and inventors for a long time.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *It is well known that one form of energy can be changed into another.*

– Yes, I agree, it is true. It is well known that one form of energy can be changed into another.

– No, I can't agree, it is false, because it is well known that one form of energy can't be changed into another.

1. Every year people need more and more energy.
2. The energy is the ability to do work.
3. The waterfalls drive the electric generators, the latter producing electric energy.
4. The sources of energy usually employed to produce current are either chemical as in the battery, or mechanical, as in the electromagnetic generator.
5. The sun is a limited source of energy.

Exercise 2. Choose the right variant:

1. In the languages of science … is the ability to do work.

a) source; b) generator; c) battery; d) energy.

2. The mechanical energy of falling water is turned into … energy.

a) electric; b) mechanical; c) kinetic; d) electromagnetic.

3. … energy is the energy of motion.

a) mechanical; b) kinetic; c) electromagnetic; d) chemical.

4. The sources of energy usually employed to produce … are either chemical as in the battery, or mechanical, as in the electromagnetic generator.

a) current; b) energy; c) electricity; d) voltage.

5. The … is an unlimited source of energy.

a) water; b) wind; c) soil; d) sun.

Exercise 3. Complete the following sentences:

1	Two kinds of mechanical energy are …	is being used directly.
2	The energy sources of the world are …	is employed in everyday life.
3	Only a little part of solar energy …	the electric generators.
4	More electric current …	decreasing while the energy needs of the world are increasing.
5	The turbines in their turn drive …	potential and kinetic.

Exercise 4. Find English equivalents in the text:

Example: современное оборудование – up-to-date equipment

1) различные формы энергии;

2) индустриальное применение;

3) расплавленные металлы;

4) солнечная энергия;

5) электрический ток.

Exercise 5. Arrange the words and the word combinations in the order in which they are presented in the text:

	Solar energy
	Standards of modern civilization
	Potential and kinetic energy
	Kinds of mechanical energy
	Turbines

Grammar exercises

Exercise 1. Translate the following sentences into Russian, paying attention to the infinitive constructions "complex subject" and "complex object":

1. The most important characteristic of an electric measuring instrument is known to be its accuracy.
2. We know faulty insulation to be dangerous.
3. The year of 1895 is considered to be the date of the invention of the radio.
4. A large number of substances are known to be neither good conductors of electricity nor good insulators.
5. We know the synchronous speed of an induction motor to depend on the frequency of the applied voltage and the number of poles.

Exercise 2. Find the sentences in which the verbs *to be, to have* are modal verbs and translate them:

1. An ammeter has to be connected in series and a voltmeter in parallel.
2. Many problems were to be solved in connection with the construction of new transmission lines.
3. Chemical potential energy has been changed into electrical energy.
4. They will have to repair the electric equipment in a month.
5. In practice the resistance is measured with an ohmmeter.

Exercise 3. Form Past Participle from the verbs in parentheses and use it as a definition for the nouns:

Model: (to mention) method-mentioned method – упомянутый метод.

(to know) advantages, (to achieve) progress, (to increase) production, (to save) power, (to improve) working conditions, (to require) quality, (to find) decision, (to receive) machine-tools.

Exercise 4. Say that the actions can or must be:

1. Mini-computers are used in each field of the national economy.
2. Scientists and engineers at our sectoral research institutes took part in the technical re-equipment of the branch.
3. Speaking about new projects developed at the Ministry of the Machine Tool and Instrument Making Industry he mentioned primarily about automated lines.
4. A computer's capacity is increased by designing specialized processors.

Exercise 5. Change the sentences using modal verbs (or their equivalents) with an infinitive in the passive:

1. The scientist referred these measurements at the conference.
2. Next year they will put into operation the new atomic power station.
3. We widely use electricity and electronic devices for various purposes.
4. First of all we decided the problem of using such variables.
5. You ought to pay more attention to the problem of power consumption.

Test yourself

Choose the correct response:

1. Two kinds of mechanical energy are … and ….
a) potential / kinetic;
b) electric / kinetic;
c) potential / mechanical;
d) solar / kinetic.

2. One form of … may be changed into another.
a) source;
b) energy;
c) melted metals;
d) electric current.

3. … sources having the great … of electric energy come from various forms of … energy.
a) chemical / quantities / mechanical;
b) mechanical / quantities / technical;
c) technical / qualities / mechanical;
d) mechanical / quantities / technical.

4. Every year people need … and … energy.
a) more / more;
b) less / less;
c) more / less;
d) less / more.

5. Using ... scientists have transformed solar energy into electric energy.
a) resistors;
b) filters;

c) relay;
d) semiconductors.

6. Chemical sources of current … a limited application, the great quantities of electric energy generated today come from various forms of mechanical energy.

a) have;
b) has;
c) having;
d) had.

7. The rising standards of modern civilization and …. Industrial application of the electric current result in an increasing need of energy.

a) growing;
b) grow;
c) grown;
d) grew.

8. The sun is an …source of energy

a) unlimited;
b) limits;
c) is limiting;
d) has limited.

9. … semiconductors scientists have transformed solar energy into electric energy.

a) use;
b) using;
c) used;
d) are used.

10. When an object loses its … energy, that energy is turned into … energy.

a) kinetic/ potential;
b) mechanical / technical;
c) solar / kinetic;
d) potential/ kinetic.

UNIT VI. ELECTRICITY

Grammar: Прошедшее и будущее время модальных глаголов. Союзы.

Vocabulary

Nouns:		
civilization	[ˌsivilaiˈzeiʃən]	цивилизация
electricity	[iˌlekˈtrisiti]	электричество
appliance	[əˈplaiəns]	прибор, оборудование
metallurgy	[məˈtælədʒi]	металлургия
chemistry	[ˈkemistri]	химия
source	[sɔːs]	источник
device	[diˈvais]	устройство, аппарат, механизм
century	[ˈsentʃəri]	век
consumption	[kənˈsʌmpʃən]	потребление
application	[ˌæpliˈkeiʃn]	применение
mankind	[mænˈkaind]	человечество
Adjectives:		
unquestionable	[ʌnˈkwestʃənəbl̩]	бесспорный, неоспоримый
industrial	[inˈdʌstriəl]	промышленный
clean	[kliːn]	чистый
various	[ˈveəriəs]	различный
widely	[ˈwaidli]	широко
Verbs:		
transform	[trænsˈfɔːm]	трансформировать, изменять
invent	[inˈvent]	изобретать, создавать
use	[juːz]	использовать
develop	[dɪˈveləp]	развивать, развиваться, разрабатывать
Word combinations:		
electrical power	[iˈlektrikl ˈpaʊə]	электричество
social progress	[ˈsəʊʃl ˈprəʊgres]	социальный прогресс
electric lightning	[iˈlektrik ˈlaitniŋ]	электрическое освещение

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

electrical	devices
social	power
electric	source
laser	progress
efficient	lightning

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
	light
transformer	
	service
indicator	
	provide

Exercise 3. Match the words and their definitions:

Example: a form of energy that can be produced in several ways and that provides power to devices that create light, heat, etc. - an electricity

1	civilization	a	a machine that produces electrical power
2	generator	b	relating to or caused by electricity that does not move in a current but is attracted to the surface of some objects
3	electromagnetism	c	human society with its well-developed social organizations, or the culture and way of life of a society or a country at a particular period in time
4	network	d	the science of magnetism and electrical currents
5	electrostatic	e	a large system consisting of many similar parts that are connected together to allow movement or communication between or along the parts, or between the parts and a control centre

Exercise 4. Using 10 new words and expressions make a brief description of electricity in our daily life in English. Work in pairs and translate your partner's description into Russian:

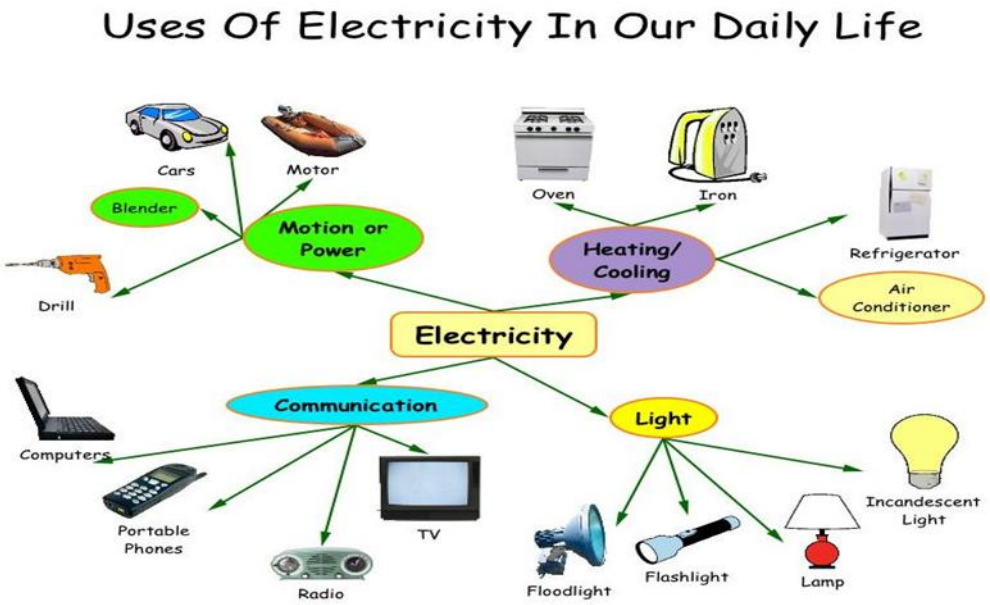
Exercise 5. Read the text and answer the following questions:

1. Is it possible to live without electricity?
2. Has electrical power become universal?
3. What was the first industrial application of electricity?
4. What has electricity replaced?
5. What is one of the greatest advantages of electricity?

Using the electricity in our daily life

It is impossible to imagine our civilization without electricity: economic and social progress will go back to the past which will completely transform our daily lives. Electrical power has become universal. Thousands of applications of electricity such as lightning, electrochemistry and electrometallurgy are longstanding and unquestionable.

With the appearance of the electrical motor power cables replaced transmission shafts, gear wheels, belts and pulleys in the 19th century workshops. And in the home a large range of various time and labour saving appliances have become a part of our everyday life. Other devices are based on the specific properties of electricity: electrostatics in the case of photocopying machine and electromagnetism in the case of radar and television. These applications have made electricity most widely used.



The first industrial application was in the silver workshops in Paris. The generator – a new compact source of electricity - was also developed there. The generator replaced the batteries and other devices that a man had used before. Electric lightning came into wide use at the end of the last century after Thomas Edison had developed the electric lamp. Then the transformer was invented, the first electric lines and networks were set up, dynamos and induction motors were designed. In the beginning of the 20th century the successful development of electricity began throughout the industrial world. The consumption of electricity has doubled every 10 years.

Today consumption of electricity per capita is an indicator of the state of development and economic state of a nation. Electricity has re-

placed other sources of energy as it has been realized that it offers improved service and reduced cost. One of the greatest advantages of electricity is that it is clean, easy-regulated and generates no by-products. Applications of electricity now cover all fields of human activity from house washing machines to the latest laser devices. Electricity is the efficient source of some of the most recent technological advances such as the laser and electron beams. Truly electricity provides mankind with the energy of the future.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *It is impossible to imagine our civilization without electricity.*

– Yes, I agree, it is true. It is impossible to imagine our civilization without electricity.

– No, I can't agree, it is false, because it is possible to imagine our civilization without electricity.

1. Thousands of applications of electricity such as lightning, electrochemistry and electrometallurgy are longstanding and unquestionable.
2. The first industrial application was in the silver workshops in Potsdam.
3. The battery – a new compact source of electricity - was also developed in Paris.
4. The generator replaced the batteries and other devices that a man had used before.
5. Applications of electricity now cover all fields of human activity from house washing machines to the latest laser devices.

Exercise 2. Choose the right variant:

1. It is impossible to imagine our civilization without ….

a) sources; b) electricity; c) water; d) energy.

2. With the appearance of the … motor power cables replaced transmission shafts.

a) electrical; b) gas turbine; c) kinetic; d) rotary.

3. Electric lightning came into wide use at the end of the last century after … had developed the electric lamp.

a) Isaac Newton; b) Nikola Tesla; c) Pierre Curie; d) Thomas Edison.

4. The consumption of electricity has doubled every … years.
a) twenty; b) fifty; c) ten; d) seventy.
5. Truly electricity provides mankind with the energy of the ....
a) future; b) tomorrow; c) yesterday; d) today.

Exercise 3. Complete the following sentences:

1	Economic and social progress will go back to the past …	the state of development and economic state of a nation.
2	A large range of various time and labour saving appliances …	which will completely transform our daily lives.
3	At the end of the last century …	have become a part of our everyday life.
4	Consumption of electricity per capita is an indicator of …	that it is clean, easy-regulated and generates no by-products.
5	One of the greatest advantages of electricity is …	electric lightning came into wide use.

Exercise 4. Find English equivalents in the text:
Example: современное оборудование – up-to-date equipment
1) давний и неоспоримый;
2) силовые кабели;
3) электрическая молния;
4) потребление электроэнергии;
5) применение электричества.

Exercise 5. Arrange the word combinations in the order in which they are presented in the text:

	Industrial development of electricity
	Applications of electricity
	The advantages of electricity
	Industrial application of electric devices
	Energy of the future

Grammar exercises

Exercise 1. Say that the action will happen in the future:
1. Atomic energy finds such wide application that our age might be called the age of atom.
2. Rapid tram lines have to be built in the remote areas of the city.

3. This arrangement must be perfectly reliable in operation.

4. The use of electricity for various purposes was to be followed by a wider application of electrical devices.

5. Compressed air or electricity must be used in both cases.

Exercise 2. Find the sentences in the translation of which we use the words *perhaps, you should*:

1. The machine-tool can be stopped at any moment.

2. This line should have been put into operation long ago.

3. Our engineers had to solve many complicated problems to reduce wear (износ) in machinery.

4. Nuclear energy may be used to light and heat our homes.

5. He may have got the condenser he needed.

Exercise 3. Find the sentences in which past participle is used in the definition function:

1. The energy utilized per second is proportional to the frequency.

2. All processes are mechanized or automatized.

3. From their very nature, charged particles are influenced by electric fields.

4. Ultraviolet installations with bactericide lamps help to clean contaminated air in livestock buildings.

5. Carbon was the first material used for such a conductor.

Exercise 4. Say that the action has already been performed:

1. We are to take into consideration all advantages and disadvantages to decide what system is the best for the future work.

2. Electro-welding is to bring basic changes to the heavy machine-building industry.

3. Built-in devices double the reliability of the computers.

4. Science is to play a decisive role in the transition over to new equipment and technologies.

5. The relay will be given its initial position.

Exercise 5. Translate these sentences, paying attention to the conjunctions:

either – также;

either … or – или … , или;

neither … nor – ни … , ни;

since – с – так как;

both … and – как … , так и.

1. A transformer can step alternating voltages either up or down.

2. The amount of energy did not change either.

3. One hundred years ago there were neither electric lamps nor electric motors.

4. Since the primary is connected to an a. c. line, the current of this winding is continually changing.

5. There are important differences between the two materials, both in their technology and in their physical properties.

Test yourself

Choose the correct response.

1. Which device transforms electrical energy into mechanical energy?
a) iron;
b) telephone;
c) motor;
d) washing machine.

2. Which device lifts objects weighing hundreds of tons?
a) electric crane;
b) electric furnace;
c) vacuum cleaner;
d) electric shaver.

3. Which device lights your room?
a) blender;
b) lift;
c) lamp;
d) hairdryer.

4. Which device is based on electromagnetism?
a) TV-set;
b) washing machine;
c) dish washer;
d) kitchen machine.

5. Which device helps people to pull things?
a) photocopying machine;
b) electric shaver;
c) electro carrier;
d) fridge.

6. What does modern civilization need more and more?
a) electricity;
b) electrochemistry;
c) electromagnetism;
d) electrometallurgy.

7. What is a new compact source of electricity?
a) generator;
b) battery;
c) vacuum cleaner;
d) power cable.

8. Who had developed the electric lamp?
a) driver;
b) doctor;
c) scientist;
d) teacher.

9. What was happened in the beginning of the 20th century?
a) successful development of electricity;
b) successful development of agriculture;
c) successful development of high education;
d) successful development of shipbuilding.

UNIT VII. ELECTRIC CURRENT

Grammar: Причастие настоящего времени. Причастие I в страдательном залоге. Перфектная форма причастия I.

Vocabulary

Nouns:		
application	[ˌæpliˈkeiʃn]	применение
source	[sɔːs]	источник
current	[ˈkʌrənt]	ток, сила тока
difference	[ˈdifrəns]	разница, различие
pole	[pəʊl]	полюс
circuit	[ˈsɜːkit]	схема, электрическая цепь
wire	[ˈwaiə]	провод
electron	[iˈlektrɒn]	электрон
charge	[ʧɑːʤ]	заряд, подзарядка
solid	[ˈsɒlɪd]	твердое тело, твердое вещество
liquid	[ˈlikwid]	жидкость, раствор
gas	[gæs]	газ, топливо
requirement	[riˈkwaiəmənt]	требование, условие
Adjectives:		
positive	[ˈpɒzitiv]	положительный
wireless	[ˈwaiəlis]	беспроводной
negative	[ˈnegətiv]	отрицательный
electric	[iˈlektrik]	электрический
industrial	[inˈdʌstriəl]	промышленный
alternating	[ˈɔːltəneitiŋ]	переменный, альтернирующий (ток)
direct	[diˈrekt]	постоянный (ток)
wide	[waid]	широкий
Verbs:		
determine	[diˈtɜːmin]	определять, устанавливать
flow	[fləʊ]	течь
carry	[ˈkæri]	проводить, осуществлять
produce	[prɒˈdjuːs]	производить, изготовлять, вырабатывать
conduct	[kənˈdʌkt]	проводить (ток)
pass	[pɑːs]	передавать (ток)

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

continuous	phenomenon
newly-discovered	voltage
moving	current
alternating	transmission
long-distance	electrons

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
form	
	produce
change	
	light
heat	

Exercise 3. Match the words and their definitions:

Example: the natural flow of air or water in one direction – current

1	scientist	a	a medium containing ions that is electrically conducting through the movement of those ions, but not conducting electrons
2	electron	b	a substance, for example water, that is not solid and that can be poured easily
3	liquid	c	someone who studies science or works in science
4	electrolyte	d	an extremely small piece of an atom with a negative electrical charge
5	voltage	e	the difference in electric potential between two points, which (in a static electric field) is defined as the work needed per unit of charge to move a test charge between the two points

Exercise 4. Using 10 new words and expressions make a brief description of electric current in English. Work in pairs and translate your partner's description into Russian.

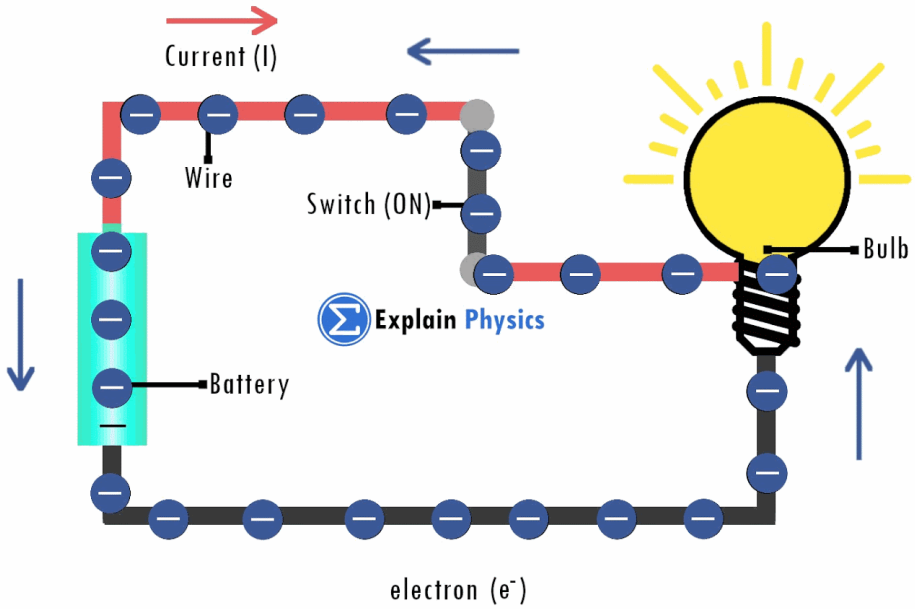
Exercise 5. Read the text and answer the following questions:

1. Which scientist determined the difference between current and static charges?
2. What does the current that flows through the wires consist of?
3. What is the name of the smallest particle having a negative electric charge?
4. What can an electric current flow through?
5. What is the simplest source of energy for direct current?

Electric Current

Ever since Volta first produced a source of continuous current, men of science have been forming theories on this subject. For some time they could see no real difference between the newly-discovered phenomenon and the former understanding of static charges. Then the famous French scientist Ampere (after whom the unit of current was named) determined the difference between the current and the static charges. In addition to it, Ampere gave the current direction: he supposed the current to flow from the positive pole of the source round the circuit and back again to the negative pole.

Ampere was right in his first statement but he was certainly wrong in the second, as to the direction of the current. The student is certain to remember that the flow of current is in a direction opposite to what Ampere thought.



The current which flows along wires consists of moving electrons. The electron is a minute particle having an electric charge that is negative. As these minute charges travel along a wire, that wire is said to carry an electric current.

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

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

When the electrons flow in one direction only the current is known to be d.c., that is, direct current. The simplest source of power for the direct current is a battery.

The letters a.c. stand for alternating current. The current under consideration flows first in one direction and then in the opposite one. The a.c. used for power and lighting purposes is assumed to go through 50 cycles in one second. One of the great advantages of a.c. is the ease with which power at low voltage can be changed into an almost similar amount of power at high voltage and vice versa. Hence, on the one hand alternating voltage is increased when it is necessary for long-distance transmission and, on the other hand, one can decrease it to meet industrial requirements as well as to operate various devices at home.

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

One cannot help mentioning here that Yablochkov, Russian scientist and inventor, was the first to apply a.c. in practice.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *The famous French scientist Ampere determined the difference between the current and the static charges.*

– *Yes, I agree, it is true. The famous French scientist Ampere determined the difference between the current and the static charges.*

– No, I can't agree, it is false, because the famous French scientist Volta determined the difference between the current and the static charges.

1. The electric current was born in the year 1800 when Volta constructed the first source of continuous current.

2. We can imagine modern civilization without the electric current.

3. In fact, telephones, lifts, electric trams and trains, radio and television have been made possible not only owing to the electric current.

4. It is well known that electric current is necessary for the operation of trolley-buses and modern trains.

5. Electric energy finds its most important use in industry.

Exercise 2. Choose the right variant:

1. The under consideration flows first in one direction and then in the opposite one.

a) current; b) energy; c) electricity; d) voltage.

2. The current flows from the positive pole of the …. round the circuit and back again to the negative pole.

a) source; b) electricity; c) water; d) energy.

3. The famous French scientist … determined the difference between the current and the static charges.

a) Volta; b) Edison; c) Ampere; d) Newton.

4. The current which flows along wires consists of moving ….

a) electrons; b) protons; c) molecules; d) atoms.

5. Alternating … is increased when it is necessary for long-distance transmission.

a) current; b) energy; c) electricity; d) voltage.

Exercise 3. Complete the following sentences:

1	They could see no real difference …	having an electric charge that is negative.
2	The current flows from the positive pole of the source …	between the newly-discovered phenomenon and the former understanding of static charges.
3	The electron is a minute particle …	without any change to themselves.
4	Some liquids, such as melted metals for example, conduct current …	a battery.
5	The simplest source of power for the direct current is …	round the circuit and back again to the negative pole.

Exercise 4. Find English equivalents in the text:

Example: современное оборудование – up-to-date equipment

1) твердые тела;
2) жидкости;
3) газы;
4) электролиты;
5) трансмиссия.

Exercise 5. Arrange the word combinations in the order in which they are presented in the text:

	scientific discovery
	the electric current
	a source of continuous current
	one of the great advantages
	the famous French scientist Ampere

Grammar exercises

Exercise 1. Use the verbs given in parentheses in Perfect Active or Passive:

1. The computers … entirely new technical possibilities in automatic control of industrial processes (to create).
2. He said that the power station … on our farm (to construct).
3. This laboratory … a large research centre (to become).
4. The farmers got much good fruit after their methods of work (to change).
5. They … already this installation in their laboratory when we came (to test).

Exercise 2. Translate the sentences, paying attention to the function of Participle I:

1. He took great interest in the problem, devoting the rest of his life to it.
2. Electrons forming an atom are in motion.
3. While working at this invention, he used an induction coil of special design.
4. The substance affecting a magnetic field was metallic.
5. Our institute is one of the leading organizations developing minicomputers.

Exercise 3. Say that the action is continuing:

Model: They have already tested this machine.

They are testing this machine now.

1. We have designed this instrument according to the new requirements.
2. Scientific information did not grow so rapidly in the last century.
3. Our electric circuits can work on sunlight.
4. Atomic physics has made tremendous progress.
5. Not so many students took part in research last year.
6. I have never worked with the electric equipment before.

Exercise 4. Use the verbs given in parentheses in Continuous Passive:

Model: Another iron and steel centre (to create) in Siberia.

Another iron and steel centre is being created in Siberia.

1. All we have spoken about has been and (to develop) by the institutes of higher learning.
2. Siberia (to transform) into a leading national centre of heavy industry.
3. Much attention (to give) at present to the development of international scientific contacts.
4. New superconducting magnets currently (to build) and they will find application in research and industry.
5. Everything that (to do) along the line of developing new and progressive technology is the result of our scientists' and engineers' joint efforts.

Exercise 5. Compare Participle I in Passive Voice and the Perfect form of Participle I (Active) translating them:

a) **Participle I in Passive**:

1. The new generation of plants and equipment, being developed by us today, will raise labour productivity by 50 to 100 per cent.
2. Being cooled in air the metal becomes hardened.
3. The temperature of the matter now being raised shows that movement of its molecules is speeded up.
4. Atomic ice-breaker is able to sail in any weather, being equipped with up-to-date radiolocation devices.

b) **the Perfect form of Participle I (Active)**:

1. Having replaced the fuses (предохранители) 1 switched on the current.

2. Having discovered the property of the electron scientists placed it at the service of mankind.

3. Having discussed all the advantages and disadvantages of the design we started work.

4. Having done their job the builders have gone and their place has been taken by operators.

Test yourself

1. Current … through liquids and through gases.
a) flow;
b) flows;
c) are flowing;
d) have flown.

2. … flow in on direction only in d.c.
a) atoms;
b) molecules;
c) electrons;
d) protons.

3. The letters a.c. stand for … current.
a) mecanical
b) kinetical
c) renewable
d) alternating

4. … produces some important effects.
a) battery;
b) gas;
c) current;
d) electron.

5. A battery is the simplest source of … for the direct current.
a) power;
b) energy;
c) current;
d) light.

6. … determined the difference between the current and the static charges before giving the current direction.

a) Volta;
b) Edison;
c) Ampere;
d) Newton.

7. Men of science formed a lot of … after Volta produced a source of continuous current.

a) theories;
b) laws;
c) experiments;
d) discoveries.

8. By … Franklin made an important contribution to the science of electricity.

a) 1701;
b) 1690;
c) 1812;
d) 1753.

9. … observed the experiments with the frogs' legs before Volta began to carry on similar experiments.

a) Volta;
b) Edison;
c) Ampere;
d) Galvani.

10. Volta spent several years before he generated a … current.

a) mechanical;
b) continuous;
c) renewable;
d) alternating.

UNIT VIII. THE ROLE OF ELECTRIFICATION IN AGRICULTURE

Grammar: Инфинитив. Функции причастий. Независимый причастный оборот. Предлоги.

Vocabulary

Nouns:		
speed	[spiːd]	скорость
use	[juːz]	применение, польза
instrumentation	[ˌinstrəmenˈteiʃən]	контрольно-измерительные приборы, оборудование
power	[ˈpaʊə(r)]	энергия
income	[ˈinkəm]	доход
advantage	[ədˈvɑːntidʒ]	преимущество
tool	[tuːl]	станок, рабочий (ручной) инструмент
circuit	[ˈsɜːkit]	электрическая цепь, схема
Adjectives:		
essential	[ɪˈsenʃl]	существенный
accurate	[ˈækjərət]	точный
versatile	[ˈvɜːsətail]	многосторонний, универсальный
variable	[ˈveəriəbl]	переменчивый, неустойчивый
Verbs:		
increase	[inˈkriːs]	увеличивать
result in	[riˈzʌlt]	приводить к чему-либо, иметь результатом
suit	[sjʊːt]	годиться, подходить, устраивать
measure	[ˈmeʒə(r)]	измерять
detect	[diˈtekt]	обнаруживать
offer	[ˈɒfə(r)]	предлагать
achieve	[əˈtʃiːv]	достигать
solve	[sɒlv]	решать
process	[ˈprəʊses]	обрабатывать
provide	[prəˈvaid]	снабжать, обеспечивать
use	[juːz]	употреблять, пользоваться
require	[rɪˈkwaiə(r)]	требовать
operate	[ˈɒpəreit]	действовать, работать, управлять
design	[diˈzain]	конструировать
run	[rʌn]	управлять

Pre-Text Exercises

Exercise 1. Make up word combinations with the following words and then your own sentences with these word combinations:

use of	energy
power	machines
inexpensive	energy
electrical	magnetism
principles of	requirements

Exercise 2. Form the new words and make sentences with them:

Nouns	Verbs
living	
	improve
farmer	
	provide
light	

Exercise 3. Match the words and their definitions:

Example: the process of powering by electricity and, in many contexts, the introduction of such power by changing over from an earlier power source – an electrification

1	standards of living	a	the quantification of attributes of an object or event, which can be used to compare with other objects or events
2	entertainment	b	the class of physical attributes that are mediated by a magnetic field, which refers to the capacity to induce attractive and repulsive phenomena in other entities
3	measurement	c	a rational type of abstract thinking about a phenomenon, or the results of such thinking
4	magnetism	d	the level of income, comforts and services available, generally applied to a society or location, rather than to an individual
5	theory	e	a form of activity that holds the attention and interest of an audience or gives pleasure and delight

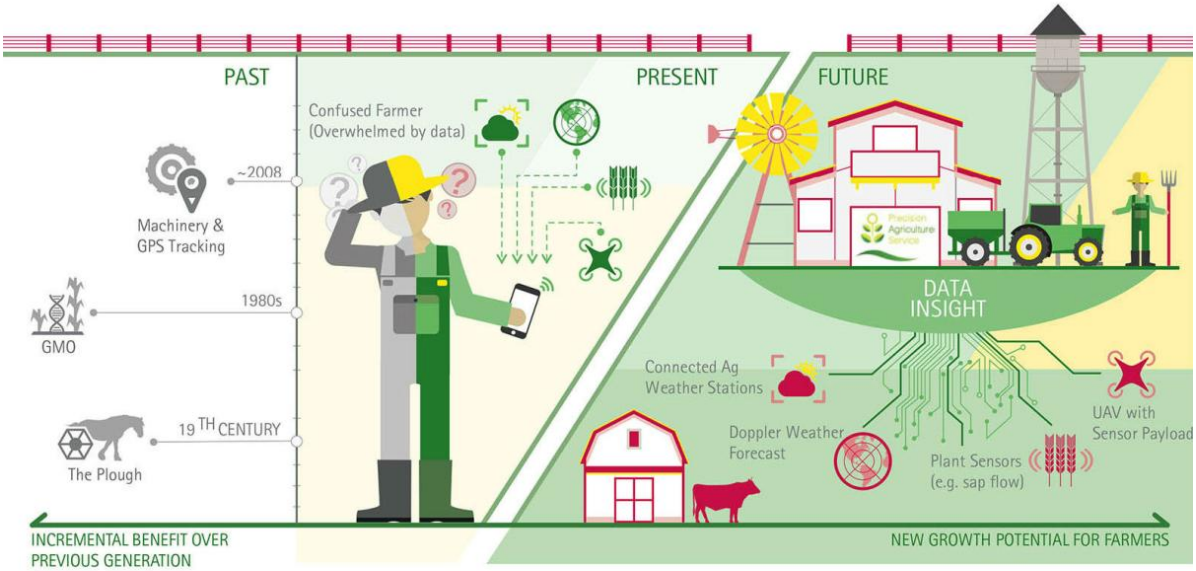
Exercise 4. Using 10 new words and expressions make a brief description of the role of electrification in agriculture in English. Work in pairs and translate your partner's description into Russian.

Exercise 5. Read the text and answer the following questions:

1. What is the role of electrification in agriculture?
2. What is the main tendency of utilizing electricity in this country?
3. What should electrical engineer know and be able to do?
4. What are his principal duties?
5. How is electricity used in animal husbandry and plant production?

The Role of Electrification in Agriculture

The use of energy on a farm is essential to the increase of agricultural production. Electricity is a clean, versatile and an inexpensive energy. In many cases this energy is ideally suited for a large number of power requirements. Agricultural electrification can much improve the standards of living of village people. In agricultural production and processing electricity has resulted in higher farm incomes, better working conditions. In future electrification will be able to improve the economic well-being of all people. It must bring comfort and entertainment into every home.



It is a key factor in our modern system of agriculture. A farmer has various electrical machines on the farm which are used to milk cows, store meat, process fruits and cook food. Electrically operated brooders, lamps, water warmers and many others provide the farmer with tools which save

him labour. Electricity lights farm-houses at night, unloads the silo, pumps water, runs electric motors and does many other things.

In research work electrical instrumentation measures, detects and controls variables. Electrical instruments offer many advantages over other types of instruments such as mechanical instruments. Higher accuracies and speeds of measurements can be achieved by electrical instrumentation.

Electrical science has many problems which are to be solved by engineers. Fundamental principles of electricity and magnetism are essential to the understanding of the theory of operations of electrical and electronic circuits.

Farming conditions have been changed during the past decade or two. They may be characterized by a definite trend toward the greater utilization of electricity. This trend is a natural result of our country's rapid development.

Most workers in rural electrification find themselves fully occupied with one operation as farm service, adviser, inventor, agricultural engineer, distribution engineer, administrator etc. Specialists should know electrical applications. They must understand and design simple electrical and electronic systems for agricultural industry. Agricultural electrification is the science and art. It comprises a distribution of electricity in rural areas, the service in keeping electric lines, the use of electricity by farmers, designing electrical equipment for agricultural production and processing operations. Everywhere we turn we can see application of electricity.

When farm electrification is mentioned, most people have in mind only lighting and electric motors for pumping of water. In fact, new uses and methods of application are constantly found for electricity on farms. The most general way of electricity is for light of farm houses, heating, control, power and communication. This in turn reduces labour requirements. On most of our farmsteads it is used for pumping water for livestock, for running electric motors, for providing comfort for our rural homes.

New uses for the application of electricity are found every day. Engineers were long ago able to heat buildings for chick and young animals, glass-houses and other structures used for plant production. In addition to these examples, there are further applications of electricity for soldering and welding, as well as the known process of brazing by means of carbon tips connected to the welding apparatus.

Text exercises

Exercise 1. Agree or disagree with the statements according to the information of the text:

Model: *Electrical science has many problems which are to be solved by engineers.*

– Yes, I agree, it is true. Electrical science has many problems which are to be solved by engineers.

– No, I can't agree, it is false, because electrical science hasn't many problems which are to be solved by engineers.

1. In research work electrical instrumentation measures, detects and controls variables.
2. Electrical science hasn't any problems which are to be solved by engineers.
3. Electricity lights farm-houses at night, unloads the silo, pumps water, runs electric motors and does many other things.
4. New uses and methods of application are constantly found for electricity on farms.
5. The most general way of energy is for light of farm houses, heating, control, power and communication.

Exercise 2. Choose the right variant:

1. Electricity is ... energy.

a) dirty; b) clean; c) valuable.

2. Electricity must bring ... into every home.

a) comfort; b) happiness; c) luck.

3. A farmer has various ... on the farm.

a) food; b) clothes; c) electrical machines.

4. Electricity ... farm-houses at night, unloads the silo, pumps water.

a) brings; b) lights; c) comes.

5. Higher accuracies and speeds of measurements can be achieved by… .

a) electrical instrumentation; b) mechanical instruments; c) reading literature.

Exercise 3. Complete the following sentences:

1	Electrically operated brooders, lamps, water warmers and many others …	one operation as farm service, adviser, inventor, agricultural engineer, distribution engineer, administrator, etc.
2	Higher accuracies and speeds of measurements can be achieved by …	provide the farmer with tools which save him labour.
3	Most workers in rural electrification find themselves fully occupied with …	electrical instrumentation.
4	When farm electrification is mentioned, most people have in mind only …	the known process of brazing by means of carbon tips connected to the welding apparatus.
5	There are further applications of electricity for soldering and welding, as well as …	lighting and electric motors for pumping of water.

Exercise 4. Find English equivalents in the text:

Example: современное оборудование – up-to-date equipment

1) фундаментальные принципы электричества;
2) применение электричества;
3) освещение и электродвигатели;
4) фермерские хозяйства;
5) стеклянные дома.

Exercise 5. Arrange the sentences in the order in which they are presented in the text:

	In future electrification will be able to improve the economic well-being of all people
	Electrical instruments offer many advantages
	Electricity is a clean energy
	In future electrification will be able to improve the economic well-being of all people
	Electrical science has many problems

Grammar exercises

Exercise 1. Insert a suitable preposition:
for, at, by, of, with

1. The conductivity … metals is very little influenced … temperature.
2. The conductivity of semiconductors sharply increases … heating and drops … cooling.
3. Yablochkov solved a problem … which many inventors had been working … years.
4. Radio electronics was extensively used … radio-telemetric data transmission and … radio communication … the earth.
5. Machine-tool builders propose the use … machines that would make it possible to cut expenditure of metal … almost 25 per cent.

Exercise 2. Determine the forms and functions of participles, translate the sentences:

1. Being a good insulator rubber is often used in cables.
2. A number of Western companies are showing increasing interest in our computer technology.
3. Much is being done today to widen foreign trade as quickly as possible.
4. Having obtained the necessary materials we could finish the experiment.
5. The substance being investigated contained some admixtures.

Exercise 3. Determine the forms and functions of Participle II, translate the sentences:

1. The condenser is, on the whole, two conductors separated by a dielectric or an insulating material.
2. When properly insulated the wire may be used in conditions of excessive moisture.
3. When treated properly this material will be a good insulator.
4. Both apparatus are equipped with a rubber-insulated conductor.
5. Some day atomic energy might have been used to control the weather of the world.

Exercise 4. Define the form of participles, translate the sentences. Pay attention to the translation of the Nominative Absolute Participial Construction:

1. The circuit having been broken up, the flow of current stopped.
2. The problem having been solved, they started their tests.
3. Each atom consists of a central part called the nucleus around which move electrons, the numbers of electrons depending on the kind of atom.
4. Having been measured with unreliable instruments the emf was found inaccurate.
5. Acids react with oxides of all the metals, a salt and water being formed.

Exercise 5. Determine the functions of the Infinitive, translate the sentences:

1. To solve this problem is of great importance.
2. Special symbols are used to show electric systems.
3. In 1756 the great Russian scientist M.V. Lomonosov was the first to make theoretical analysis of electrical phenomena.
4. Who was the first to invent an electric motor?
5. Electrical measurements are used, firstly, to measure electrical quantities (current, voltage, power, resistance) and, secondly, to measure heat, light, mechanical and other non-electrical quantities by electric methods.

Test yourself

Choose the correct response:

1. Electrical science has many problems which are solved by … .
a) readers;
b) engineers;
c) workers;
d) students.

2. Fundamental principles of electricity and magnetism are … to the understanding of the theory of operations of electrical and electronic circuits.
a) good;
b) excellent;

c) essential;
d) not required.

3. Can agricultural electrification much improve the standards of living of village people?
a) Yes, it do;
b) No, it can not;
c) Yes, it can;
d) No, it do not.

4. In agricultural production and processing electricity has resulted in higher farm incomes better … .
a) labour;
b) food;
c) working conditions;
d) standard of living.

5. Electricity operated brooders, lamps, water warmers and many others provide the farmer with tools which save him … .
a) life;
b) house;
c) labour;
d) time.

6. This kind of energy … on farms.
a) is used;
b) were used;
c) uses;
d) are used.

7. Electrical instruments … many advantages over mechanical instruments.
a) has;
b) have;
c) is having;
d) are having.

8. … electrification a key factor in our modern system of agriculture?
a) does;
b) do;
c) is;
d) were.

9. Agricultural electrification improves the standards of living of village people, …?
a) doesn't it;
b) didn't it;
c) isn't it;
d) wasn't it.

10. How often are found new uses for the application of electricity?
a) every day;
b) every year;
c) every month;
d) once a century.

TASKS FOR INDEPENDENT WORK

Text 1. The Nature of Electricity

Exercise 1. Read the text:

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

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

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

Matter is defined as any substance which has mass (or weight) and occupies space. This definition should be broad enough to cover all physical objects in the universe. Wood, water, iron, and paper are some examples of matter. Energy is closely related to, but not to be confused with, matter. Energy does not have mass, and it does not occupy space. Heat and light are examples of energy.

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

Exercise 2. Guess the meaning of the following international words:

Electricity, electron, effect, structure, combination, material, mass, energy, atom, orbit.

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

1) производить; 2) частица; 3) тепло и свет; 4) напряжение; 5) сила; 6) вещество; 7) положительный; 8) отрицательный; 9) электрический ток; 10) вес; 11) ядро.

Exercise 4. Translate into Russian the words and expressions from the text:

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

Exercise 5. Complete the sentences using the text:

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

Exercise 6. Answer the questions:

1. What are the principles of electricity? 2. What must the science of electricity begin with? 3. Are there any differences between energy and matter? What are they? 4. What is recognized as an original substance now?

Exercise 7. Topics for the discussion:

1. The nature of electricity.
2. The nature of matter.
3. Contents of atomic theory.

Text 2. Electric current

Exercise 1. Read the text:

The electric current is a quantity of electrons flowing in a circuit per second of time. The unit of measure for current is ampere. If one coulomb passes a point in a circuit per second then the current strength is 1 ampere. The symbol for current is I.

The current which flows along wires consists of moving electrons. The electrons move along the circuit because the electromotive force drives them. The current is directly proportional to the e. m. f.

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

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

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

The letters a.c. stand for alternating current. The current under consideration flows first in one direction and then in the opposite one. The a.c. used for power and lighting purposes is assumed to go through 50 cycles in one second. One of the great advantages of a.c. is the ease with which power at low voltage can be changed into an almost similar amount of power at high voltage and vice versa. Hence, on the one hand alternating voltage is increased when it is necessary for long-distance transmission and, on the other hand, one can decrease it to meet industrial requirements as well as to operate various devices at home.

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

Exercise 2. Guess the meaning of the following international words:

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

Exercise 3. Give the English equivalents for the words and word combinations below:

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

Exercise 4. Give Russian equivalents for the following:

1) to meet industrial requirements; 2) melted metals; 3) to push in the same direction; 4) negatively (positively) charged terminal; 5) power and

lightning purposes; 6) long-distance transmission; 7) to operate devices; 8) to find wide application.

Exercise 5. Say whether these sentences are true or false:

1. The symbol for current is I.
2. The electric current can flow only through liquids.
3. The current can be of two types: direct current and alternating current.
4. The alternating current flows in one direction.
5. A battery is the simplest source of power for the direct current.
6. Direct current finds wider application than alternating current.
7. Electrolytes don't change greatly when current passes through them.
8. One of the great advantages of alternating current is the ease with which voltage can be changed.

Exercise 6. Fill in the blanks, using the words from the box:

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

A quantity of moving electrons flowing in a circuit is the _____. The current can flow through _____ and _____. Some liquids _____ current without any change to themselves. When the electrons flow in one direction only, the current is known to be _____. The current flowing first in one direction and then in the opposite one is _____. Such advantage of alternating current as alternating _____ finds wide industrial and household application.

Exercise 7. State the questions to the underlined words:

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

Text 3. Effects produced by a current

Exercise 1. Read the text.

The current flow is detected and measured by any of the effects that it produces. There are three important effects accompanying the motion of electric charges: the heating, the magnetic, and chemical effects, the latter is manifested under special conditions.

The production of heat is perhaps the most familiar among the principal effects of an electric current. The heating effect of the current is found to occur in the electric circuit itself. It is detected owing to an increase in the temperature of the circuit. This effect represents a continual transformation of electric energy into heat. For instance, the current which flows through the filament of an incandescent lamp heats that filament to a high temperature.

The heat produced per second depends both upon the resistance of the conductor and upon the amount of current carried through it. The thinner the wire is, the greater the developed heat is. On the contrary, the larger the wire is, the more negligible the heat produced is. Heat is greatly desirable at times but at other times it represents a waste of useful energy. It is this waste that is generally called "heat loss" for it serves no useful purposes and decreases efficiency.

The heat developed in the electric circuit is of great practical importance for heating, lighting and other purposes. Owing to it people are provided with a large number of appliances, such as: electric lamps that light our homes, streets and factories, electrical heaters that are widely used to meet industrial requirements, and a hundred and one other necessary and irreplaceable things which have been serving mankind for so many years.

The electric current can manifest itself in some other way. It is the motion of the electric charges that produces the magnetic forces. A conductor of any kind carrying an electric current, a magnetic field is set up about that conductor. This effect exists always whenever an electric current flows, although in many cases it is so weak that one neglects it in dealing with the circuit. An electric charge at rest does not manifest any magnetic effect. The use of such a machine as the electric motor has become possible owing to the electromagnetic effect.

The last effect to be considered is the chemical one. The chemical effect is known to occur when an electric current flows through a liquid. Thanks to it a metal can be transferred from one part of the liquid to an-

other. It may also effect chemical changes in the part of the circuit comprising the liquid and the two electrodes which are found in this liquid. Any of the above mentioned effects may be used for detecting and measuring current.

Exercise 2. Give the English equivalents for the following words:

выявлять, обнаруживать	лампа накаливания
измерять	прибор
заряд	потеря энергии
нить накала	освещать
тепловой эффект	обнаруживаться, проявляться

Exercise 3. Guess the meaning of the following international words:

transformation, temperature, chemical, magnetic, special, practical, motor, electrode.

Exercise 4. Insert words and expressions:

1. The current flow is (выявляется и измеряется) by any of the effects that it produces.
2. There are three important effects accompanying the motion of (электрические заряды).
3. The current which flows through the (нить накала лампы накаливания) heats that filament to a high temperature.
4. Heat represents (потерю полезной энергии) at times.
5. Electric lamps (освещать) our homes, streets and factories.
6. The electric current can (проявлять) magnetic effect.

Exercise 5. Choose the correct translation:

1. The heating effect of the current is found to occur in the electric circuit itself.

a. Установлено, что тепловой эффект электрического тока появляется в самой электрической цепи.

b. Тепловой эффект электрического тока может появляться в самой электрической цепи.

c. Установлено, что тепловой эффект электрического тока должен появляться в самой электрической цепи.

2. Когда в любом проводнике появляется электрический ток, вокруг него возникает магнитное поле.

a. A conductor of any kind carrying an electric current, a magnetic field was set up about that conductor.

b. A conductor of any kind have been carrying an electric current, a magnetic field is set up about that conductor.

c. A conductor of any kind carrying an electric current, a magnetic field is set up about that conductor.

3. Последний эффект, который необходимо рассмотреть – химический эффект.

a. The last effect is considered to be the chemical one.

b. The last effect to be considered is the chemical one.

c. The last effect would be considered the chemical one.

4. Известно, что химический эффект возникает, когда электрический ток проходит через жидкость.

a. The chemical effect is known to occur when an electric current flows through a liquid.

b. The chemical effect is famous to occur when an electric current flows through a liquid.

c. The chemical effect may be known to occur when an electric current flows through a liquid.

5. Именно движение электрических зарядов порождает магнитные силы.

a. The motion of the electric charges produces the magnetic forces.

b. It is the motion of the electric charges that produces the magnetic forces.

c. The motion of the electric charges is certain to produce the magnetic forces.

Exercise 6. Answer the questions:

1. What effects does the current flow produce? 2. How is the heating effect detected? 3. What does the heat produced depend upon? 4. What is called “heat loss”? 5. How is the magnetic effect set up? 6. What is the main condition of the magnetic effect existence? 7. When does the chemical effect occur?

Exercise 7. Speak about the principal effects of an electric current, using the text and chart above.

Text 4. Electric Circuits

Exercise 1. Read the text.

The concepts of electric charge and potential are very important in the study of electric currents. When an extended conductor has different potentials at its ends, the free electrons of the conductor itself are caused to drift from one end to the other. The potential difference must be maintained by some electric source such as electrostatic generator or a battery or a direct current generator. The wire and the electric source together form an electric circuit, the electrons are drifting around it as long as the conducting path is maintained.

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

To understand the difference between the following circuit connections is not difficult at all. If the circuit is broken or "opened" anywhere, the current is known to stop everywhere. The circuit is broken when an electric device is switched off. The path along which the electrons travel must be complete otherwise no electric power can be supplied from the source to the load. Thus the circuit is "closed" when an electric device is switched on.

When electrical devices are connected so that the current flows from one device to another, they are said "to be connected in series". Under such conditions the current flow is the same in all parts of the circuit as there is only a single path along which it may flow. The electrical bell circuit is considered to be a typical example of a series circuit. The "parallel" circuit provides two or more paths for the passage of current. The circuit is divided in such a way that part of the current flows through one path and part through another. The lamps in the houses are generally connected in parallel.

The "short" circuit is produced when the current can return to the source of supply without control. The short circuits often result from cable fault or wire fault. Under certain conditions the short circuit may cause fire because the current flows where it was not supposed to flow. If the current flow is too great a fuse is used as a safety device to stop the current flow.

Exercise 2. Guess the meaning of the following international words:

concept, potential, electrostatic generator, aluminum, parallel, typical, control.

Exercise 3. Give the English equivalents for the following words and word combinations:

1) электрические цепи; 2) электрический заряд; 3) проводник; 4) сопротивление; 5) движение электронов; 6) изолятор; 7) короткое замыкание; 8) энергия.

Exercise 4. Say whether these sentences are true or false:

1. When an extended conductor has the same potential at its ends, free electrons are drifting from one end to another. 2. The wire and the electric source together form an electric circuit. 3. A path of any material will allow current to exist. 4. Silver, copper and gold oppose very strongly. 5. The slighter the opposition is, the better the insulator is. 6. There is only one type of electric circuit. 7. We close the circuit when we switch on our electric device.

Exercise 5. Complete the sentences using the text:

1. The potential difference must be maintained by … 2. Materials that offer slight opposition are called … 3. The best insulators are … 4. There are various kinds of electric circuits such as … 5. We "open" the circuit when … 6. We "close" the circuit when … 7. The "short" circuit is produced when … 8. A fuse is …

Exercise 6. Answer the questions:

1. What concepts are very important in study of electric current? 2. What forms an electric circuit? 3. What materials are the best conductors and insulators? 4. What kinds of electric circuits do you know? 5. How can we open and close the circuit? 6. When are electrical devices connected in series? 7. What is an example of a series circuit? 8. What can you say about "parallel" circuits? 9. What does the short circuit often result from?

Text 5. Alternating Current

Exercise 1. Read the text.

Current is defined as increment of electrons. The unit for measuring current was named in honor of A.M. Ampere, the French physicist. Thus it is called ampere. The symbol for current is I. The electric current is a quantity of electrons flowing in a circuit per second of time. The electrons move along the circuit because the e.m.f. drives them. The current is directly proportional to the e.m.f.

A steam of electrons in a circuit will develop a magnetic field around the conductor along which the electrons are moving. The strength of the magnetic field depends upon the current strength along the conductor. The direction of the field is dependant upon the direction of the current.

If the force causing the electron flow is indirect, the current is called direct (d.c.). If the force changes its direction periodically the current is called alternative (a.c.).

Alternating current is the current that changes direction periodically. The electrons leave one terminal of the power supply, flow out along the conductor, stop, and then flow back toward the same terminal. A voltage that caused current reverses its polarity periodically. This is properly called an alternating voltage. The power supply that provides the alternating voltage actually reverses the polarity of its terminals according to a fixed periodic pattern. A given terminal will be negative for a specific period of time and drive electrons out through the circuit. Then, the same terminal becomes positive and attracts electrons back from the circuit. This voltage source cannot be a battery. It must consist of some types of rotating machinery.

Exercise 2. Guess the meaning of the following international words:

1) physicist; 2) ampere; 3) symbol; 4) second; 5) polarity; 6) period; 7) battery.

Exercise 3. Translate into Russian the words and expression from the text:

1) increment of electrons; 2) measuring; 3) to drive; 4) directly proportional; 5) conductor; 6) strength; 7) causing force; 8) terminal; 9) to flow; 10) to reverse.

Exercise 4. Give the English equivalents for the words below:

1) переменный ток; 2) за секунду; 3) количество электронов; 4) поток электронов; 5) магнитное поле; 6) направление; 7) зависеть; 8) усиление; 9) источник напряжения; 10) ротационный механизм.

Exercise 5. Complete the sentences using the text:

1. The electric current is …
2. The unit for measuring current is …
3. A steam of electrons in a circuit will develop …

4. The current is called direct if …
5. The current is called alternating if…
6. Alternating voltage is …
7. Alternating voltage source cannot be …

Exercise 6. Answer the questions:

1. Why do electrons move along the circuit?
2. What does the strength of the magnetic field depend upon?
3. What does the direction of the field depend upon?
4. What is the way of alternating current electrons?
5. How does the alternating voltage power supply reverse the polarity of terminals?

Exercise 7. Talk on the properties of the electric current and its types.

Text 6. Conductors and insulators

Exercise 1. Read the text.

All substances have some ability of conducting the electric current, however, they differ greatly in the ease with which the current can pass through them. Solid metals conduct electricity with ease while non-metals do not allow it to flow freely. Thus, there are conductors and insulators.

What do the terms "conductors" and "insulators" mean? This difference is expressed by what is called electrical conductivity of the body. It depends upon the atomic constitution of the body. Substances through which electricity is easily transmitted are called conductors. Any material that strongly resists the electric current flow is known as an insulator.

Conductance, that is the conductor's ability of passing electric charges, depends on the four factors: the size of the wire used, its length and temperature as well as the kind of material to be employed.

A large conductor will carry the current more readily than a thinner one. To flow through a short conductor is certainly easier for the current than through a long one in spite of their being made of similar material. Hence, the longer the wire, the greater is its opposition, that is resistance, to the passage of current.

There is a great difference in the conducting ability of various substances. Almost all metals are good electric current conductors. The best conductors are silver, copper, gold and aluminum. Nevertheless, copper

carries the current more freely than iron; and silver, in its turn, is a better conductor than copper. Copper is the most widely used conductor. The electrically operated devices are connected to the wall socket by copper wires.

A material which resists the flow of the electric current is called an insulator.

The higher the opposition is, the better the insulator is. There are many kinds of insulation used to cover the wires. The kind used depends upon the purposes the wire or cord is meant for. The insulating materials generally used to cover the wires are rubber, asbestos, glass, plastics and others. The best insulators are oil, rubber and glass.

Rubber covered with cotton, or rubber alone is the insulating material usually used to cover desk lamp cords and radio cords.

Glass is the insulator to be often seen on the poles that carry the telephone wires in city streets. Glass insulator strings are usually suspended from the towers of high voltage transmission lines. One of the most important insulators of all, however, is air. That is why power transmission line wires are bare wires depending on air to keep the current from leaking off.

Conducting materials are by no means the only materials to play an important part in electrical engineering. There must certainly be a conductor, that is a path, along which electricity is to travel and there must be insulators keeping it from leaking off the conductor.

Exercise 2. Give the Russian equivalents for the words and word combinations below:

1) conductors; 2) insulators; 3) transmit; 4) resistance; 5) passage of current; 6) socket; 7) to connect to; 8) cord; 9) high voltage transmission line; 10) leak off.

Exercise 3. Find in the text the sentences with the following related words and translate them:

conducting – conductor – conductivity – conductance.

Exercise 4. Make up sentences corresponding to the information given in the text:

Copper	is	used to cover desk lamp cords
Silver		one of the most important insulators of all
Rubber		the most widely used conductor

Glass a better conductor than copper

Iron not so good conductor as copper

Air the insulator usually used on the city street poles and high voltage transmission lines

Exercise 5. State questions to the underlined words:

1) Solid metals conduct electricity with ease.

2) Conductance depends on the four factors.

3) There are many kinds of insulation used to cover the wires.

4) Insulators keep electricity from leaking off the conductor.

5) Conductors play an important role in electrical engineering.

Exercise 6. Say whether these sentences are true or false:

1) Electrical conductivity of a body depends upon its atomic constitution.

2) There is no difference in the conducting ability of various substances.

3) The longer the wire is the weaker its opposition is.

4) The kind of the insulating material depends upon the purpose it is meant for.

5) Conductors are substances through which electricity is easily transmitted.

6) Insulators do not allow the electric current to flow freely.

Exercise 7. Talk on the conducting ability of various substances and their application in electrical engineering.

Text 7. Semiconductors

Exercise 1. Read the text.

There are materials that really occupy a place between the conductors of the electric current and the non-conductors. They are called semiconductors. These materials conduct electricity less readily than conductors but much better than insulators.

Semiconductors include almost all minerals, many chemical elements, a great variety of chemical compounds, alloys of metals, and a number of organic compounds. Like metals, they conduct electricity but they do it less effectively. In metals all electrons are free and in insulators they are fixed. In semiconductors electrons are fixed, too, but the connec-

tion is so weak that the heat motion of the atoms of a body easily pulls them away and sets them free.

Minerals and crystals appear to possess some unexpected properties. It is well known that their conductivity increases with heating and falls with cooling. As a semiconductor is heated, free electrons in it increase in number, hence, its conductivity increases as well.

Heat is by no means the only phenomenon influencing semiconductors. They are sensitive to light, too. Take germanium as an example. Its electrical properties may greatly change when it is exposed to light. With the help of a ray of light directed at a semiconductor, we can start or stop various machines, effect remote control, and perform lots of other useful things. Just as they are influenced by falling light, semiconductors are also influenced by all radiation. Generally speaking, they are so sensitive that a heated object can be detected by its radiation.

Such dependence of conductivity on heat and light has opened up great possibilities for various uses of semiconductors. The semiconductor devices are applied for transmission of signals, for automatic control of a variety of processes, for switching on engines, for the reproduction of sound, protection of high-voltage transmission lines, speeding up of some chemical reactions, and so on. On the one hand they may be used to transform light and heat energy directly into electric energy without any complex mechanism with moving parts, and on the other hand, they are capable of generating heat or cold from electricity.

Russian engineers and scientists turned their attention to semiconductors many years ago. They saw in them a means of solving an old engineering problem, namely, that of direct conversion of heat into electricity without boilers or machines. Semiconductor thermocouples created in Russia convert heat directly into electricity just as a complex system consisting of a steam boiler, a steam engine and a generator does it.

Exercise 2. Give the English equivalents for the words and word combinations below:

1) полупроводник; 2) химическое соединение; 3) сплав; 4) освобождать; 5) свойство; 6) увеличивать(ся); 7) охлаждение; 8) чувствительный к; 9) выставлять; 10) луч; 11) направлять на; 12) дистанционное управление; 13) находить, обнаруживать; 14) защита; 15) ускорение; 16) решить инженерную проблему; 17) термоэлемент.

Exercise 3. Guess the meaning of the following international words:

element, organic, mineral, crystal, phenomenon, automatic, control, process, reproduction, conversion, boiler.

Exercise 4. Join the beginnings and ends:

Semiconductors are sensitive to…	… conductors of the electric current and non-conductors
Semiconductors convert heat into …	… dependence of conductivity on heat and light.
Semiconductors occupy a place between …	… heat and light.
Semiconductors conduct electricity …	…into electricity without machine.
Great possibilities for various uses of semiconductors are connected with …	… less effectively than metals.
As a semiconductor is heated …	… its conductivity increases as well.

Exercise 5. Insert words and expressions:

1. Semiconductors include a great variety of (химические соединения), (сплавы металлов).

2. Minerals and crystals appear to possess some unexpected (свойства). Their conductivity increases with (нагревание) and falls with (охлаждение).

3. With the help of a ray of light directed at a semiconductor, we can effect (дистанционное управление).

4. The semiconductor devices are applied for (автоматический контроль) of a variety of processes, for the (воспроизведение) of sound, (ускорение) of some chemical reactions.

5. (Термоэлементы) created in Russia convert heat directly into electricity.

Exercise 6. Answer the questions:

1) What do semiconductors include? 2) How does the atomic structure of semiconductors influence their properties? 3) What phenomena influence semiconductors? 4) What are the semiconductor devices applied for? 5) How do semiconductors help in solving engineering problems?

Text 8. Electricity and magnetism

Exercise 1. Read the text.

When free electrons are dislodged from atoms, electrical energy is released. Chemical reaction, friction heat and electromagnetic induction will cause electrons to move from one atom to another. Whenever energy in any form is released, a force called electromotive (e. m. f.) is developed.

If the force exerts its effort always in one direction, it is called direct; and if the force changes its direction of exertion periodically, it is called alternating. The chemical reaction in a dry cell, heat and friction are sources of a unidirectional force. Electromagnetic induction produces an alternating force. The direction of force depends on the direction in which the field is cut. Whenever an e. m. f. is developed, there is also a field of energy called an electrostatic field, which can be detected by an electroscope and measured by an electrometer.

An electromotive force is induced in the conductor when there is a change in the magnetic field surrounding a conductor. This induced electromotive force may be produced in several ways as follows:

a) A conductor may move in a stationary magnetic field of constant strength.

b) A stationary conductor may be exposed to a moving magnetic field of constant strength.

c) The strength of the field surrounding the conductor may change without any motion of conductor or magnetic circuit.

The electromotive force induced by motion of a conductor or a magnetic flux is the same when the conductor rotates and the flux is stationary or the flux rotates and the conductor is stationary. If both, conductor and flux, rotate in the same direction at the same speed, no electromotive force will be produced, if they rotate at the same speed but in opposite directions, the electromotive force induced would be twice as that which would be induced, if one of them was stationary. An electromotive force is not induced when a conductor is moved parallel to the lines of force, but only when it moves at an angle with these lines.

Any motion across the direction of the lines, however, will produce an electromotive force in the conductor. For this reason, the conductor is said to „cut" the lines of force. The actual electromotive force induced in the conductor depends upon the nature at which the flux is cut.

The electromotive force is the very force that moves the electrons from one point in an electric circuit towards another. In case this e.m.f. is

direct, the current is direct. On the other hand, were the electromotive force alternating, the current would be alternating, too. The e.m.f. is measurable and it is the volt that is the unit used for measuring it. A current is unable to flow in a circuit consisting of metallic wires alone. A source of an e.m.f. should be provided as well. The source under consideration may be a cell or a battery, a generator, a thermocouple or a photocell, etc.

In addition to the electromotive force and the potential difference reference should be made to another important factor that greatly influences electrical flow, namely, resistance. All substances offer a certain amount of opposition, that is to say resistance, to the passage of current. This resistance may be high or low depending on the type of circuit and the material employed. Glass and rubber offer a very high resistance and, hence, they are considered as good insulators. All substances do allow the passage of some current provided the potential difference is high enough.

Certain factors can greatly influence the resistance of an electric circuit. They are the size of the wire, its length, and type. In short, the thinner or longer the wire is, the greater the resistance offered is.

Exercise 2. Give the English equivalents for the words below. Find in the text the sentences with these words and translate them:

1) трение; 2) электродвижущая сила; 3) элемент; 4) параллельное соединение; 5) сопротивление; 6) электромагнитная индукция; 7) переменный ток; 8) постоянное напряжение; 9) фотоэлемент.

Exercise 3. Guess the meaning of the following international words and translate them:

reaction, electrostatic, electrometer, electroscope, volt, metallic.

Exercise 4. Say whether these sentences are true or false:

1. Alternatingforce always exerts its effort in one direction.
2. Alternating force is produced by electromagnetic induction.
3. The electromotive force is induced by motion of a conductor.
4. Resistance is an important factor that greatly influences electrical flow.
5. The type of the material employed doesn’t influence the resistance.

Exercise 5. Answer the questions:

1) What factors cause the motion of electrons from one atom to another? 2) When is the electromotive force developed? 3) When does an

electrostatic field appear? 4) How is the electromotive force induced? 5) What unit is used for measuring the electromotive force? 6) What are the sources of electromotive force? 7) What is called “resistance”? 8) How do the types of circuit and material influence the resistance? 9) Name the factors that influence the resistance of an electric.

Text 9. Dynamos

Exercise 1. Read the text.

The term “dynamo” is applied to machines which convert either mechanical energy into electrical energy or electrical energy into mechanical energy by utilizing the principle of electromagnetic induction. A dynamo is called a generator when mechanical energy supplied in the form of rotation is converted into electrical energy. When the energy conversion takes place in the reverse order the dynamo is called a motor. Thus a dynamo is a reversible machine capable of operation as a generator or motor as desired.

A generator does not create electricity, but generates or produces an induced electromotive force, which causes a current to flow through a properly insulated system of electrical conductors external to it. The amount of electricity obtainable from such a generator is dependent upon the mechanical energy supplied. In the circuit external to a generator the e.m.f. causes the electricity to flow from a higher or positive potential to a lower or negative potential. In the internal circuit of a generator the e.m.f. causes the current to flow from a lower potential to a higher potential. The action of a generator is based upon the principles of electromagnetic induction.

The dynamo consists essentially of two parts: a magnetic field, produced by electromagnets, and a number of loops or coils of wire wound upon an iron core, forming the armature. These parts are arranged so that the number of the magnetic lines of force of the field threading through the armature, coils will be constantly varied, thereby producing a steady e.m.f. in the generator or a constant torque in the motor.

Exercise 2. Fill in the gaps with the words given below:

To convert, reversible, obtainable, induction, loops.

1. The term “dynamo” is applied to machines which ..... either mechanical energy into electrical or on the contrary electrical energy into mechanical energy.

2. A dynamo is a ..... machine capable of operation as a generator or motor as desired.

3. The amount of electricity ..... from such a generator is dependent upon the mechanical energy supplied.

4. The action of a generator is based upon the principles of electromagnetic ..... .

5. The dynamo consists of two parts: a magnetic field, produced by electromagnets, and a number of ..... or coils of wire.

Exercise 3. Find the Russian equivalents for the following English words and word combinations:

1) to be applied to smth.; 2) to convert smth. into smth.; 3) rotation; 4) to utilize; 5) a properly insulated system; 6) internal (external) circuit; 7) capable of operation; 8) positive (negative) potential; 9) reverse order; 10) energy conversion.

Exercise 4. Answer the questions.

1. What term can be applied to machines converting mechanical energy into electrical and vice versa? 2. What kind of machine is a dynamo? 3. What is the function of a generator? 4. What is the action of a generator based upon? 5. What parts does the dynamo consist of?

Text 10. Generators

Exercise 1. Read the text.

The powerful, highly efficient generators and alternators that are in use today operate on the same principle as the dynamo invented by the great English scientist Faraday in 1831.

Dynamo-electric machines are used to supply light, heat and power on a large scale. These are the machines that produce more than 99.99 per cent of all the world's electric power.

There are two types of dynamos – the generator and the alternator. The former supplies d.c. which is similar to the current from a battery and the latter provides a.c. To generate electricity both of them must be continuously provided with energy from some outside source of mechanical energy such as steam engines, steam turbines or water turbines.

A generator is an electric machine, which converts mechanical energy into electric energy. There are direct-current (d.c.) generators and alternating-current (a.c.) generators. Their construction is much alike. A d.c.

generator consists of stationary and rotating elements. The stationary elements are: the yoke or the frame and the field structure. The yoke forms the closed circuit for the magnetic flux. The function of the magnetic structure is to produce the magnetic field.

The rotating elements are: true armature and the commutator. They are on the same shaft. The armature consists of the core and the winding. The winding is connected to the commutator. With the help of the brushes on the commutator that conduct the electric current to the line the winding is connected to the external circuit. The stationary element of an a-c. generator is called a stator. The rotating element is called a rotor.

The essential difference between a d.c. generator and a.c. generator is that the former has a commutator by means of which the generated e. m. f. is made continuous, i.e. the commutator mechanically rectifies the alternating e.m.f. so that it is always of the same polarity.

D.c. generators are used for electrolytic processes such as electroplating. Large d.c. generators are employed in such manufacturing processes as steel making. The d.c. generator of small capacities is used for various special purposes such as arc welding, automobile generators, train lighting systems, etc. It also finds rather extensive use in connection with communication systems.

Exercise 2. Give the Russian equivalents for the following English words and word combinations:

1) generator; 2) alternator; 3) steam turbine; 4) water turbine; 5) armature; 6) rotor; 7) stationary; 8) commutator; 9) stator; 10) yoke; 11) brushes; 12) core; 13) frame; 14) winding.

Exercise 3. Fill in the blanks

1. A generator is an electric machine, which … mechanical energy into electrical energy.
2. A direct-current generator consists of … .
3. The dynamo was invented by … in 1831.
4. The d.c. generator is used for various purposes such as … .

Exercise 4. Work out the plan of the text.

Exercise 5. Speak on the following points:

1. The construction of a generator.
2. The direct – current generators and their industrial application.
3. Industrial application of D.C. Generators.

Text 11. Transformers

Exercise 1. Read the text.

One of the great advantages in the use of the alternating current is the ease with which the voltage may be changed by means of a relatively simple device known as a transformer. Although there are many different types of transformers and a great variety of different applications, the principles of action are the same in each case.

The transformer is a device for changing the electric current from one voltage to another. It is used for increasing or decreasing voltage. So the function of a transformer is to change voltage and current of an alternating system to meet requirements of the equipment used. It is known to be simple in elementary principle, and in construction that is it involves no moving parts. Transformers change voltage through electromagnetic induction.

The principle parts of a transformer are: an iron core and, usually, two coils of insulated windings. One of them is called primary, another is called the secondary. The primary coil is connected to the source of power. The secondary coil is connected to the load. Thus, the primary is the coil to which power is supplied. The secondary is the coil from which power is taken. In scientific terms to produce an alternating magnetic flux in the iron core an alternating current must be passed through the primary coil. This flux is considered to induce electromotive force in both primary and secondary coils. The secondary coil is open-circuited. Current flows in the secondary coil when the latter is connected to the external circuit or load. The flow of current in the secondary coil tends to reduce the flux in the core. Transformers are placed inside a steel tank usually with oil to improve the insulation and also to cool the device.

Exercise 2. Guess the meaning of the following international words:

1) transformer; 2) type; 3) principle; 4) electric; 5) function; 6) elementary; 7) construction; 8) induction.

Exercise 3. Translate into Russian the words and expressions from the text:

1) advantage; 2) voltage; 3) relatively simple; 4) application; 5) increase; 6) to decrease; 7) to meet requirements; 8) moving parts; 9) iron core; 10) insulated windings; 11) load; 12) electromotive force; 13) to induce.

Exercise 4. Give the English equivalents to the words below:

1) переменный ток; 2) прибор; 3) принцип работы (действия); 4) электромагнитная индукция; 5) катушка; 6) первичная (вторичная) обмотка; 7) источник питания; 8) магнитный поток; 9) стальной контейнер; 10) остужать.

Exercise 5. Answer the questions:

1. What kind of device is a transformer? 2. What are the functions of a transformer? 3. What are the principle parts of a transformer? 4. What is the primary coil connected to? 5. What is the secondary coil connected to? 6. What are the principles of action of a transformer? 7. Where are transformers usually placed?

Exercise 6. Topics for discussion:

1) Transformer as an electric device;
2) Main parts and principles of a transformer action.

Text 12. Types of transformers

Exercise 1. Read the text.

There are different types of transformers. By the purpose they are classified into step-up transformers and step-down transformers. In a step-up transformer the output voltage is larger than the input voltage, because the number of turns on the secondary winding is greater than that of the primary. In a step-down transformer the output voltage is less than input voltage as the number of turns on the secondary is fewer than that on the primary.

By the construction transformers are classified into core-type and shell-type transformers. In the core-type transformers the primary and the secondary coils surround the core. In the shell type transformers the iron core surrounds the coils. Electrically they are equivalent. The difference is in the mechanical construction.

By the methods of cooling transformers are classified into air-cooled, oilcooled and water-cooled transformers.

By the number of phases transformers are divided into singlephase and polyphase transformers. Instrument transformers are of two types, current and potential.

A current transformer is an instrument transformer used for the transformation of a current at a high voltage into proportionate current at a low

voltage. Current transformers are used in conjunction with a.-c. meters or instruments where the current to be measured must be of low value. They are also used where high-voltage current has to be metered. A voltage transformer, which is also called a potential transformer, may be defined as an instrument transformer for the transformation of voltage from one value to another. This transformer is usually of a step-down type because it is used when a meter is installed for use on a high-voltage system.

Transformers operate equally well to increase the voltage and to reduce it. The above process needs a negligible quantity of power. Transformers are widely used in our everyday life. All radiosets and all television sets are known to use two or more kinds of transformers. These are familiar examples showing that electronic equipment cannot do without transformers.

Exercise 2. Guess the meaning of the following international words:

1) to classify; 2) method; 3) phase; 4) instrument; 5) system; 6) process; 7) radio; 8) television.

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

1) цель; 2) повышающий / понижающий трансформатор; 3) выходящее / входящее напряжение; 4) число витков; 5) механическое устройство; 6) монофазные / полифазные трансформаторы; 7) высокое / низкое напряжение; 8) определять; 9) работать; 10) незначительное количество.

Exercise 4. Translate into Russian the words and expression from the text:

1) core-type / shell-type transformers; 2) air-cooled / oil-cooled / water-cooled transformers; 3) current / potential transformers; 4) in conjunction with smith; 5) to reduce; 6) electronic equipment.

Exercise 5. Complete the sentences using the text:

1. By the purpose transformers are …
2. By the construction transformers are …
3. By the methods of cooling transformers are …
4. By the number of phases transformers are …
5. Transformers operate equally well…
6. Process of voltage changing needs…
7. Familiar examples of transformer applications are …

Exercise 6. Answer the questions:

1. What voltage is larger in a step-up transformer and why?
2. What voltage is less in a step-down transformer and why?
3. What is the construction of a core-type transformer?
4. What is the construction of a shell-type transformer?
5. What are the two types of instrument transformers?
6. What are current transformers used for?
7. What are potential transformers used for?

Exercise 7. Topics for discussion:

1) Types of transformers.
2) Use of transformers in everyday life.

Text 13. Iinstruments

Exercise 1. Read the text.

Any instrument which measures electrical values is called a meter. An ammeter measures the current in amperes. The abbreviation for the ampere is amp. A voltmeter measures the voltage and the potential difference in volts.

The current in a conductor is determined by two things – the voltage across the conductor and the resistance of the conductor. The unit by which resistance is measured is called the ohm. The resistance in practice is measured with the ohm-meter. A wattmeter measures electrical power in watts. Very delicate ammeters are often used for measuring very small currents. A meter whose scale is calibrated to read a thousandth of an ampere is called a micro ammeter or galvanometer.

Whenever an ammeter or voltmeter is connected to a circuit to measure electric current or potential difference, the ammeter must be connected in series and the voltmeter in parallel. To prevent a change in the electric current when making such an insertion, all ammeters must have a low resistance. Hence, most ammeters have a low resistance wire, called a shunt, connected across the armature coil.

A voltmeter, on the other hand, is connected across that part of the circuit for which a measurement of the potential difference is required. In order that the connection of the voltmeter to the circuit does not change tire electric current in the circuit, the voltmeter must have high resistance. If the armature coil does not have large resistance of its own, additional resistance is added in series.

The heating effect, electrostatic effect, magnetic and electromagnetic effects of electric current are used in order to produce the defleting torque. The resulting measuring instruments are called: (a) hot wire, (b) electrostatic, (c) moving iron, (d) moving coil, and (e) induction. Various types are used with both d.c. and a.c., but the permanent-magnet moving coil instrument are used only with d.c., and the induction type instruments are limited to a.c.

All, except the electrostatic type instruments, are current measuring devices, fundamentally ammeters. Consequently, most voltmeters are ammeters designed also to measure small values of current directly proportional to voltage to be measured.

Exercise 2. Guess the meaning of international words:

1) instrument; 2) fact; 3) abbreviation; 4) voltmeter; 5) ohm; 6) ohmmeter; 7) wattmeter; 8) galvanometer; 9) shunt.

Exercise 3. Give the Russian equivalents to the words below:

1) resistance; 2) to offer; 3) scale; 4) to prevent; 5) armature; 6) connection; 7) heating effect.

Exercise 4. Give the English equivalents to the words and word-combinations:

1) амперметр; 2) разница потенциалов; 3) определять; 4) чувствительный; 5) градуировать; 6) вставка; 7) катушка; 8) переменный ток.

Exercise 5. Answer the questions:

1. How are electrical values measuring instruments called?
2. How must the ammeter and the voltmeter be connected?
3. What resistance must the ammeter and the voltmeter have?
4. What resulting measuring instruments do you know?
5. What types of instruments are used with both d.c. and a.c.?
6. What instruments are used only with d.c. and limited to a.c.?

SUPPLEMENTARY TEXTS

Part I. HISTORY OF ELECTRICITY: OUTSTANDING SCIENTISTS AND DISCOVERIES

TEXT 1

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

GEORGE SYMON OHM

George Symon Ohm (1784–1854) is a famous German physicist. In 1805 he entered the Erlangen University. Though he did not graduate from this University, he managed to write and defend a thesis in 1811. Later, he was a teacher at the gymnasiums of Gottstadt and Wamburg. Beginning from 1833 he became a professor at the Polytechnical School in Nuremberg, and since 1849 – at the Munich University.

He is the most famous for establishment of the general law of the electric circuit, stating the relation between resistance, electromotive force, and strength of the current in the electric circuit. The law was discovered experimentally and first formulated in 1826. Further investigations made use of this law. The unit of resistance was named after Ohm at the International Congress of Electricians in1881.

Exercise 2: Answer the following questions:

1. When was George Symon Ohm born?
2. Did he graduate from the university?
3. Did he defend a thesis?
4. What did Ohm discover?
5. When and where was the unit of resistance named after Ohm?

TEXT 2

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

OHM'S LAW

One of Ohm's major contributions was the establishment of a definite relationship between voltage, resistance, and current in a closed circuit. A

circuit consists of a voltage source and a complete path for current. Ohm stated this relationship as follows:

Current is directly proportional to voltage and inversely proportional to resistance.

As a formula, it appeals like this:

$$\text{Current (in amperes)} - \frac{\text{Voltage (in volts)}}{\text{Resistance (in ohms)}}.$$

This formula is commonly known as Ohm's Law.

Around 1817 Ohm discovered that a simple correlation existed between resistance, current and voltage. That is: the current that flows in the circuit is directly proportional to the voltage and inversely proportional to the resistance. A current is measured in amperes, a voltage, or potential difference is measured in volts. A resistance is measured in ohms.

Exercise 2: Answer the following questions:

1. What was one of Ohm's major contributions?
2. What does a circuit consist of?
3. Is current directly proportional to voltage and inversely proportional to resistance?
4. How is Ohm’s formula commonly known?
5. When did Ohm discover that a simple correlation existed between resistance, current and voltage?

TEXT 3

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

FARADAY'S LAW

Michael Faraday was a great British physicist, the founder of the theory of electron field, a member of the London Royal Society. He was born in London in the family of a smith. Spending a few years in the primary school, he continued his studies all by himself, reading books and listening public lectures. Greatly impressed by lectures of a well-known English chemist H. Davy, he sent him a letter asking for a job at the Royal Institute. In 1813 Davy gave him a job of a laboratory assistant. Thanks to the

brilliant talent of an experimenter, Faraday soon made himself known. All his future scientific work was carried out in the Royal Institute laboratories.

Faraday's law is formulated as follows: (a) the induced E.M.F. in a conductor is proportional to the rate at which the conductor cuts the magnetic lines of force. (b) The induced E.M.F. in a circuit is proportional to the rate of change of the lines' number of force threading the circuit.

Exercise 2: Answer the following questions:

1. Who was the founder of the theory of electron field?
2. Where was Michael Faraday born?
3. Whom did Faraday send a letter asking for a job at the Royal Institute?
4. Was all his future scientific work carried out in the Royal Institute laboratories?
5. How is Faraday's law formulated?

TEXT 4

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

EMIL LENZ. LENZ'S LAW

Emil Lenz was born on the 12 of February 1804 and died on the 29 of January 1865 in Derpt. He became a prominent Russian physicist, an Academician.

At the age of 16 he entered the Derpt University. In 1823, when being a student, he joined a 3 year round-the-world trip on board of the ship "Enterprise" as a physicist. The chief of the expedition was Kotzebu, a famous Russian seaman and explorer. In 1828 Lenz was elected adjunct-professor of the St. Petersburg Academy of Sciences for his outstanding investigations in geophysics.

In the 30s of the 19th century, Lenz reorganized a physical laboratory of the Academy of Sciences where he began his famous studies on electricity and magnetism. He discovered the law of the electric current emitting heat in conductors. This law laid the foundation for the discovery of the Law of conservation and conversion of energy.

The direction of the induced current is such that its effect opposes the change producing it. The right-hand rule enables one to predict the direction of the induced current, and may be shown to conform with Lenz's law.

The induction coil, the dynamo, the transformer, and the telephone are practical application of electromagnetic induction.

Exercise 2: Answer the following questions:

1. Who was Emil Lenz?
2. When did he join a 3 year round-the-world trip as a physicist?
3. Where did Lenz begin his studies on electricity and magnetism?
4. What did he discover?
5. Are the induction coil, the dynamo, the transformer, and the telephone practical application of electromagnetic induction?

TEXT 5

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

KIRCHHOFF'S LAWS

Gustav Robert Kirchhoff (1824–1887) is a famous German scientist. He graduated from the Konigsberg University in 1846. Since 1850 he had been an extraordinary professor of physics at the University of Breslau, and since 1854 – an ordinary professor of experimental and theoretical physics in Heidelberg University, in 1875 he became the chief of the Chair of mathematical physics in Berlin University.

His first works (1845–1849) were dedicated to studies of the electric current in various kinds of conductors, series and parallel circuits, and to distribution of electricity in the conductors. Together with Bunsen, he was the author of spectral analysis.

G.R. Kirchhoff expanded and clarified Ohm's law with two statements which may be paraphrased as follows:

1. The current entering a point is equivalent to the current leaving the point.

2. The sum of the voltage drops around a closed loop is equal to the applied voltage.

Kirchhoff intended his statements to apply to all circuits. The two main principles of circuit analysis are:

(1) Kirchhoff's Current Law. The sum of the currents directed away from the junction is equal to the sum of the currents directed toward the junction.

(2) Kirchhoff's E. M. F. Law. The sum of the voltage drops around any closed loop of a network equals the sum of the voltage rises around this loop.

Exercise 2: Answer the following questions:

1. What university did Gustav Robert Kirchhoff graduate from?
2. When did he become the chief of the Chair of mathematical physics in Berlin University?
3. Were his first works dedicated to studies of the electric current in various kinds of conductors, series and parallel circuits, and to distribution of electricity in the conductors?
4. Did G.R. Kirchhoff expand Ohm's law?
5. How many main principles of circuit analysis are there?

Part II. INTERESTING FACTS ON ELECTRICITY AND ELECTRONICS

TEXT 1

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

ELECTRICITY MAY BE DANGEROUS

Many people have had strong shocks from the electric wires in a house. The wires seldom carry current at a higher voltage than 220, and a person who touches a bare wire or terminal may suffer no harm if the skin is dry. But if the hand is wet, he may be killed. Water is known to be a good conductor of electricity and provides an easy path for the current from the wire to the body. One of the main wires carrying the current is connected to earth, and if a person touches the other one with a wet hand, a heavy current will flow through his body to earth and so to the others. The body forms part of an electric circuit.

When dealing with wires and fuses carrying an electric current, it is best to wear rubber gloves. Rubber is a good insulator and will not let the current pass to the skin. If no rubber gloves can be found in the house, dry

cloth gloves are better than nothing. Never touch a bare wire with the wet hand, and never, in any situation, touch a water pipe and an electric wire at the same time.

People use electricity in their homes every day but sometimes forget that it is a form of power and may be dangerous. At the other end of the wire there are great generators driven by turbines turning at high speed. One should remember that the power they generate is enormous. It can burn and kill, but it will serve well if it is used wisely.

Exercise 2: Answer the following questions:

1. What is known to be a good conductor of electricity?
2. What is one of the main wires carrying the current connected to?
3. When is it best to wear rubber gloves?
4. Why is it necessary to wear rubber gloves?
5. Are there great generators at the other end of the wire?

TEXT 2

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

POWER TRANSMISSION

They say that about a hundred years ago, power was never carried far away from its source. Later on, the range of transmission was expanded to a few miles. And now, in a comparatively short period of time, electrical engineering has achieved so much that it is quite possible, at will, to convert mechanical energy into electrical energy and transmit the latter over hundreds of kilometres and more in any direction required. Then in a suitable locality the electric energy can be reconverted into mechanical energy whenever it is desirable. It is not difficult to understand that the above process has been made possible owing to generators, transformers and motors as well as to other necessary electrical equipment. In this connection one cannot but mention the growth of electric power generation in this country. The longest transmission line in pre-revolutionary Russia was that connecting the Klasson power-station with Moscow. It is said to have been 70 km long, while the present Volgograd-Moscow high-tension transmission line is over 1000 kilometres long. (The reader is asked to note that the English terms "high-tension" and "high-voltage" are interchangeable.)

It goes without saying that as soon as the electric energy is produced at the power-station, it is to be transmitted over wires to the substation and then to the consumer. However, the longer the wire, the greater is its resistance to current flow. On the other hand, the higher the offered resistance, the greater are the heating losses in electric wires. One can reduce these undesirable losses in two ways, namely, one can reduce either the resistance or the current. It is easy for us to see how we can reduce resistance: it is necessary to make use of a better conducting material and as thick wires as possible. However, such wires are calculated to require too much material and, hence, they will be too expensive. Can the current be reduced? Yes, it is quite possible to reduce the current in the transmission system by employing transformers. In effect, the waste of useful energy has been greatly decreased due to high-voltage lines. It is well known that high voltage means low current, low current in its turn results in reduced heating losses in electrical wires. It is dangerous, however, to use power at very high voltages for anything but transmission and distribution. For that reason, the voltage is always reduced again before the power is made use of.

Exercise 2: Answer the following questions:

1. When was power carried not far away from its source?
2. Can the electric energy be reconverted into mechanical energy whenever it is desirable?
3. How can one reduce the undesirable losses?
4. Can the current be reduced?
5. What does high voltage mean?

TEXT 3

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

HYDROELECTRIC POWER-STATION

Water power was used to drive machinery long before Polzunov and James Watt harnessed steam to meet man's needs for useful power.

Modern hydroelectric power-stations use water power to turn the machines which generate electricity. The water power may be obtained from small dams in rivers or from enormous sources of water power like

those to be found in Russia. However, most of our electricity, that is about 86 per cent, still comes from steam power-stations.

In some other countries, such as Norway, Sweden, and Switzerland, more electric energy is produced from water power than from steam. They have been developing large hydroelectric power-stations for the past forty years, or so, because they lack a sufficient fuel supply. The tendency, nowadays, even for countries that have large coal resources is to utilize their water power in order to conserve their resources of coal. As a matter of fact, almost one half of the total electric supply of the world comes from water power.

The locality of a hydroelectric power-station depends on natural conditions. The hydroelectric power-station may be located either at the dam or at a considerable distance below. That depends on the desirability of using the head supply at the dam itself or the desirability of getting a greater head. In the latter case, water is conducted through pipes or open channels to a point farther downstream where the natural conditions make a greater head possible.

The design of machines for using water power greatly depends on the nature of the available water supply. In some cases great quantities of water can be taken from a large river with only a few feet head. In other cases, instead of a few feet, we may have a head of several thousands of feet. In general, power may be developed from water by action of its pressure, of its velocity, or by a combination of both.

A hydraulic turbine and a generator are the main equipment in a hydroelectric power-station. Hydraulic turbines are the key machines converting the energy of flowing water into mechanical energy. Such turbines have the following principal parts: a runner composed of radial blades mounted on a rotating shaft and a steel casing which houses the runner. There are two types of water turbines, namely, the reaction turbine and the impulse turbine. The reaction turbine is the one for low heads and a small flow. Modified forms of the above turbine are used for medium heads up to 500–600 ft, the shaft being horizontal for the larger heads. High heads, above 500 ft, employ the impulse type turbine.

Hydropower engineering is developing mainly by constructing high capacity stations integrated into river systems known as cascades. Such cascades are already in operation on the Dnieper, the Volga and the Angara.

Exercise 2: Answer the following questions:

1. Why do modern hydroelectric power-stations use water power?
2. In what countries is more electric energy produced from water power than from steam?
3. What does the locality of a hydroelectric power-station depend on?
4. What is the main equipment in a hydroelectric power-station?
5. Are hydraulic turbines the key machines converting the energy of flowing water into mechanical energy?

TEXT 4

Exercise 1: Read and translate the text. Use the dictionary at the end of the textbook.

NUCLEAR POWER PLANT

The heart of the nuclear power plant is the reactor which contains the nuclear fuel. The fuel usually consists of hundreds of uranium pellets placed in long thin cartridges of stainless steel. The whole fuel cell consists of hundreds of these cartridges. The fuel is situated in a reactor vessel filled with a fluid. The fuel heats the fluid and the super-hot fluid goes to a heat exchanger i.e. steam generator, where the hot fluid converts water to steam in the heat exchanger. The fluid is highly radioactive, but it should never come into contact with the water that is converted into steam. Then this steam operates steam turbines in exactly the same way as in the coal or oil fired power-plant.

A nuclear reactor has several advantages over power-plants that use coal or natural gas. The latter produce considerable air pollution, releasing combusted gases into atmosphere, whereas a nuclear power plant gives off almost no air pollutants. As to nuclear fuel, it is far cleaner than any other fuel for operating a heat engine. Furthermore, our reserves of coal, oil and gas are decreasing so nuclear fuel is to replace them.

Exercise 2: Answer the following questions:

1. What does the fuel usually consist of?
2. Where is the fuel situated?
3. Is the fluid highly radioactive?
4. How does the steam operate steam turbines?
5. Why does a nuclear reactor have several advantages over power-plants that use coal or natural gas?

ГРАММАТИЧЕСКИЙ СПРАВОЧНИК

Множественное число существительных (The Plural of Nouns)

Множественное число существительных в основном образуется путем прибавления окончания **-s:**

a table – table**s**

a book – book**s**

Если исходное существительное оканчивается на **-ch, -x, -sh, -ss, -o,** то во множественном числе оно имеет окончание **-es:**

a box – box**es**

a match – match**es**

a class – class**es**

a dish – dish**es**

a tomato – tomato**es**

Если существительное оканчивается на **-f, -fe,** то во множественном числе оно меняет **-f, -fe** на **-v** и принимает окончание **-(e)s:**

a knife – kni**ves**

Если существительное оканчивается на **-y** с предшествующей согласной, то во множественном числе **-y** меняется на **-i** и прибавляется окончание **-es:**

a baby – bab**ies**

Существительные-исключения образуют множественное число путем изменения корневой гласной, не прибавляя окончания:

a m**a**n – m**e**n

a wom**a**n – wom**e**n

a child – child**ren**

a f**oo**t – f**ee**t

a g**oo**se – g**ee**se

a t**oo**th – t**ee**th

a m**ous**e – m**i**ce

Существительные, которые употребляются только в единственном числе:

money

advice

information

hair

fruit

watch

knowledge

progress

Существительные с одинаковыми формами единственного и множественного числа:

fish – fish
series – series
sheep – sheep
deer – deer
means – means

Артикль (The Article)

В английском языке используют неопределенный **a (an)** и определенный **the** артикли.

Определенный артикль **the** обычно употребляется с определенными или единственными в своем роде объектами. Он имеет индивидуализирующее значение. Употребляется:

1) с существительными, единственными в своем роде:

There wasn't a cloud in **the sky**.

The sun is shining.

2) с существительными, которые определены контекстом:

She is in **the kitchen**.

Why don't we go to **the coast**?

3) с существительными, употребление которых повторяется в данном контексте:

I saw a moth and **a butterfly**. **The butterfly** was beautiful.

4) с существительными, имеющими при себе определительное пояснение:

Think of **the animals** that you have seen yourself.

5) с прилагательными в превосходной степени сравнения:

It's **the biggest** park in our city.

6) с порядковыми числительными:

Gagarin was **the first** cosmonaut.

7) с прилагательными, которые представляют определенный класс людей:

The rich are not always happy.

8) с существительными, которые в единственном числе представляют целый класс предметов или животных:

The elephant is the biggest animal that lives on land.

9) с названиями некоторых газет и журналов:

I have already read about it in **the "Times"**.

Неопределенный артикль употребляется с исчисляемыми существительными в единственном числе. Он имеет две формы:

1) **a** употребляется перед существительным, начинающимся с согласного звука или имеющим перед собой определение, начинающееся с согласного звука: **a** book, **a** cognitive book;

2) **an** употребляется перед существительным, начинающимся с гласного звука или имеющим перед собой определение, начинающееся с гласного звука: **an** elephant, **an** interesting book.

Неопределенный артикль употребляется:

1) с существительным в единственном числе, если оно упоминается впервые и не является определенным:

I have **a family**.

2) с существительными-дополнениями (после глаголов be, seem, sound), включая названия профессий:

He is **an** engineer.

3) с определенными выражениями, в которых говорится о количестве и типе:

There are **a lot** of things I am fond of.

4) если речь идет о стоимости, скорости, периодичности:

We visit them once **a month**.

5) в восклицаниях с исчисляемыми существительными в единственном числе:

What **a beautiful garden**!

Артикль не употребляется:

1) с существительными во множественном числе, которые употреблены в общем смысле:

I like **zoos**.

2) с неисчисляемыми существительными:

Petrol is very expensive now.

3) с абстрактными существительными:

I want to get **information** about this business.

4) с именами собственными:

Helen is my sister.

5) с наименованиями приемов пищи:

What is he doing? He is having **dinner**.

6) со следующими существительными, употребленными в их первоначальном смысле – bed, church, college, court, home, hospital, market, prison, school, sea, university, work:

Are you still in **bed**?

Определенный артикль **the** обычно употребляется с географическими названиями в следующих категориях:

1) океаны, моря и реки: **the** Pacific Ocean, **the** Black Sea;

2) названия, употребляющиеся во множественном числе: **the** Alps, **the** Netherlands;

3) названия, включающие в себя слово **republic, federation, kingdom, states: the** United States, **the** Russian Federation;

4) названия, включающие в себя предлог **of: the** Isle of Man;

5) гостиницы и пабы: **the** Russia Hotel;

6) театры и кинотеатры: **the** Pushkin Theatre;

7) музеи: **the** British Museum.

Категории, в которых артикль не употребляется:

1) аэропорты и станции: **Heathrow Airport**;

2) замки и дворцы: **Buckingham Palace**;

3) города: **Paris, Krasnoyarsk**;

4) континенты: **Africa, South America**;

5) страны и графства: **Germany, Kent**;

6) острова: **Madagascar**;

7) озера: **Lake Baikal**;

8) горы: **Mount Kilimanjaro**;

9) штаты: **Texas**;

10) улицы и площади: **Lenin Street**;

11) университеты, колледжи и школы: **Cambridge University**.

Спряжение глагола to be

Present	Past	Future
I **am** He, she, it **is** You, we, they **are**	I, he, she, it **was** You, we, they **were**	I, we **shall be** He, she, it, you, they **will be**

Глагол **to be** – *быть, существовать, являться, находиться.* Это единственный глагол, который имеет совершенно непохожие на инфинитив (**be**) формы: в Present Indefinite - **am / is / are**, а в Past Indefinite - **was / were.** Он всегда образует вопросительную и отрицательную формы без вспомогательного глагола do.

В вопросительных предложениях соответствующие формы глагола **to be** ставятся перед подлежащим.

В отрицательной форме после глагола ставится частица **not**.

I **am** a student. *Я студент*.

Am I a student? *Я студент?*

I **am <u>not</u>** a student. *Я **не** студент.*

She **was** busy yesterday. *Она **была** занята вчера.*
Was she busy yesterday? ***Была (ли)** она занята вчера?*
She **was <u>not</u>** busy yesterday. *Она **не была** занята вчера.*

Спряжение глагола to have

Present	Past	Future
I, you, we, they **have** He, she, it **has**	I, you, he, she, it, we, they **had**	I, we **shall have** He, she, it, you, they **will have**

Глагол **to have** – *иметь, обладать.*

Глагол **to have** спрягается по общим правилам, сохраняя в Present Indefinite форму **have** во всех лицах и числах, кроме 3-го лица единственного числа, где он принимает форму **has**. В Past Indefinite он принимает форму **had**.

1) Без вспомогательного do. Раньше всегда было нормой в британском английском. В современном британском считается книжной формой и чаще употребляется с конкретными, единичными событиями/явлениями (наряду с **have got**).

В вопросах have ставится перед подлежащим:

He **has** a car. *У него **есть** машина.*
Has he a car? ***Есть** у него машина?*

Отрицания образуются двумя способами:

С отрицательным местоимением **no**, если существительное-дополнение не имеет перед собой определителей (после **no** никакие артикли не употребляются):

I **have no** pen. *У меня **нет** ручки.*

С отрицательной частицей **not**, если перед существительным имеются его определители (притяжательные или указательные местоимения, неопределенные местоимения **much**, **many** и др., количественные числительные и т.д.):

I **have not** your book. *У меня **нет** твоей книги.*
I **haven't** many pencils. *У меня немного карандашей.*

2) С использованием do. В американском английском – всегда. В современном британском языке эти формы становятся все более употребительны, особенно если речь идет о предложениях в прошедшем времени, о привычных, повторяющихся действиях, о постоянном наличии какого-либо предмета, явления или состояния и т.п.:

Do you **have** a sister? *У тебя **есть** сестра?*
Does he **have** any children? *У него **есть** дети?*
We **didn't have** money. *У нас **не было** денег.*

We **don't** usually **have** whisky. *У нас обычно **нет** виски в доме.*

Личные и притяжательные местоимения (The Personal and Possessive Pronouns)

Личные местоимения (The Personal pronouns)		**Притяжательные местоимения (The Possessive Pronouns)**	
Именительный падеж	**Объектный падеж**	**I форма (примыкающая)**	**II форма (абсолютная)**
Употребляется в роли подлежащего	**Употребляется в роли дополнения**	**Употребляется перед существительным**	**Употребляется самостоятельно без существительного**
I я **you** ты **he** он **she** она **it** он, она, оно (обозначает неодушевленные предметы) **we** мы **you** вы **they** они	**me** меня, мне **you** тебя, тебе **him** его, ему **her** ее, ей **it** его, ему, ее, ей (обозначает неодушевленные предметы) **us** нас, нам **you** вас, вам **them** их, им	**my** мой (-я, е, и) **your** твой (-я, е, и) **his** его **her** ее **its** его, ее (обозначает неодушевленные предметы) **our** наш (-а, е, и) **your** ваш (-а, е, и) **their** их	**mine** мой (-я, е, и) **yours** твой (-я, е, и) **his** его **hers** ее **its** его, ее (обозначает неодушевленные предметы) **ours** наш (-а, е, и) **yours** ваш (-а, е, и) **theirs** их

Личные местоимения:

I am talking to **him**.	***Я** разговариваю с **ним**.*
He is talking to **me**.	***Он** разговаривает со **мной**.*
You see **them**.	***Вы** видите **их**.*
They see **you**.	***Они** видят **вас**.*
I don't want this book.	***Мне** не нужна эта книга.*
You can have **it**.	***Ты** можешь **ее** взять.*

Притяжательные местоимения:

I know Nick but I don't know **his** wife.	*Я знаю Ника, но не знаю **его** жену.*
It's **my** favourite sport.	*Это **мой** любимый вид спорта.*
It is **her** husband's house.	*Это дом **ее** мужа.*
Oxford is famous for **its** university.	*Оксфорд известен **своим** университетом.*
This is **your** pen and that is **mine**.	*Это **твоя** ручка, а то – **моя**.*

Возвратные местоимения (The Reflexive Pronouns)

Единственное число -self сам, сама, само, себя	**Множественное число -selves** сами, себя
myself **yourself** **himself** **herself** **itself**	**ourselves** **yourselves** **themselves**

oneself – неопределенно-личная форма;
to enjoy **oneself** веселить**ся.**

He only thinks about **himself.** *Он думает только о **себе.***
She looked at **herself** in the mirror. *Она посмотрела на **себя** в зеркало.*
Sometimes I talk to **myself**. *Иногда я разговариваю сам с **собою**.*

Some, any, no, every и их производные (Some, any, no, every and their derivatives)

Тип предложения	**some, any, no, every**	**Производные от some, any, no, every**		
		+ thing **предметы**	**+ body** **люди**	**+ where** **место**
Утвердительное предложение	**some** какой-то, какой-нибудь, несколько	**something** что-то, что-нибудь	**somebody** кто-то, кто-нибудь, кое-кто	**somewhere** где-то, где-нибудь, куда-нибудь
Вопросительное предложение	**any** какой-то, какой-нибудь	**anything** что-нибудь	**anybody** кто-нибудь	**anywhere** где-нибудь, куда-нибудь
Отрицательное предложение	**any** никакой, ни один	**anything** ничего, ничто	**anybody** никто	**anywhere** нигде, никуда
Отрицательное предложение	**no** никакой, ни один	**nothing** ничего, ничто	**nobody** никто	**nowhere** нигде, никуда
Все типы	**every** каждый, все	**everything** все	**everybody** все, каждый	**everywhere** везде

When we were on holiday, we visited **some** very interesting places. *Когда мы были в отпуске, мы посетили **несколько** очень интересных мест.*

Do you know **any** good hotels in London? *Вы знаете **какие-нибудь** хорошие отели в Лондоне?*

No translation is correct. ***Ни один** перевод не верен.*

Somebody is waiting for you in the hall. ***Кто-то** ждет вас в холле.*

Were you **anywhere** yesterday? *Вы были **где-нибудь** вчера?*

Should we bring **anything** to the meeting? *Должны ли мы принести **что-нибудь** на встречу?*

His report wasn't printed **anywhere.** *Его доклад **нигде** не был напечатан.*

His report was printed **nowhere.** *Его доклад **нигде** не был напечатан.*

Указательные местоимения (The Demonstrative Pronouns)

	Местоимения	Подлежащее	Дополнение	Определение
Ед. число	**this** этот, эта, это	**This** is my book. ***Это** моя книга.*	Show me **this.** *Покажите мне **это.***	**This** book is mine. ***Эта** книга моя.*
	that тот, та, то	**That** is his book. ***То** его книга.*	Did you see **that?** *Вы видели **то?***	**That** book is his. ***Та** книга его.*
Мн. число	**these** эти (это)	**These** are my books. ***Это** мои книги.*	I will take **these.** *Я возьму **эти.***	**These** books are mine. *Эти книги **мои.***
	those те (то)	**Those** are his books. ***То** его книги.*	I don't like **those.** *Мне не нравятся **те.***	**Those** books are his. ***Те** книги его.*

this/these обозначают то, что ближе к говорящему во времени и пространстве;

that/those обозначают то, что дальше от говорящего во времени и пространстве.

Many, much, (a) few, (a) little, a lot of

С исчисляемыми сущ.	**many/a lot of** много	**few** мало	**a few** несколько
	There are **many/a lot of** pictures in the book. *В книге **много** картинок.*	There are **few** pictures in the book. *В книге **мало** картинок.*	There are **a few** pictures in the book. *В книге **несколько** картинок.*
С неисчисляемыми сущ.	**much/a lot of** много	**little** мало	**a little** немного
	He has **much/a lot of** milk in the cup. *У него в чашке **много** молока.*	He has **little** milk in the cup. *У него в чашке **мало** молока.*	He has **a little** milk in the cup. *У него в чашке **немного** молока.*
С глаголами	**much/a lot** много	**little** мало	**a little** немного
	He works too **much**. *Он слишком **много** работает.*	He rests very **little**. *Он очень **мало** отдыхает.*	He knows French **a little.** *Он знает **немного** французский.*

A lot (of) употребляется главным образом в утвердительных предложениях.

Количественные числительные (Cardinal Numerals)

1 – one 2 – two 3 – three 4 – four 5 – five 6 – six 7 – seven 8 – eight 9 – nine 10 – ten	11 – eleven 12 – twelve 13 – thirteen 14 – fourteen 15 – fifteen 16 – sixteen 17 – seventeen 18 – eighteen 19 – nineteen 20 – twenty	21 – twenty-one 22 – twenty-two 30 – thirty 40 – forty 50 – fifty 60 – sixty 70 – seventy 80 – eighty 90 – ninety 100 – a (one) hundred	101 – a (one) hundred and one 102 – a (one) hundred and two 200 – two hundred 1,000 – a (one) thousand 1,001 – a (one) thousand and one 1,032 – a (one) thousand and thirty-two 2,000 – two thousand 2,456 – two thousand four hundred and fifty-six

Порядковые числительные (Ordinal Numerals)

1st – first 2nd – second 3rd – third 4th – fourth 5th – fifth 6th – sixth 7th – seventh 8th – eighth 9th – ninth 10th – tenth	11th – eleventh 12th – twelfth 13th – thirteenth 14th – fourteenth 15th – fifteenth 16th – sixteenth 17th – seventeenth 18th – eighteenth 19th – nineteenth 20th – twentieth	21st – twenty-first 22nd – twenty-second 30th – thirtieth 40th – fortieth 50th – fiftieth 60th – sixtieth 70th – seventieth 80th – eightieth 90th – ninetieth 100th – hundredth
101st – hundred and first 102nd – hundred and second 200th – two hundredth 300th – three hundredth		1,000th – thousandth 1,003rd – thousand and third 1,000,000th – millionth

Степени сравнения прилагательных и наречий (The Degrees of Comparison of Adjectives and Adverbs)

В английском языке качественные прилагательные, так же как и в русском языке, имеют степени сравнения: положительную, сравнительную и превосходную.

Все односложные прилагательные и некоторые двусложные, оканчивающиеся на **-y, -er, -ow**, образуют сравнительную степень путем прибавления суффикса **–er**, и превосходную степень – путем прибавления суффикса **-est:**

warm – warm**er – the** warm**est**

happy – happ**ier – the** happ**iest**

clever – clever**er – the** clever**est**

narrow – narrow**er – the** narrow**est**

This is a **shorter** text. *Это **более короткий** текст.*

Who is **the youngest** engineer in your office? *Кто **самый молодой** инженер в вашей конторе?*

При образовании степеней сравнения путем прибавления суффиксов **-er, -est** происходят следующие орфографические изменения:

1. Если прилагательные в положительной степени оканчиваются на немую букву **-e,** то прибавляется только **-r, -st:** larg**e – larger – the** larg**est.**

2. Если прилагательное в положительной степени оканчивается на согласную букву, перед которой стоит гласная, произносящаяся кратко, то конечная согласная буква удваивается: ho**t** – ho**tter** – the ho**ttest**.

3. Если прилагательное в положительной степени оканчивается на **-y,** перед которой стоит согласная буква, то **-y** переходит в **-i,** а затем прибавляются суффиксы **-er, -est:** earl**y – earlier – the** earl**iest.**

Многосложные прилагательные и большинство двусложных образуют сравнительную степень при помощи слов **more** (более) или **less** (менее), а превосходную степень – при помощи слов **most** (самый, наиболее) или **least** (самый не):

wonderful – **more** wonderful – **the most** wonderful

interesting – **less** interesting – **the least** interesting

This is a **more interesting** book. *Это **более интересная** книга.*

That is a **less interesting** book. *То – **менее интересная** книга.*

Некоторые прилагательные образуют степени сравнения от других корней:

good – **better** – **the best**

bad – **worse** – **the worst**

little – **less** – **the least**

many – **more** – **the most**

much – **more** – **the most**

Перед прилагательным в превосходной степени обычно стоит определенный артикль, который относится к последующему существительному; это существительное иногда имеется в предложении, а иногда только подразумевается:

London is **the largest city** in England. *Лондон – **самый большой город** в Англии.*

These terms are **the most acceptable** to us. *Эти условия **самые приемлемые** для нас.*

В английском языке после прилагательного в сравнительной степени всегда стоит союз **than**, в отличие от русского языка, где этот союз опускается:

I am **older than** he is. *Я **старше** его.*

В сравнительных конструкциях для избежания повторения существительного часто употребляется местоимение **one** для единственного числа и **ones -** для множественного числа:

This book is more interesting than that **one.** *Эта книга интереснее той.*

I don't like these books. Give me more interesting **ones,** please. *Мне не нравятся эти книги. Дайте мне более интересные книги.*

Степени сравнения наречий образуются так же, как и степени сравнения прилагательных, и по форме они всегда совпадают:

late – lat**er** – lat**est**

early – earl**ier** – earl**iest**

wonderfully – **more** wonderfully – **most** wonderfully

well – **better** – **best**

badly **– worse – worst**

little **– less – least**

much **– more – most**

Перед наречием в превосходной степени артикль никогда не употребляется, но для усиления значения превосходной степени часто после наречия употребляется **of all:**

He speaks English **best of all.** *Он говорит по-английски **лучше всех.***

Модальные глаголы и их эквиваленты
(The Modal Verbs and their equivalent forms)

Verb	Present	Past	Future
can **to be able to** *мочь, уметь,* *быть в состоянии* (физическая/умственная способность)	**can** **am/is/are able to** I *can* swim. / I *am able to* swim. Я *умею* плавать. I *cannot (can't)* swim. *Can* you swim?	**could** **was/were able to** I *could* swim. / *I was able to* swim. Я *умел* плавать. I *could not (couldn't)* swim. *Could* you swim?	**will/shall be able to** I *shall/will be able to* swim. Я *смогу* плавать. I *shall not (shan't)/will not (won't) be able to* swim. *Will* you *be able* to swim?
1) may **to be allowed to** *можно* (разрешение); **2) may/might** *возможно, может быть*	**may** **am/is/are allowed to** 1) You *may* go home. You *are allowed to* go home. Вы *можете* пойти домой. You *may not* go home. *May* I go home now? 2) They *may/might* still be working. *Возможно,* они все еще работают.	**was/were allowed to** I *was allowed to* go home. Мне *разрешили* идти домой. I *was not (wasn't) allowed to* go home. *Were* you *allowed to* go home? **might** (в косвенной речи) He said I *might* go. Он сказал, что я *могу* уйти.	**will/shall be allowed to** You *will be allowed to* go home. Вам *разрешат* идти домой. You *will not (won't) be allowed to* go home. *Will* you *be allowed to* go home?
must *должен*	**must** I *must* do it now. Я *должен* сделать это сейчас. I *must not (mustn't)* do it now. *(нельзя)* *Must* I do it now?	——	——

Verb	Present	Past	Future
have to *должен, приходится, вынужден* (выражает вынужденную необходимость вследствие сложившихся обстоятельств)	**have/has to** I *have to* do it now. He *has to* do it now. Мне (ему) *приходится* (я/он *вынужден*) это сделать сейчас. I *don't have to* do it now. He *doesn't have to* do it now. *Do* you *have to* do it now? *Does* he *have to* do it now?	**had to** I *had to* go there. *Я должен был* (мне *пришлось, надо было*) пойти туда. I *didn't have to* go there. *Did* you *have to* go there?	**will/shall have to** You *will have to* go there. Вы *должны будете* (вам *надо будет/придется*) пойти туда. You *won't have to* go there. *Will* you *have to* go there?
to be to *должен* (выражает необходимость, предусмотренную планом)	**am/is/are to** He *is to* do it at 6. Он *должен* сделать это в 6 часов. He *isn't to* do it at 6. *Is* he *to* do it at 6?	**was/were to** He *was to* do it at 6. Он *должен был* сделать это в 6 часов. He *wasn't to* do it at 6. *Was* he *to* do it at 6?	——
should *следует, должен* (выражает совет)	**should** You *should* go there. Вам *следует* (вы *должны*) идти туда. You *should not (shouldn't)* go there. *Should* I go there?	——	——
ought to *следует, должен* (выражает моральный долг)	**ought to** We *ought to* help her. Нам *следует* (мы *должны*) ей помочь. We *ought not (oughtn't) to* help her. *Ought* we *to* help her?	——	——

Типы и структура английских вопросов (The Types and Structure of English Questions)

General questions	*Do* you *work* at a plant? *Does* he *work* at a plant? *Did* you *work* at a plant? *Did* you *go* to the plant? *Will* you *work* at a plant?	Yes, I *do*. No, I *don't*. Yes, he *does*. No, he *doesn't*. Yes, I *did*. No, I *didn't*. Yes, I *did*. No, I *didn't*. Yes, I *will*. No, I *won't.*
Alternative questions	*Do* you *work* at a plant *or* at a factory? *Does* he *work* at a plant *or* at a factory? *Did* you *work* at a plant *or* at factory? *Did* you *go* to the plant *or* to the factory? *Will* you *work* at a plant *or* at a factory?	At a plant. / At a factory. At a plant. / At a factory. At a plant. / At a factory. To the plant. / To the factory. At a plant. / At a factory.
Special questions	*Where do* you *work*? *What does* he *like* to do in the evening? *Who did* you *see* yesterday? *When did* you *go* to the plant? *Why will* he *go* to Moscow? *What* foreign languages *does* he *speak*? *How many texts are* you *going* to translate?	I work at the plant. He likes reading. I saw my brother. I went to the plant in the morning. Because he likes the city. He speaks English and German. I am going to translate two texts.
	Who works at the plant? *Who finished* your work yesterday? *Whose* friend *will return* soon?	My sister *does*. My brother *did*. Her friend *will.*
Tag questions	You *work* much, *don't* you? You *don't work* much, *do* you? You *worked* much, *didn't* you? You *didn't work* much, *did* you? You *will work* much, *won't* you? You *will not work* much, *will* you?	Yes, I *do*. No, I *don't*. No, I *don't*. Yes, I *do*. Yes, I *did*. No, I *didn't.* No, I *didn't*. Yes, I *did*. Yes, I *will*. No, I *won't*. No, I *won't*. Yes, I *will*.

Общий вопрос (General Question)

Прежде чем задать такой вопрос, нужно посмотреть, какие глаголы содержатся в повествовательном предложении.

Если в предложении есть глаголы **is, am, are, was, were, will, shall, can, could, must, may, might, should, would, dare, need, ought, have, has, had**, то нужно лишь поставить один из этих глаголов на первое место:

He is at home. – **Is he** at home?

She has given them some money. – **Has she** given them any money?

Ha can play the guitar very well. – **Can he** play the guitar very well?

Если в предложении нет таких глаголов, то придется прибегнуть к помощи вспомогательного глагола **do:**

They live in Moscow. – **Do they live** in Moscow?

He knows two foreign languages. – **Does he know** two foreign languages?

She bought a car in August. – **Did she buy** a car in August?

Специальный вопрос (Special Question)

Обычный порядок слов в вопросительных предложениях, начинающихся с **where, when, why, how**:

They are going to travel by car. – How are they going to travel?

She will do the work in two days' time. – When will she do the work?

He has never been to London. – Where has he never been?

В вопросительных предложениях, начинающихся со слов **who, whose, what, which**, **whom**, которые являются дополнением, порядок слов будет следующим:

He didn't do his homework. – What didn't he do?

She wore a green shirt. – Which shirt did she wear?

This is my friend. – Whose friend is this?

Если вопросительные слова выступают в предложении в роли подлежащего, то порядок слов остается неизменным:

Tom asked the question. – **Who asked** the question?

Your phone is ringing. – **Whose phone is** ringing?

The red colour suits you. – **What colour suits** you?

Альтернативный вопрос (Alternative question)

Такой вопрос строится так же, как общий, но здесь присутствует выбор:

Does your working day last eight **or** nine hours? – Eight hours.

Разделительный вопрос (Tag question)

Разделительный вопрос заканчивается словами: **не правда ли, не так ли**. Во второй (вопросительной) части используется такое же личное местоимение, как и в первой, и глагол стоит в том же времени, что и в первой (утвердительной) части.

She has already come, **hasn't she**? *Она уже пришла, **не так ли**?*

It isn't raining now, **is it**? *Сейчас нет дождя, **не так ли**?*

Если в первой части предложения содержится отрицание, то во второй части его не будет, и наоборот.

Если предложение повелительное, то вторая часть будет выглядеть так:

Open the window, **will you**? *Не откроете ли окно?*

Let's go to the country, **shall we**? *Давайте поедем за город, не возражаете?*

Времена глагола в активном залоге (The Active Voice)

Действительный залог в английском языке выражает действие, совершаемое *самим* подлежащим (лицом или предметом).

	Present	**Past**	**Future**
Simple/ Indefinite	**+ подл. + V /$V_{s\ (es)}$ (3 л.ед.ч)** **- подл. + don't/doesn't + V** **? Do/Does +подл. +V** 1) постоянные состояния; 2) повторяющиеся, повседневные действия; 3) непреложная истина, закон природы; 4) действия, происходящие по программе, расписанию. ***Обычно используется со словами:*** **usually, always, every day/week/month/year, on Mondays/ Tuesdays, in the morning/afternoon/ evening, at night/the weekend**	**+ подл. + $V_{2\ (ed)}$** **- подл. + didn't + V** **? Did + подл. + V** 1). действия, произошедшие в прошлом в определенное указанное время (when); 2) повторяющиеся в прошлом действия, которые более не происходят (always, often, usually); 3) действия, происходящие непосредственно одно за другим в прошлом; 4) когда речь идет о людях, которых нет в живых. ***Обычно используется со словами:*** **yesterday, last night, two days/weeks/months/ years ago, then, when, in 1992**	**Will + V** 1) действия, которые возможно произойдут, а возможно нет; 2) для предсказаний; 3) для угроз, предупреждений; 4) для обещаний, решений, принятых в момент речи; 5) со словами hope, think, believe, expect, I'm sure, I'm afraid, probably, perhaps. ***Обычно используется со словами:*** **tomorrow, the day after tomorrow, next week/month/year, tonight, soon, in a week/month/year**

Примеры – Группа времен Simple:

Present Simple Tense:

(+) I go to work every day. / He goes to work every day.

(?) Do you go to work every day? / Does he go to work every day?

(-) I don't go to work every day. / He doesn't go to work every day.

Past Simple Tense:
(+) I went to work yesterday. / He finished work yesterday.
(?) Did you go to work yesterday? / Did he finish work yesterday?
(-) I didn't go to work yesterday. / He didn't finish work yesterday.

Future Simple Tense:
(+) I will go to work tomorrow. / He will go to work tomorrow.
(?) Will you go to work tomorrow ? / Will he go to work tomorrow?
(-) I will not go to work tomorrow. / He won't go to work tomorrow.

Continuous/ Progressive	**Am/ is/ are + V_{ing}** 1) действия, происходящие в момент речи; 2) временные действия, происходящие в наст. период времени, но не обязательно в момент речи; 3) действия, происходящие слишком часто и по поводу которых мы хотим высказать раздражение или критику (always); 4) действия, заранее запланированные на будущее. ***Обычно используется со словами:*** **now, at the moment, these days, at present, always, tonight, still.**	**Was/were + V_{ing}** 1) временные действия, продолжавшиеся в прошлом в момент, о котором мы говорим. Мы не знаем, когда началось и когда закончилось это действие; 2) временное действие, продолжавшееся в прошлом, когда произошло другое короткое действие; 3) два и более одновременных действия; 4) для описания обстановки, на фоне которой происходили события рассказа. ***Обычно используется со словами:*** **while, when, as, all day/night/morning.**	**Will be+ V_{ing}** 1) для действий, которые будут в процессе в определенный момент в будущем; 2) действия, которые определенно произойдут в результате режима дня или договоренности; 3) когда мы спрашиваем о чьих-то планах на ближайшее будущее (с корыстной целью). ***Обычно используется со словами:*** **this time tomorrow.**

Примеры – Группа времен Continuous:

Present Continuous Tense:
(+) I am working now. / He is working now.
(?) Are you working now? / Is he working now?

(-) I am not working now. / He isn't working now.

Past Continuous Tense:

(+) I was working. / He was working.

(?) Were you working? / Was he working?

(-) I was not working. / He wasn't working.

Future Continuous Tense:

(+) I will not be working.

(?) Will he be working?

(-) They will not be working.

Примеры – Группа времен Perfect:

Present Perfect Tense:

(+) I have done my work. / He has done his work.

(?) Have you done your work? / Has he done his work?

(-) I have not done my work. /He has not done his work.

Past Perfect Tense:

(+) I had done my work. / He had done his work.

(?) Had you done your work? / Had he done his work?

(-) I had not done my work. /He had not done his work.

Future Perfect Tense:

(+) I will have done my work.

(?) Will he have done his work?

(-) They will not have done their work.

Примеры – Группа времен Perfect Continuous:

Present Perfect Continuous Tense:

(+) I have been doing my work for a week. / He has been doing his work for a week.

(?) Have you been doing you work for a week? / Has he been doing his work for a week?

(-) I have not been doing my work for a week. / He has not been doing his work for a week.

Past Perfect Continuous Tense:

(+) I had been doing my work for a week. / He had been doing his work for a week.

(?) Had you been doing you work for a week? / Had he been doing his work for a week?

(-) I had not been doing my work for a week. / He had not been doing his work for a week.

Future Perfect Continuous Tense:

(+) I will have been doing my work for a week.

(?) Will you have been doing your work for a week?

(-) He will not have been doing his work for a week.

Perfect	**Have/has + $V_{3(ed)}$** 1) действия, которые произошли в прошлом в неопределенное время. Время не важно, важен результат; 2) действия, которые начались в прошлом и все еще продолжаются в настоящем (non-continuous verbs); 3) действия, которые завершились совсем недавно и их результаты ощущаются в настоящем; 4) со словами «today, this morning/ afternoon», когда обозначенное ими время еще не истекло, а действие уже совершилось. ***Обычно используется со словами:*** **for, since, already, just, always, recently, ever, how long, yet, lately, never, so far, today, this morning/ afternoon/week/month, year**	**Had + $V_{3\ (ed)}$** 1) действие, которое произошло раньше другого действия в прошлом. *Которое раньше - Past Perfect, позже – Past Simple*; 2) действия, которые произошли до указанного действия в прошлом. ***Обычно используется со словами:*** **before, after, already, just, till/until, when, by, by the time**	**Will have + $V_{3\ (ed)}$** 1) для действий, которые завершатся до определенного периода в будущем. ***Обычно используется со словами:*** **by the time, until, before**

Perfect Continuous	**Have/has been + V_{ing}** 1) действия, которые начались в прошлом и продолжаются в настоящем; 2) действия, которые длились какой-то период, завершились и от этого действия есть результат в настоящем. ***Обычно используется со словами:*** **for, since, all morning/afternoon /week/day, how long**	**Had been + V_{ing}** 1) подчеркивает действие, которое длилось какой-то период времени в прошлом и закончилось до другого действия или периода времени в прошлом; 2) подчеркивает действие, которое длилось какой-то период времени в прошлом и от этого действия в прошлом был результат. ***Обычно используется со словами:*** **for, since, how long, before, until, by, by the time**	**Will have been + V_{ing}** 1) подчеркивает действие, которое будет длиться какой-то период и завершится до определенного периода в будущем ***Обычно используется со словами:*** **by the time, until, before**

Пассивный залог (The Passive Voice)

Если подлежащее в предложении само совершает действие (я иду, он рисует, мы купили, они будут лететь), то тогда нам понадобится активная форма. Если же над подлежащим совершают что-то, его подвергают воздействию (деревья сажают, воду налили, меня пригласили, нас поведут), значит, используем страдательную (пассивную) конструкцию.

Пассивный залог

	Present	**Past**	**Future**
Формула Simple	*is/am/are + V_{ed} (V_3)*	*was/were + V_{ed} (V_3)*	*will + be + V_{ed}(V_3)*
	Letters are sent every day. – Письма посылают каждый день.	Letters were sent yesterday. – Письма отправили вчера.	Letters will be sent tomorrow. – Письма отправят завтра.

	Present	Past	Future
Формула Continuous	*is/am/are + being + V_{ed} (V_3)*	*was/were + being + V_{ed} (V_3)*	————
	Letters are being sent now. – Письма отправляют сейчас.	Letters were being sent at 5 yesterday. – Письма вчера отправляли в 5 часов.	————
Формула Perfect	*has/have + been + V_{ed} (V_3)*	*had + been + V_{ed} (V_3)*	*will + have/has + been + V_{ed} (V_3)*
	Letters have been already sent. – Письма уже отправили.	Letters had been sent before he phoned. – Письма отправили до того, как он позвонил.	Letters will have been sent by 5 tomorrow. – Письма отправят завтра до 5 часов.
Perfect Continuous	————	————	————

Обратите внимание, что Perfect Continuous вообще не используется в страдательном залоге. А время Continuous не имеет будущего отрезка. Вопросительная и отрицательная форма во всех временах идентичная.

?: Вспом. глагол + подл. + сказуемое
—: Подлежащее + вспом. глагол + not + сказуемое

Were you invited to the party yesterday? – Тебя пригласили на вечеринку вчера?

I wasn't invited to the party yesterday. – Меня не пригласили на вечеринку вчера.

Are the flowers being planted now? – Цветы сейчас сажают?

The trees are not being planted now. – Деревья сейчас не сажают.

Употребление различных времен полностью соответствует их аналогам в активном залоге.

Сравнение Active и Passive

	Active	Passive
Present Simple	She writes a new play for the theatre every year. – Она пишет новую пьесу для театра каждый год.	A new play for the theatre is written by her every year. – Новая пьеса для театра написана ею каждый год.
Past Simple	He stole food from the shop. – Он украл еду в магазине.	Food was stolen from the shop by him. – Еда была им украдена в магазине.
Future Simple	They will show a new musical on TV next month. – Они покажут новый мюзикл по телевидению в следующем месяце.	A new musical will be shown on TV next month. – Новый мюзикл покажут по телевидению в следующем месяце.
Present Continuous	My dad is repairing the car now. – Мой папа сейчас ремонтирует машину.	The car is being repaired by my dad now. – Машина сейчас ремонтируется папой.
Past Continuous	At 9 my brother was loading the truck. – В 9 часов мой брат разгружал грузовик.	At 9 o'clock the truck was being loaded by my brother. – В 9 часов грузовик разгружался моим братом.
Present Perfect	My daughter has already translated the whole text. – Моя дочь уже перевела весь текст.	The whole text has been already translated by my daughter. – Весь текст уже переведен моей дочерью.
Past Perfect	When we came to the kitchen, he had eaten the pie. – Когда мы вошли в кухню, он уже съел пирог.	When we came to the kitchen, the pie had been eaten. – Когда мы вошли в кухню, пирог был уже съеден.
Future Perfect	We will have finished the work by 6 tomorrow. – Завтра мы закончим работу к шести.	The work will have been finished by 6 tomorrow. – Работа будет закончена завтра к шести.

Future Simple Tense / Be going to
для выражения будущего времени

Способ	Объяснение	Примеры
1. Выражение будущего с помощью времени **Future Simple**	Употребляется для выражения действия, которое **совершится или будет совершаться в будущем.** Часто используется, когда говорящий решает что-то сделать **во время разговора.** Употребляется, когда говорящий **обещает что-то сделать.** Используется **при предсказании** будущих событий.	• Mary **will call** us. – Мария позвонит нам (действие совершится в будущем). • I don't understand this grammar rule. Don't worry, I **will explain** it to you. – Я не понимаю этого правила. Не волнуйся, я объясню его тебе (решение принято во время разговора). • I **won't tell** Sally what you've said – Я не скажу Салли о том, что ты сказал (обещание). • I think we **will win** this game! – Я думаю, мы выиграем эту игру (предсказание).
2. Выражение будущего с помощью конструкции **to be going to**	• Употребляется, когда мы говорим о наших **планах на будущее** и о том, что мы **уже решили сделать.** • **To be going to** в этом случае переводится как **собираться, намереваться.**	• I **am going to** repair my car. – Я **собираюсь** отремонтировать свою машину. • My brother **is going to** marry next year. – Мой брат **собирается** жениться в следующем году.

Герундий (The Gerund)

Герундий – это глагол, у которого нет категории лица, числа, времени и наклонения.

Так как соответствий герундию в русском языке нет, следует тщательно изучить правила его образования, формы, функции и случаи употребления.

Герундий может выполнять функции любого члена предложения, но чаще всего он играет роль существительного или глагола.

По выполняемым функциям в предложении герундий имеет сходство с инфинитивом.

Очень легко ошибиться в выборе между герундием и инфинитивом. Поэтому необходимо знать их отличия друг от друга.

Формы

Время (Tense)	Активный залог (Active)	Пасивный залог (Passive)
Simple (отражает настоящее или будущее)	Правило: **глагол + ing**	Правило: **being + Participle II (**3 форма глагола)
	He admitted to **stealing** a wallet. – Он признался в краже кошелька.	I like **being helped** with my homework. – Мне нравится, когда мне помогают с домашним заданием.
	Mary hates **cleaning** the flat. – Мэри ненавидит убирать квартиру.	You enjoy **being photographed.** – Тебе нравится, когда тебя фотографируют.
Perfect (используется, когда действие, которое он выражает, предшествует другому действию)	Правило: **having + Participle II**	Правило: **having been + Participle II**
	They are proud **of having talked** with this person. – Они гордятся тем, что разговаривали с этим человеком.	We called the police when we found our **house having been robbed.** – Мы позвонили в полицию, когда обнаружили, что наш дом был ограблен.
	I didn't approve of my daughter **having sold** the car. – Я не одобряю, что моя дочь продала машину.	Mike heard of **having been landed** a job. – Майк услышал, что его взяли на работу.

Употребление и функции в предложении

Случаи употребления	Примеры с переводом
В качестве существительного	•**Reading** is the best pastime. – Чтение – это лучшее времяпрепровождение.
После глаголов **admit (допускать), anticipate (ожидать), appreciate (оценивать), avoid (избегать), consider (рассматривать), continue (продолжать), delay (откладывать), escape (совершать побег), finish (завершать), imagine (воображать), practise (применять), report (сообщать), suggest (предлагать)** и др.	•My sister **avoided looking** at him. – Моя сестра избегала смотреть на него. •I **finished training** at 9 p.m. – Я закончила тренироваться в 9 часов. •Mark and Jane didn't **consider coming** back home. – Марк и Джэйн не рассматривали возвращаться домой.

Случаи употребления	Примеры с переводом
После таких глаголов, как **dislike (испытывать неприязнь), enjoy (получать удовольствие), hate (ненавидеть), like (нравиться), love (любить), которые выражают предпочтение** **НО!** с выражениями *would love (очень хотеть), would like (хотеть), would prefer (предпочесть) используется инфинитив.*	•She **hates watching** TV news. – Она ненавидит смотреть новости. •I **like eating** sweeties. – Мне нравится кушать сладости. •His neighbour **loves fishing**. – Его сосед обажает ловить рыбу. •I *would like to speak* with your father. – Я бы хотела поговорить с твоим отцом.
После таких выражений как **be busy (быть занятым), it's no use (ни к чему), it's worth (стоит), there's no point (нет смысла), have trouble (испытывать затруднения), what's the use of (какой смысл)** и др.	•**There is no point in worrying**. – Нет никакого смысла волноваться. •My mother **was busy cooking** the dinner for me. – Моя мама была занята приготовлением обеда для меня. •**What's the use of going** there? – Какой смысл туда идти?
После **глаголов spend (тратить), waste (тратить впустую), lose (терять)**	•Tara **wasted** a lot of time **trying** to explain her point of view. – Тара потратила очень много времени стараясь объяснить свою точку зрения. •**He lost all his money playing in gamble**. – Он потерял все свои деньги, играя в азартные игры.
После **предлогов**	•You suspect me **of stealing** your bracelet. – Вы подозреваете меня в том, что я украл ваш браслет. •They have interest **in playing** chess. –Они интересуются шахматами.
После предлога **"to" с такими выражениями, как look forward to (с нетерпением ждать), be used to (привыкнуть), object to (возражать), in addition to (в дополнение к)** и др.	•I am **looking forward to meeting** with him. – Я с нетерпением жду встречи с ним. •This employee **objects to working** for that company. – Этот служащий отказывается работать на ту компанию.

Случаи употребления	Примеры с переводом
После глаголов **hear (слышать), listen to (слушать), notice (замечать), see (видеть), watch (смотреть),** чтобы описать неполное действие	•Olga **heard** your parents **speaking** about future. – Ольга слышала, как родители разговаривали о будущем (Ольга слышала только часть разговора). •I **saw** our football team **playing** game. – Я видела, как играла наша футбольная команда (Я видела только часть игры).

Инфинитив (The Infinitive)

Инфинитив является одной из неличных форм глагола, обозначающей действие и отвечающей на вопросы: **что делать? что сделать?** Отличительным признаком инфинитива является наличие частицы **to** перед глаголом, однако в некоторых случаях она может опускаться.

Образование основных форм инфинитива

Инфинитив (Infinitive)	Активный залог (Active Voice)	Пассивный залог (Passive Voice)*
Неопределенный (Indefinite)	to do, to look, to tell, to know, to ask	to be done, to be looked, to be told, to be known, to be asked
Длительный (Continuous)**	to be doing, to be watching, to be saying, to be writing	–
Совершенный (Perfect)	to have done, to have asked, to have seen, to have worked	to have been done, to have been asked, to have been seen, to have been known
Совершенный длительный (Perfect Continuous)**	to have been doing, to have been watching, to have been painting, to have been laughing	–

*Обратите внимание, что формы пассивного залога есть только у переходных глаголов.

**Обратите внимание, что некоторые глаголы в английском языке не могут принимать форму Continuous (например, to know, to seem, to mind, и другие).

Употребление основных форм инфинитива

Инфинитив (Infinitive)	Активный залог (Active Voice)	Пассивный залог (Passive Voice)
Неопределенный (Indefinite) обозначает действие (или состояние), одновременное с действием (или состоянием), выраженным глаголом в личной форме	• I like **to photograph** my children. – Я люблю фотографировать своих детей. • I want **to listen** to her. – Я хочу послушать ее. • She can't **tell** her the truth. – Она не может сказать ей правду.	• My children like **to be photographed**. – Мои дети любят, чтобы их фотографировали. • She wants **to be listened** to. – Она хочет, чтобы ее послушали. • She can't **be told** the truth. – Ей нельзя говорить правду.
Длительный (Continuous) – действие, выраженное инфинитивом, обозначает текущее время, одновременно происходящее с действием, выраженным глаголом в личной форме	• He seems **to be looking for** something. – Кажется, он что-то ищет. • It is wonderful **to be sitting** here in the sun. – Как хорошо сидеть здесь, на солнце. • She must still **be writing** this letter. – Должно быть, она все еще пишет это письмо.	–
Совершенный (Perfect) – действие, выраженное инфинитивом, обозначает прошедшее время относительно действия, выраженного глаголом в личной форме	• They should **have finished** this project by now. – Они уже должны были закончить этот проект. • He seems **to have forgotten** about this deal. – Похоже, что он забыл об этой сделке. • I am sorry not **to have phoned** you. – Мне жаль, что я тебе не позвонил.	• This project should **have been finished** by now. – Этот проект уже должен был быть закончен. • This deal seems **to have been forgotten** about. – Похоже, что об этой сделке забыли. • I am glad you **have been contacted** by them. – Я рад, что они связались с тобой.

Инфинитив (Infinitive)	Активный залог (Active Voice)	Пассивный залог (Passive Voice)
Совершенный длительный (Perfect Continuous) – действие, выраженное инфинитивом, происходило на протяжении определенного времени перед действием, выраженным глаголом в личной форме	• They turned out **to have been preparing** for the exam. – Оказалось, что они готовились к экзамену. • She seems **to have been looking** after him for a long time. – Кажется, что она присматривала за ним на протяжении долгого времени. • I must **have been watching** TV when you knocked on the door. – Должно быть, я смотрела телевизор, когда ты постучал в дверь.	–

Употребление инфинитива без частицы to

Случай	Примеры
1. После модальных глаголов	• **Could** you **help** me? – Вы не могли бы мне помочь? • You **must do** it. – Ты должен сделать это. • You **should have called** her. – Ты должен был позвонить ей. • She **may join** us later. – Может быть, она позже присоединится к нам.
2. После конструкций **would rather, had better**	• **I'd rather check** the weather forecast now. – Я лучше сейчас проверю прогноз погоды. • **You'd better get** off the bus here. – Вам лучше выйти из автобуса здесь.
3. После глагола **do**, используемого для усиления действия	• I **do know** what you mean. – Я знаю, что ты имеешь в виду. • I **did try**! – Я старался!
4. После глаголов чувственного восприятия (**to see, to hear, to feel, to watch,** etc.), а также глаголов **to let и to make** **Запомните! При употреблении этих глаголов в пассивном залоге перед инфинитивом ставится частица **to***	• I **heard** somebody **knock** on the door. – Я слышал, как кто-то постучал в дверь. • **Let** me **buy** you a cup of coffee. – Позволь, я куплю тебе чашку кофе. • I **will make** him **change** his mind. – Я заставлю его поменять свое мнение. • She **was seen** to **leave** the house. – Видели, как она выходила из дома. • He **was made** to **clean** all the mess. – Его заставили убрать весь беспорядок.

Случай	Примеры
5. После **why и why not** в вопросительных предложениях	• **Why not do** it straight away? – Почему бы не сделать это сразу? • **Why hurry up**? We will be there soon. – Зачем торопиться? Мы скоро будем там.
6. После союзов **and, or, except, but, then, as и like**	• I would like **to sit** on the sofa **and read** some book. – Я бы хотел сесть на диван и почитать какую-нибудь книгу. • I was ready for everything **but hear** this kind of news. – Я был готов ко всему, но только не услышать такие новости.
7. Иногда после глаголов **to dare и to help**	• How **dare** you **not listen** to your parents? (= How **dare** you **not to listen** to your parents?) – Как ты смеешь не слушаться своих родителей? **Но после daren't инфинитив всегда без to: I daren't look into his eyes – Я не осмеливаюсь смотреть ему в глаза.* • **Help** me **do** this task, please! (= **Help** me **to do** this task, please!) – Помоги мне сделать это задание, пожалуйста.

Роль инфинитива в английском предложении

Член предложения	Примеры
Подлежащее	**To have** a car is one of the requirements. – Иметь машину – одно из требований.
Именная часть составного именного сказуемого	All I need is **to cut** my hair. – Все, что мне нужно – это подстричь волосы.
Часть составного глагольного сказуемого	You ***must*** **read** this article. – Ты должен прочитать эту статью.
Прямое дополнение	I wanted you **to meet** my friend. – Я хотел, чтобы ты познакомился с моим другом.
Определение	What will be the best way **to begin** with? – С чего лучше начать?
Обстоятельство	I called her **to ask** this question. – Я позвонила ей, чтобы задать этот вопрос.

Сложное дополнение (The Complex Object)
Сложное подлежащее (The Complex Subject)

Сложное дополнение является одним членом предложения и представляет собой **сочетание местоимения в объектном падеже/существительного в общем падеже с инфинитивом** (в некоторых случаях с причастием настоящего времени).

В русском языке не существует аналогичной конструкции.

С английского языка такие предложения переводятся дополнительным придаточным предложением.

В этом обороте существительное или местоимение выражают предмет или лицо, совершающее действие, выраженное инфинитивом, или подвергающееся этому действию.

Конструкция Complex Object

Verb + Object + Infinitive (with or without to) or -ing form

(Глагол + Дополнение + Инфинитив (с частицей *to* или без нее) или причастие настоящего времени)

Общие случаи употребления Complex Object

Употребление	Пример	Объяснение
После глагола в любой форме времени, а также после глагола в форме инфинитива, причастия или герундия	• We **expected Tom to be late**. – Мы ожидали, что Том опоздает. • **Expecting him to finish** the work on his own, I went home. – Ожидая, что он закончит работу самостоятельно, я ушел домой.	• Сказуемое выражено глаголом в форме Past Simple Tense (**expected**), дополнение выражено именем собственным (**Tom**), за дополнением следует инфинитив с частицей to (**to be late**). • **Expecting** – причастие, дополнение выражено местоимением в объектном падеже (**him**), за которым следует инфинитив с частицей to (**to finish**)
В страдательном залоге	I **expect the goods to be loaded** immediately. – Я ожидаю, что товары будут погружены немедленно.	Сказуемое выражено глаголом в Present Simple Tense (**expect**), дополнение выражено существительным (**the goods**), за которым следует инфинитив с частицей to в страдательном залоге (**to be loaded**)

Употребление	Пример	Объяснение
В обороте может быть употреблено 2 или более инфинитивов	I **expect him to come and help** me. – Я ожидаю, что он придет и поможет мне.	Сказуемое выражено глаголом в Present Simple Tense (**expect**), дополнение выражено местоимением в объектном падеже (**him**), за которым следуют 2 глагола в форме инфинитива с частицей to (**to come and help**)

Употребление конструкции Verb + Object + Infinitive + to (Глагол + Дополнение + Инфинитив с частицей to)

Употребление	Пример	Объяснение
После глаголов, выражающих желание (**to want – хотеть, to wish – желать, to like – любить**)	Do you **want me to go** with you? – Хочешь, чтобы я пошел с тобой?	Глагол **want**, выражающий желание, употреблен с местоимением в объектном падеже (**me**), за которым следует инфинитив с частицей to (**to go**)
После глаголов, выражающих предположение (**to believe – полагать, считать; to expect – ожидать, to declare – заявлять, to suppose – полагать**)	I **suppose him to be** about fifty. – Я полагаю, что ему лет пятьдесят.	**Suppose** – глагол, выражающий предположение, употреблен с местоимением в объектном падеже (**him**), за которым следует инфинитив с частицей to (**to be**)
После глаголов, выражающих просьбу, приказ, разрешение (**to ask – просить, to allow – разрешать, to order – приказывать**)	She **asked them to behave** themselves. – Она попросила их вести себя хорошо.	Глагол **ask** выражает просьбу, употреблен с местоимением в объектном падеже (**them**), за которым следует инфинитив с частицей to (**to behave**)
После глаголов, требующих дополнения с предлогом (**to wait for – ждать чего-то, to rely on – полагаться на, to count on – рассчитывать на**)	I **count on him to help** me. – Я рассчитываю на то, что он мне поможет.	Глагол **count on** употреблен с местоимением в объектном падеже (**him**), за которым следует инфинитив с частицей to (**to help**)

Употребление конструкции Verb + Object + Infinitive (Глагол + Дополнение + Инфинитив без частицы to)

Употребление	Пример	Объяснение
После глаголов, выражающих восприятие посредством органов чувств (**to see – видеть, to notice – замечать, to feel – чувствовать**)	We did not **see her enter** the room. – Мы не видели, как она вошла в комнату.	Глагол **see** является глаголом чувственного восприятия, употреблен с местоимением в объектном падеже (**her**), за которым следует инфинитив без частицы to (**enter**)
После глаголов **make** (в значении **заставлять**) и **let– позволять**	• **Let me carry** your bag for you. – Позволь мне понести твою сумку. • The customs officer **made Sally open** her case. – Сотрудник таможни заставил Салли открыть чемодан.	• Сказуемое выражено глаголом **let,** после которого употреблено дополнение, выраженное местоимением в объектном падеже (**me**) и инфинитив без частицы to (**carry**). • Сказуемое выражено глаголом в past simple tense (**made**) с дополнением, выраженным именем собственным (**sally**), после которого употреблен инфинитив без частицы to (**open**)

Употребление конструкции Verb + Object + -ing form (Глагол + Дополнение + Причастие настоящего времени)

Употребление	Пример	Объяснение
После глаголов, выражающих восприятие посредством органов чувств, вместо инфинитива может употребляться причастие настоящего времени. В таком случае инфинитив выражает законченное действие, а причастие подчеркивает действие в процессе	Сравните: • I **saw him cross** the street. – Я видел, как он перешел улицу. • I **saw him crossing** the street. – Я видел, как он переходил улицу.	В первом случае инфинитив без частицы to (**cross**) подчеркивает законченность действия, во втором случае причастие **crossing** указывает на сам процесс

Случаи, в которых не употребляется Complex Object

Употребление	Пример	Объяснение
Когда глаголы чувственного восприятия употреблены в переносном значении, Complex Object не употребляется, вместо него используется дополнительное придаточное предложение	I **heard** that he had returned to Moscow. – Я слышал (узнал), что он вернулся в Москву.	Глагол **hear** употреблен в переносном значении «узнавать»
Complex Object не употребляется после таких глаголов, как **to suggest – предлагать; to recommend – советовать; to deny – отрицать**, и некоторых других	I **suggested** that she should go home. – Я предложил ей пойти домой.	Сказуемое выражено глаголом **suggest**, после которого употребляется конструкция **that somebody should do something**

Образование Complex Subject

Подлежащее (существительное или местоимение в именительном падеже)	Сказуемое	Инфинитив	Другие члены предложения
He	**is known**	**to work**	**hard.**
Complex Subject			
Известно, что он работает			**усердно.**

Разница между Complex Object и Complex Subject

Случаи употребления	Complex Object	Complex Subject
После глаголов, выражающих желание (**to want – хотеть, to wish – желать, to like – любить**)	I **wanted him to be** invited here. – Я хотел, чтобы его пригласили сюда.	Не употребляется

Случаи употребления	Complex Object	Complex Subject
После глаголов, выражающих предположение (**to believe – полагать, считать; to expect – ожидать, to declare – заявлять, to suppose – полагать**)	• I **believe him to be** a very good person. – Я полагаю, что он очень хороший человек. (Сказуемое выражено глаголом в Present Simple Tense.) • I **expected her to arrive** on time. – Я ожидал, что она прибудет вовремя. (Сказуемое выражено глаголом в Past Simple Tense.)	• **He is believed to be** a very good person. – Полагают, что он очень хороший человек. (Сказуемое выражено глаголом в страдательном залоге в настоящем времени.) • **She was expected to arrive** on time. – Ожидали, что она прибудет вовремя. (Сказуемое выражено глаголом в страдательном залоге в прошедшем времени.)
После глаголов, выражающих восприятие посредством органов чувств (**to see – видеть, to notice – замечать, to feel – чувствовать**)	We **heard him knock** at the door. – Мы слышали, как он постучал в дверь. (После глагола чувственного восприятия инфинитив употреблен без частицы to.)	**He was heard to knock** at the door. – Слышали, что он постучал в дверь. (После глагола чувственного восприятия в страдательном залоге инфинитив употребляется с частицей to.)
После глаголов, выражающих просьбу, приказ, разрешение (**to ask – просить, to allow – разрешать, to order – приказывать**)	He **asked for the letter to be sent off** immediately. – Он попросил, чтобы письмо было отправлено немедленно. (Сказуемое выражено глаголом в Past Simple Tense.)	**He was asked to send** the letter. – Его попросили отправить письмо. (Сказуемое выражено глаголом в страдательном залоге в прошедшем времени.)
После глаголов **make (в значении заставлять) и let – позволять**	The customs officer **made Sally open** her bag. – Сотрудник таможни заставил Салли открыть свою сумку. (После глагола make инфинитив употреблен без частицы to.)	**Sally was made to open** her bag. – Салли заставили открыть свою сумку. (После глагола make в страдательном залоге инфинитив употребляется с частицей to.)

Случаи употребления	Complex Object	Complex Subject
После глаголов **to seem, to appear – казаться, to prove – оказываться, to happen – случаться**	Не употребляется	**He seems to know** English well. – Кажется, он хорошо знает английский язык. (Глаголы этой группы употребляются в действительном залоге.)
Когда сказуемое выражено глаголом-связкой **to be** со следующими прилагательными: **likely – вероятный, unlikely – маловероятный, certain – определенный**	Не употребляется	**He is likely to know** her address. – Он, вероятно, знает ее адрес.

Согласование времен (The Sequence of Tenses)

Как и в русском языке, в английском есть сложные предложения, которые состоят из главной и придаточной части.

Если в главном предложении сказуемое выражено глаголом в одной из форм прошедшего времени, то в придаточном предложении **употребление времен ограничено.** Правило, которому в этом случае подчиняется употребление времен в придаточном предложении, называется **согласованием времен.**

Правило 1

Если глагол главного предложения имеет форму **настоящего или будущего** времени, то глагол придаточного предложения будет иметь любую форму, которая требуется смыслом предложения. То есть **никаких изменений не произойдет**, согласование времен здесь в силу **не вступает**.

Правило 2

Если глагол главного предложения имеет форму **прошедшего времени** (обычно Past Simple), то глагол придаточного предложения должен быть в форме **одного из прошедших времен.** То есть в данном случае время придаточного предложения **изменится.** Все эти изменения отражены в нижеследующей таблице (показаны наиболее распространенные времена).

Согласование времен

Переход из одного времени в другое	Пример	
Present Simple » Past Simple	He **can speak** French. – Он говорит по-французски.	Boris said that he **could speak** French. – Борис сказал, что он говорит по-французски.
Present Continuous » Past Continuous	They **are listening** to him. – Они слушают его.	I **thought** they **were listening** to him. – Я думал, они слушают его.
Present Perfect » Past Perfect	Our teacher **has asked** my parents to help him. – Наш учитель попросил моих родителей помочь ему.	Mary **told** me that our teacher **had asked** my parents to help him. – Мария сказала мне, что наш учитель попросил моих родителей помочь ему.
Past Simple » Past Perfect	I **invited** her. – Я пригласил ее.	Peter **didn't know** that I **had invited** her – Петр не знал, что я пригласил ее.
Past Continuous » Past Perfect Continuous	She **was crying**. – Она плакала.	John **said** that she **had been crying** – Джон сказал, что она плакала.
Present Perfect Continuous » Past Perfect Continuous	It **has been raining** for an hour. – Дождь идет уже час.	He **said** that it **had been raining** for an hour – Он сказал, что уже час шел дождь.
Future Simple » Future in the Past	She **will show** us the map. – Она покажет нам карту.	I **didn't expect** she **would show** us the map – Я не ожидал, что она покажет нам карту.

Случаи, когда согласование времен не употребляется

1. Если в придаточном предложении сообщается **общеизвестное положение или факт**	• We **convinced** him how important learning English **is**. – Мы убедили его, насколько важно изучение английского. • Even the early doctors **knew** that the washing of hands **prevents** infection. – Еще издавна врачи знали, что мытье рук препятствует распространению инфекции.
2. Если в придаточном предложении сказуемое выражено глаголом в **сослагательном наклонении**	• If your father **were** kind, he **would let** us stay here. – Если бы твой отец был добрым, он бы разрешил нам остаться здесь. • Boris **would not lend** us money, if we **asked** him – Борис не одолжил бы нам деньги, если бы мы его попросили.
3. Если в состав сказуемого придаточного предложения входит модальный глагол **must, need, should**, **ought,** согласование времен **не употребляется.**	• Mary **said** that he **must** call her. – Мария сказала, что он должен позвонить ей. • They **said** they **might** come back early. – Они сказали, что, может быть, вернутся рано.
Однако **can меняется** на **could,** а **may меняется** на **might**	• Boris **said** that he **could** speak French. – Борис сказал, что он говорит по-французски.

Изменение обстоятельств времени и места при согласовании времен

Следует запомнить, что при согласовании времен изменяются также **некоторые слова (обстоятельства времени и места).**

• this » that • these » those • here » there • now » then • yesterday » the day before • next » the next (the following)	• today » that day • tomorrow » the next (following) day • last week (year) » the previous week (year) • ago » before • next week (year) » the next (following) week (year)

Причастие (The Participle)

В английском языке **причастие (the Participle)** — это одна из неличных *форм глагола,* наряду с инфинитивом (the Infinitive) и *герундием* (the Gerund). В английском языке причастие одновременно выполняет функции таких частей речи, как прилагательное, глагол и наречие. В нашем родном языке функции Participle I выполняет деепричастие и отвечает на вопрос: «Что делая?». Английскому языку не известно деепричастие, поэтому **английское причастие совмещает в себе русское причастие и деепричастие**.

Например:

Причастие: Мальчик, листающий журнал…	The boy flipping magazine…
Деепричастие: Просматривая книгу, мальчик нашел много интересных фактов.	Looking through the book, the boy found a lot of interesting facts.

Есть 2 вида причастия: **причастие настоящего времени** (*Participle I, или Present Participle*) и **причастие прошедшего времени** (*Participle II, или Past Participle*).

Причастие настоящего времени (**Participle I, или Present Participle**) образуется путем добавления к основе глагола (инфинитиву, но без частицы **to)** окончания **-ing**. Например: **to work** – работать, **work**ing – **работая**. Чтобы выразить отрицание, перед причастием ставится частица **not**. Например: **not paying** attention – **не обращая** внимание.

Причастие настоящего времени имеет 4 формы (на примере глагола *surprise – удивлять*):

1. **Simple Active** (простое длящееся, действительный залог): **surprising** – удивляющий, удивляя.
2. **Simple Passive** (простое длящееся, страдательный залог): **being surprised** – удивляемый, будучи удивленным.
3. **Perfect Active** (завершенное, действительный залог): **having surprised** – удививший, удивив.
4. **Perfect Passive** (завершенное, страдательный залог): **having been surprised** – был удивлен, будучи удивленным.

Для образования **причастия прошедшего времени** (**Participle II, или Past Participle**) необходимо:

1) у правильных глаголов (Regular Verbs) к основной инфинитивной форме без частицы **to** добавить окончание -ed. **surpris**ed – удивленный;

2) у неправильных глаголов (Irregular Verbs) причастие прошедшего времени соответствует **3-й форме неправильного глагола.**

Причастие 2 в английском языке выполняет в предложении функции **определения к существительному** (**cooked** dinner – **приготовленный** ужин) либо обстоятельства (when **asked** he did not answer – когда его спрашивали, он не отвечал).

Формы причастий

	Participle I		**Participle II**
	Active voice	***Passive voice***	
Simple	surprising	being surprised	surprised
Perfect	having surprised	having been surprised	

Неправильные глаголы (Irregular Verbs)

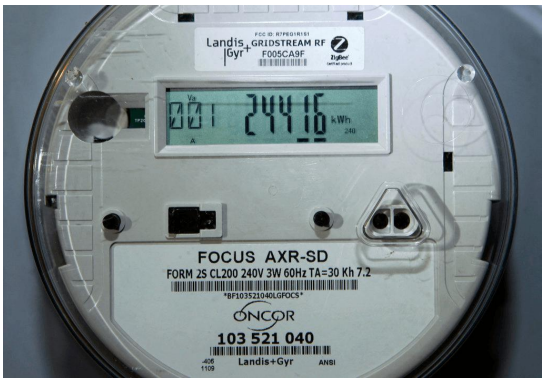
Infinitive	**Past Indefinite**	**Participle II**	**Перевод**
be	was, were	been	быть
become	became	become	становиться
begin	began	begun	начинать
blow	blew	blown	дуть
break	broke	broken	ломать
bring	brought	brought	приносить
build	built	built	строить
buy	bought	bought	покупать
catch	caught	caught	ловить
choose	chose	chosen	выбирать
come	came	come	приходить
do	did	done	делать
draw	drew	drawn	рисовать
dream	dreamt	dreamt	мечтать
drink	drank	drunk	пить
eat	ate	eaten	есть
fight	fought	fought	сражаться
find	found	found	находить
fly	flew	flown	летать
forget	forgot	forgotten	забывать
forgive	forgave	forgiven	прощать
freeze	froze	frozen	замерзать
get	got	got	получать
give	gave	given	давать
go	went	gone	идти
grow	grew	grown	расти

Infinitive	Past Indefinite	Participle II	Перевод
have	had	had	иметь
hear	heard	heard	слышать
hide	hid	hid, hidden	прятать
keep	kept	kept	держать
know	knew	known	знать
leave	left	left	покидать
let	let	let	позволять
lose	lost	lost	терять
make	made	made	делать
meet	met	met	встречать
put	put	put	класть
read	read	read	читать
ring	rang	rung	звонить
run	ran	run	бежать
say	said	said	говорить
see	saw	seen	видеть
sell	sold	sold	продавать
send	sent	sent	посылать
shake	shook	shaken	трясти
shoot	shot	shot	стрелять
show	showed	shown	показывать
sing	sang	sung	петь
sit	sat	sat	сидеть
sleep	slept	slept	спать
sow	sowed	sown	сеять
speak	spoke	spoken	разговаривать
spend	spent	spent	тратить
stand	stood	stood	стоять
sweep	swept	swept	мести
swim	swam	swum	плыть
take	took	taken	брать
teach	taught	taught	учить
tell	told	told	рассказывать
think	thought	thought	думать
throw	threw	thrown	бросать
understand	understood	understood	понимать
wear	wore	worn	носить
win	won	won	выигрывать
write	wrote	written	писать

APPENDIXES

Appendix 1

List of devices

1	**A voltmeter** is an instrument used for measuring electric potential difference between two points in an electric circuit. It is connected in parallel. It usually has a high resistance so that it takes negligible current from the circuit.	
2	**An electricity meter, electric meter, electrical matter, energy meter, or kilowatt-hour meter** is a device that measures the amount of electric energy consumed by a residence, a business, or an electrically powered device. Electric meter or energy meter measures the total power consumed over a time interval.	
3	A **tachometer** (revolution-counter, tach, rev-counter, RPM gauge) is an instrument measuring the rotation speed of a shaft or disk, as in a motor or other machine. The device usually displays the revolutions per minute (RPM) one calibrated analogue dial, by digital display is increasingly common.	
4	**A frequency meter** is an instrument that displays the frequency of a periodic electrical signal. Various types of frequency meters are used. Many are instruments of the reflection type, ordinarily used for measuring low frequencies.	

5	**An anemometer** is a device that measures wind speed and direction. It is a common weather station instrument. The term is derived from the Greek word anemos (wind), and describes any wind-speed instrument used in meteorology. The earliest known description of an anemometer was by Italian architect and author Leon Battista Alberti (1404–1472) in 1450.	
6	**The megohmmeter (or megger)** is an instrument for measuring very high resistance, such as the insulation resistance of electrical cables.	
7	**A laser rangefinder**, also known as a laser telemeter, is a rangefinder that uses a laser beam to determine the distance to an object. The most common form of laser rangefinder operates on the time of flight principle by sending a laser pulse in a narrow beam towards the object and measuring the time taken by the pulse to be reflected off the target and returned to the sender.	
8	**A pyrometer** is a type of remote-sensing thermometer used to measure the temperature of distant objects. Various forms of pyrometers have historically existed. In the modern usage, it is a device that from a distance determines the temperature of a surface from the amount of the thermal radiation it emits, a process is known as pyrometry and sometimes radiometry.	

9	**An incandescent light bulbs, incandescent lamp or incandescent light globe** is an electric light with a wire filament heated until it glows. The filament is enclosed in a glass bulb with a vacuum or inert gas to protect the filament from oxidation. Current is supplied to the filament by terminals or wires embedded in the glass. A bulb socket provides mechanical support and electrical connections.	
10	**Wireless headphones** are Bluetooth enabled devices that help with several audio functions without having to deal with the inconvenience of wires. Bluetooth headphones can be used from a distance of up to nine meters from the phone and are compatible with all android phones, iOS, and Windows devices.	
11	**Gaming monitors** are designed to make the output of your graphics card and CPU look as good as possible while gaming. They're responsible for displaying the final result of all of your computer's image rendering and processing, yet they can vary widely in their representation of color, motion, and image sharpness.	
12	A **tablet is** a wireless touch screen personal computer (PC) that is smaller than a notebook but larger than a smartphone.	

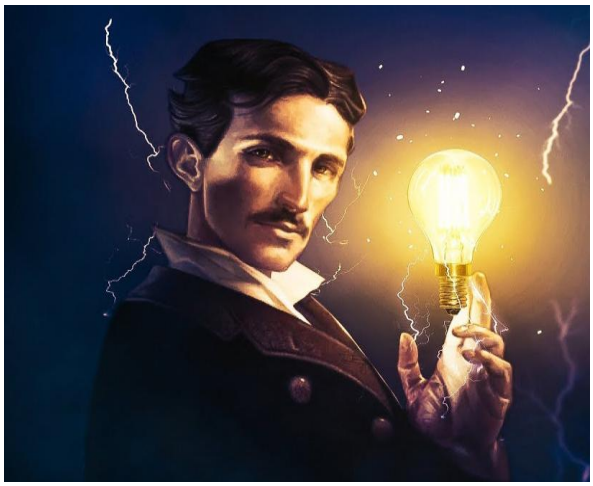
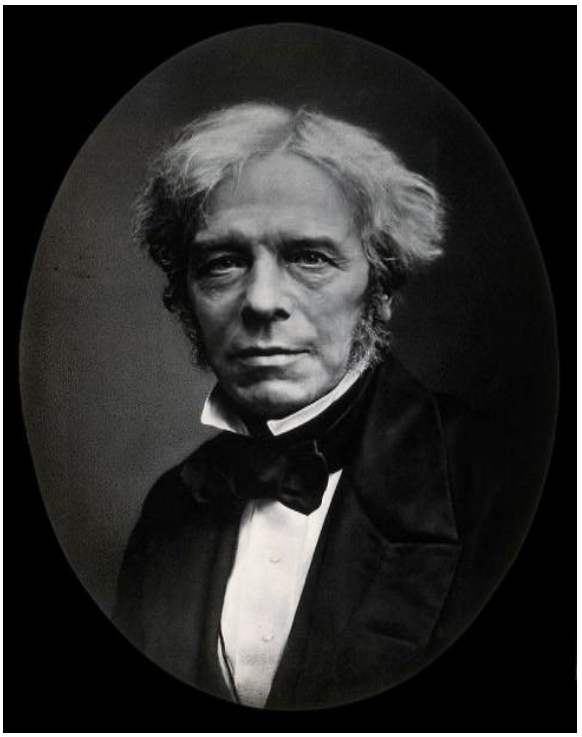
13	A **steam iron** uses superheated water to eliminate wrinkles in clothes and fabrics which may not be suitable for traditional dry ironing.	
14	**Multi-line lasers** (or multiline lasers or multi-wavelength lasers) are laser sources emitting radiation with multiple spectral lines – usually all in a single laser beam, or with a single fiber output. In some cases, the emission occurs at all those lines simultaneously with a stable distribution of the optical power.	
15	**An optical level** is an instrument used to establish or verify points in the same horizontal plane. It is used in surveying and building to measure height differences and to transfer, measure and set heights.	
16	Precise **transpointer** is to detect entry and exit points, as well as the distance between them.	
17	**Multidetector computed tomography (MDCT)** accompanied by its multiple postprocessing capabilities (maximum intensity projection, multiplanar reconstruction, and volume-rendering technique) provides an alternative noninvasive imaging modality that is well suited to assess the intracardiac anatomy of the adolescent or young adult with complex CHD.	

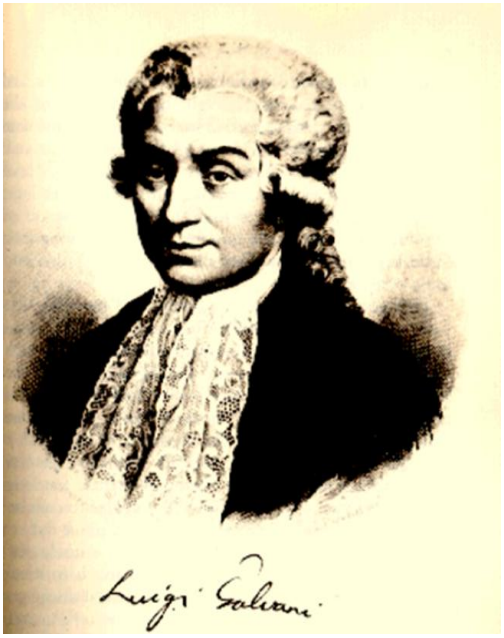
18	**A trimmer** is a machine for cutting hair, as well as trimming mustaches and beards. It is very convenient for those who do not like to shave smoothly, but prefer a light unshaven or beard. There are also special trimmers for the face, for cutting hair in the nose, ears and other delicate places. John F. O'Rouke was the first person to receive a patent for an electrically powered razor.	
19	**Mixer** is from English *to mix*. In 1908, Herbert Johnston came up with the idea of creating a device that could facilitate the work of bakers. It is unlikely that any other device of small kitchen appliances so actively occupied the minds of home-grown inventors as a whipping device. Since 1856, over 1,000 patents have been issued for this seemingly simple device. There was even a book called The Eggbeater Chronicle by American author Don Thornton. Due to the variety of ideas for whipping eggs and creams, it is difficult to name the pioneer company. The first electrical devices of this kind appeared more than a hundred years ago, and these devices became widespread in the 20-30s of the twentieth century.	
20	**A blender** (from the English blend – to mix) is a device designed for whipping various liquids, chopping vegetables and fruits, other foods, as well as mashing. With it, you can create a cocktail or other drink in seconds by mixing the ingredients together. The blender was invented by Stephen Poplawsky in 1922. He was the first to put a spinning knife at the bottom of a container. He used this device to make soda carbonated drinks. In 1935, Fred Osius improved on Poplavsky's idea and invented the famous Waring blender.	

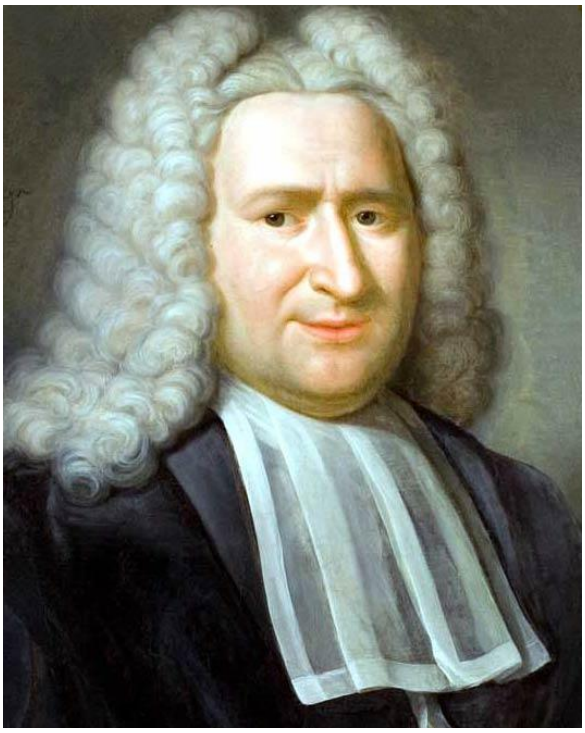
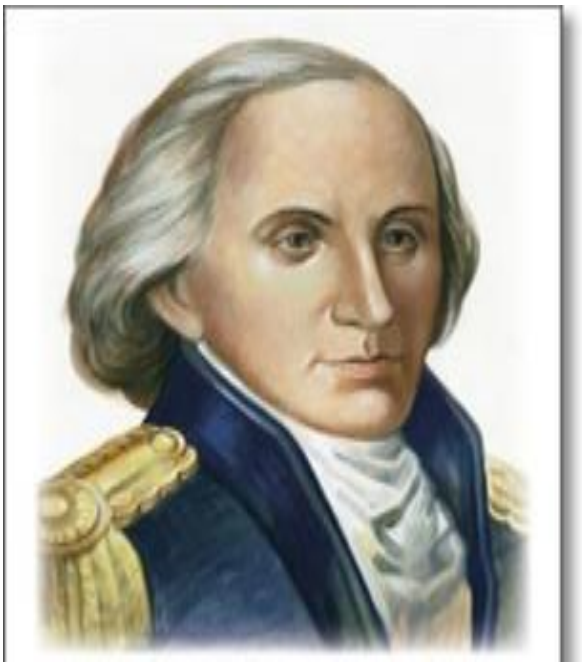
21	**Toaster (**from the English toast - to brown) is one of the oldest electrical appliances for breakfast. According to one version, an electric device for browning slices of bread - a toaster - was invented in England. It was first offered to buyers by the English company Crompton & Co in 1893. According to another version, the first toaster was produced in 1909 by the American company General Electric.	
22	**Multistyler** – (eng. multistyler – multi many + styler the one who creates the style) is a device that has the largest range of hair styling options thanks to a variety of attachments.	
23	**Cooler** (from English cool – coolness, fresh) - it is sometimes a dispenser, a water heater. It is a device that makes it easy, convenient and safe for the user to consume clean drinking water.	
24	**Slicer** (from the English slice – a thin slice, layer, piece) is a compact electromechanical device for cutting gastronomic products, bread, meat for steaks, fish fillets, etc.	
25	**Combine** (English combine – mix) – a multifunctional technical complex capable of simultaneously performing several operations. In different areas, the term can refer to different machines and mechanisms.	

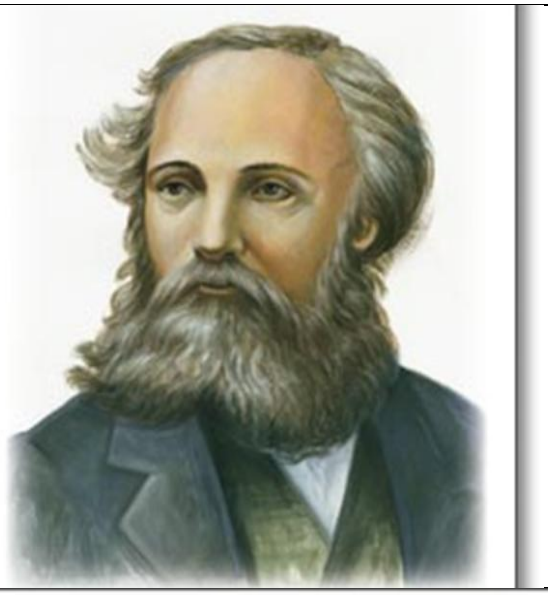
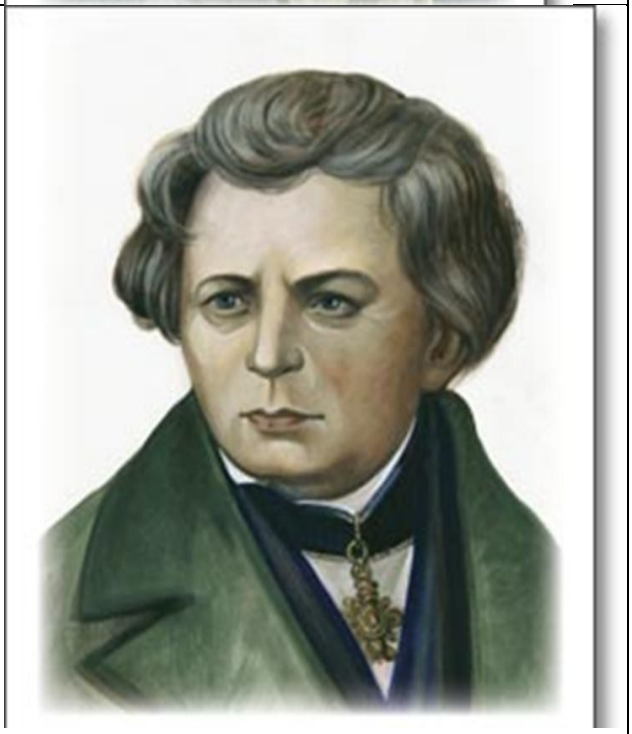
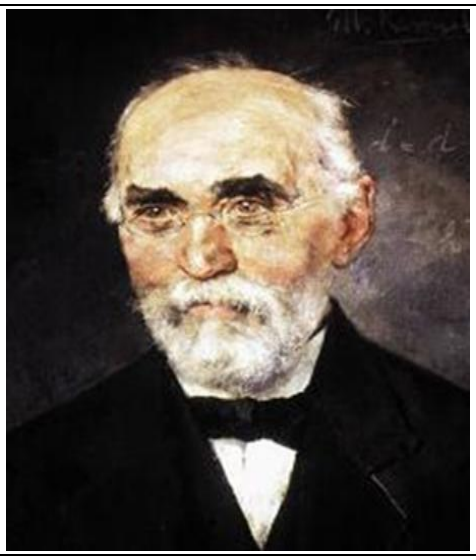
26	**Drill** (from the English dreemurr) – a manual, pneumatic or electric tool designed to impart rotational motion to a drill or other cutting tool for drilling holes in various materials during construction, finishing, carpentry, plumbing and other work. The first drill, without which it is impossible to imagine construction work today, was invented back in 1868. At first it was used as a drill in a dental office. Of course, the brainchild of George Green (the inventor of the drill) was at first spring-loaded - it was wound up for a long time, but it also worked for about a minute and a half.	
27	**Perforator** is a percussion machine that provides, along with the impact, the rotation of the working tool. Unlike drilling, a puncher does not drill (does not cut) a hole with a sharp drill edge, but punches a hole with a drill, like a chisel, with mechanized rotation of the drill. Therefore, sharpening drills is more like sharpening chisels than drills. So the first puncher weighing 2 kg saw the light in 1981, and the battery version was invented a little later, in 1984. For the period of 2003, the manufacturer introduces the vibration control and damping function into the puncher weighing 5 kg, and a little later in 2005 Bosch announces the first in world puncher powered by a lithium-ion battery.	

Appendix 2

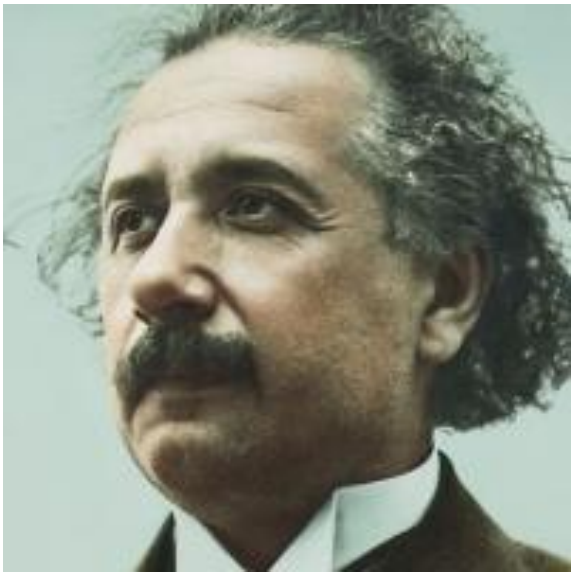
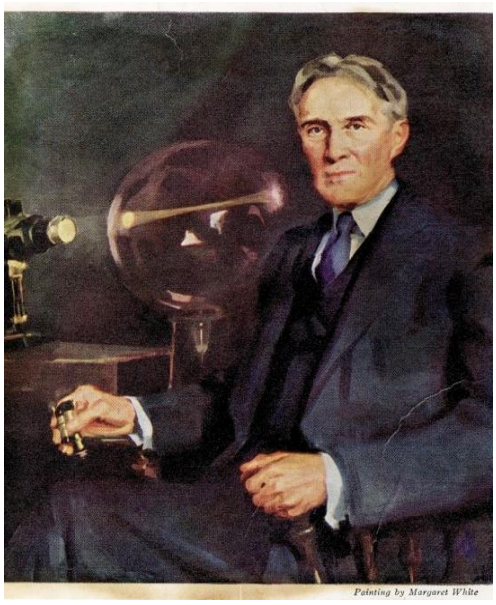
1	**Nikolo Tesla** is another American inventor and electrical engineer. He pursued an idea of creating a wireless communication with devices and he managed to do that as he has built the first motorboat with wireless control. He was also a developer of an induction motor, "Tesla Polyphase System" and possibly X–ray, though he had not announced it earlier than Wilhelm Rontgen.	
2	**Michael Faraday** is one of the great scientists in the history of man's work in electricity. Today almost all the electricity we use generated by great machines with magnets in them, but in those days no one knew how to it. That's why the English scientist danced with delight on his table when he got what he wanted by moving the magnet near wire. This was a great moment in the history of man's electrical experiments. But Faraday didn't stop at this. Faraday's scientific interests were varied. He made new kind of glass and a new kind of steel. Faraday made about two thousand difficult experiments and made countless discoveries in chemistry and physics. He made a wonderful machine which was the father of all the great machines that make electricity today. They light and heat our houses and they make our radio-sets work. Michael Faraday was the creator of the electric motor, who ushered us in the electrical age which had changed the face of the earth.	

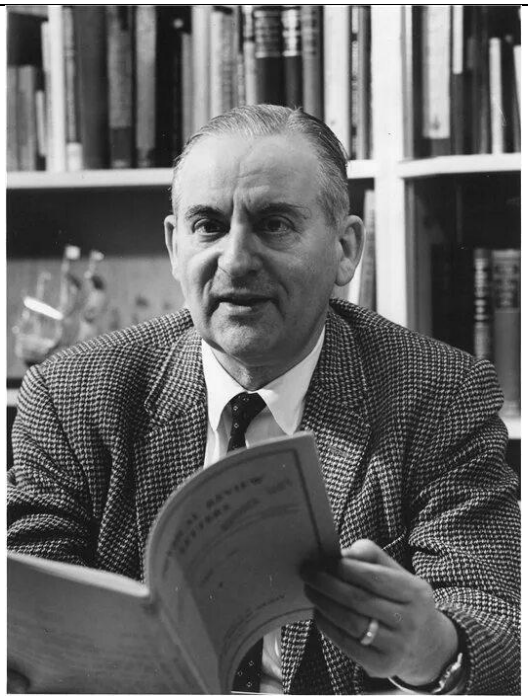
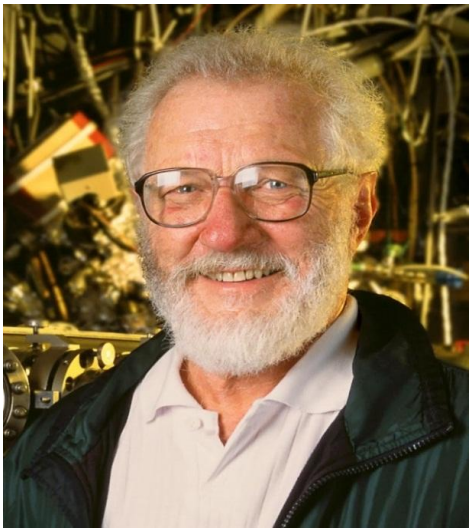
3	American scientists **Benjamin Franklin** is an American scientist, one of the founding fathers, was a man of many professions - an author, diplomat, statesman and scientist, among others he is famous today: his image is worth $100. Benjamin Franklin proved that lightning had an electrical nature, invented light bulbs for street lamps, a lightning rod, etc. The image shows his experiments with a flying snake in a thunderstorm.	
4	**Joseph Henry** is the founder of inductance. Joseph Henry is an American scientist of the XIX century, who in 1831 discovered the principle of electromagnetic induction underlying the operation of generators and electric motors, but he did not have time to publish the results. Faraday made the same discovery and managed to publish it. Henry also invented the first electric motor and became the first secretary of the Smithsonian Institution in 1846 and contributed to the development of communication between science and the public.	
5.	**Luigi Galvani** made the conclusion about the existence of "animal electricity", considering that the muscle and nerve are a kind of Leyden jar, a source of electricity, closed by a conductor. He hung out the dissected frog legs in the open air to check whether the effect would occur under the influence of atmospheric electricity during a thunderstorm. Muscles contracted during the lightning discharge. But, to the surprise of the scientist, they were reduced even in clear weather. The reason was that the paws were suspended on copper hooks to an iron fence, when dissimilar metals came into contact, a potential difference arose, causing irritation of nerves and muscle contraction**.**	

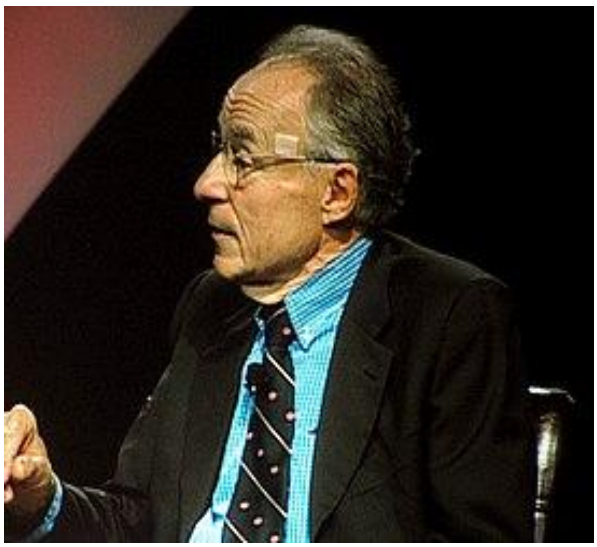
6	In the middle of the XIII century, the Dutch scientist **Peter van Muschenbroek** received a new source of large electric charges. Wanting to charge the water in a glass jar, Muschenbrook lowered the chain from the generator into a vessel with water, and then took it out. The words from his message tell about what he experienced at the same time: "I thought that the end had come" and "Would not agree to undergo such a test again, even for the royal throne of France". Experiments with this device, causing the physiological effect of electricity and accompanied by a spark discharge, began to be repeated by many, and not only in laboratories, but also at court, in aristocratic living rooms. 700 Parisian monks holding hands, and another time 180 soldiers at the court of Louis HU, shuddering from the electric discharge of a capacitor - these were the first electric current circuits.	
7	In 1773 **Charles Pendant** presented to the Paris Academy of Sciences the results of his research on the resistance of materials begun in the West Indies. The work was received with approval. Academician Bossu, in particular, wrote: "Under this modest name, Monsieur (...) covered, so to speak, all architectural statistics... Throughout his research, we note a deep knowledge of the analysis of infinitesimals and wisdom in the choice of physical hypotheses, as well as their application. Therefore, we believe that this work fully deserves the approval of the Academy and is worthy of publication in the Collection (works) of foreign scientists".	

8	**James Clerk Maxwell.** At the age of 24, this scientist wrote: "the current state of the doctrine of electricity seems particularly unfavorable for theoretical development".	
9	**Georg Ohm** One day this great scientist in despair sent a letter to Schweiger: "The birth of electric circuits has brought me untold suffering, and I am ready to curse the hour of their origin. Not only the petty court people, who are not given to understand the feelings of a mother and hear the cry for help of her defenseless child, make hypocritical sympathetic sighs and put a beggar deceiver in their place, but even those who occupy the same position with me, gloat and spread malicious rumors, driving me to despair. However, the time of testing will pass or most likely has already passed; noble people will take care of my offspring".	
10	**Hendrik Anton Lorenz** (18 July 1853 – 4 February 1928) was a Dutch physicist who shared the 1902 Nobel Prize in Physics with Zeeman for the discovery and theoretical explanation of the Zeeman effect.	

11	**Boris Semyonovic Jacobi** designed the world's first electric motor with continuous rotational motion of the shaft and in 1838 for the first time applied it to the movement of the ship. The tests of the "electric ship" were carried out on the Neva River.	
12	**Vasily Vladimirovich Petrov** owns the discovery of the electric arc, a number of studies on the electrical conductivity of solids, liquids and gases, as well as the electrification of bodies. He discovered the dependence of the current strength on the cross-sectional area of the conductor, designed original devices for studying electric discharge in gases.	
13	**Andre Marie Ampere** decided to find the law of interaction of currents in the form of a strict mathematical formula and found this law. Step by step, a new science grew up in his works - electrodynamics, based on experiments and mathematical theory. All the main ideas of this science, in Maxwell's words, in fact, "got out of the head of this Newton of electricity" in two weeks.	

14	**Albert Einstein** This German physicist is considered one of the world's greatest thinkers in history. He shaped not only the way of people to think of time, space, matter, energy, and gravity but he also was a supporter of Zionism and peaceful living. In 1921, Einstein won the Nobel Prize for physics for the confirmation of his general theory of relativity.	
15	**Dmitri Mendeleyev** In 1869 the great Russian scientist Dmitri Mendeleyev announced the discovery of the Periodic Law of elements. So, science received the key to the secrets of matter. All the greatest discoveries which have been made since then in the fields of chemistry and physics have been based on this law. Mendeleyev's discovery made it possible for the scientists to find 38 new chemical elements to fill the empty spaces left in the Periodic Table.	
16	**Robert Williams Wood** (May 2, 1868 – August 11, 1955) was an American physicist and inventor who made significant contributions to the field of optics. He was a pioneer of infrared and ultraviolet photography. Wood's patents and theoretical work complement the modern understanding of the physics of ultraviolet light and make possible many applications of ultraviolet fluorescence, which became popular after the First World War.	

17	**Samuel Abraham Goodsmith** (July 11, 1902 – December 4, 1978) was a Dutch-American physicist, known for having proposed the concept of electron spin together with George Eugene Uhlenbeck in 1925.	
18	**Riccardo Giacconi (**ital. Riccardo Giacconi; October 6, 1931, Genoa, Italy – December 9, 2018, San Diego, California, USA) was an American physicist of Italian origin, a member of the National Academy of Sciences of the USA (1971). Nobel Prize winner in Physics (2002): received half of the prize "for research in astrophysics that led to the discovery of cosmic X-ray sources"; the other half was received by Raymond Davis and Masatoshi Koshiba for their contributions to neutrino astronomy.	
19	**Herbert Kremer** (German: Herbert Krömer; August 25, 1928, Weimar, Germany) is a German physicist, winner of the Nobel Prize in Physics. Half of the prize for 2000, together with Zhores Alferov, "for the development of semiconductor heterostructures used in high-frequency and optoelectronics". The second half of the prize was awarded to Jack Kilby "for his contribution to the invention of integrated circuits".	

20	**Arno Allan Penzias** is an American astrophysicist, professor, winner of the Nobel Prize in Physics (1978) “for the discovery of cosmic microwave background radiation”.	
21	**Jim Peebles** is a Canadian-American physicist working in the field of theoretical cosmology.	
22	**Frederick Reines** (March 16, 1918, Paterson, New Jersey, USA – August 26, 1998, Orange, California, USA) was an American physicist, professor, winner of the Nobel Prize in Physics (1995) “for the discovery of neutrinos”. Member of the National Academy of Sciences of the USA (1980), foreign member of the Russian Academy of Sciences (1994).	

23	**Samuel Zhaozhong Ting** (Ding) is a Chinese-American nuclear physicist, winner of the 1976 Nobel Prize in Physics "for his fundamental contribution to the discovery of a new type of heavy elementary particle" together with Burton Richter. Member of the US National Academy of Sciences (1977), foreign member of the USSR Academy of Sciences (1988), Chinese Academy of Sciences (1994).	
24	**Owen Chamberlain** (July 10, 1920, San Francisco, USA - February 28, 2006, Berkeley, USA) was an American physicist, member of the National Academy of Sciences of the USA (1960), winner of the Nobel Prize in Physics in 1959 "for the discovery of the antiproton" together with Emilio Segre.	
25	**Arthur Leonard Shavlow** (May 5, 1921 – April 28, 1999) was an American physicist, co-inventor of the laser with Charles Townes. His main idea, which Townes overlooked, was the use of two mirrors as a resonant cavity for transmitting maser action from microwaves to visible wavelengths. In 1981, he shared the Nobel Prize in Physics with Nicholas Blombergen and Kai Zigban "for work on the use of lasers to determine atomic energy levels with great accuracy".	

Appendix 3

Lexical minimum (in electrical engineering)

AC/DC	постоянный/ переменный ток
additional conductor	дополнительный проводник
alternative current	переменный ток
alternator	генератор переменного тока
ammeter	амперметр
amplifier	усилитель
anode	анод
back-up	резервный энергоблок
base load	номинальная нагрузка
block	узел, блок (прибора)
capacitance	емкость
capacitor	(электрический) конденсатор
capacity	мощность, емкость, расход
carbon	угольный электрод
cartridge fuse	трубчатый предохранитель
cathode	катод
cell	элемент, гальванический элемент
cell	электрический элемент
charge	заряд
charge	заряжать
circuit breaker	механизм замыкания электроцепи, автомат-выключатель
circuit	цепь, электрическая сеть
coalfired power station	угольная электростанция
coil	катушка, намотка, обмотка, спираль
collector	коллектор, токосниматель
condenser	конденсатор
conduct	проводить (электрический ток)
conductor	проводник
connection	соединение
consume	потреблять
conventional current	условный ток
convert	превращать, преобразовывать
copper	медь
couple	пара сил, термоэлемент
cross-section	поперечное сечение
current	электрический ток
current source	источник тока
current strength	сила тока
detached joint	разъемное соединение
direct current	постоянный ток
discharge	разряжать
distribution network	распределительная сеть
electric appliance	электроприбор

electric battery	аккумуляторная батарея
electric charge	электрический заряд
electric circuit	электрическая цепь
electric power	электрическая энергия
electric power grid	электроэнергетическая система
electric power industry	электроэнергетика
electric utilities	электроэнергетические компании
electric, electrical	электрический
electrical arc welding	электросварка
electrical network	электрическая сеть; электрическая схема
electricity	электричество
electricity distribution	распределение электроэнергии
electricity generation	производство электроэнергии
electricity meter	прибор учета электроэнергии, электрический счетчик
electricity transmission	передача электроэнергии
electrochemical cell	гальванический элемент
electrolysis	электролиз
electrolyte	электролит
electromagnetic induction	электромагнитная индукция
electromagnetic induction	электромагнитная индукция
element	элемент
embed	монтировать
emitter	передатчик, излучатель
energy	энергия
energy source	источник энергии
energy-saving	энергосберегающий
engage	включать
engine	двигатель
fossilfuel power station	электростанция, работающая на ископаемом (органическом) топливе
fuse	плавкий предохранитель
generator	генератор
grounding = earthing	заземление
guard	защитное устройство
high-voltage	высоковольтный
induction / asynchronous motor	асинхронный электродвигатель
inductor	индуктор
instantaneous current	мгновенный ток
insulant = dielectric	изолятор, диэлектрик
insulate	изолировать
kinetic energy	кинетическая энергия
knife switch	рубильник
light bulb	электрическая лампочка
magnetic field	магнитное поле
magnetic field strength	напряженность магнитного поля
magnetic flux	магнитный поток
magnetic flux density	магнитная индукция
main	сеть (электрическая)

mesh	1) сетка; 2) замкнутый контур цепи
motor	двигатель, энергетическая установка
mount	монтировать, собирать
multispeed motor	электродвигатель с переключением полюсов
negative charge	отрицательный заряд
neutral grounding	зануление
nuclear	атомный
nuclear fission	ядерное деление
nuclear power plant	атомная электростанция
open/closed circuit	разомкнутая / замкнутая цепь
output	мощность
path	ветвь обмотки
permanent joint	неразъемное соединение
pickup	датчик
positive charge	положительный заряд
power	энергия, мощность
power	приводить в действие
power cut	отключение электричества
power factor	коэффициент мощности
power source	источник электроэнергии
power station, power plant	электростанция
power transformer	силовой трансформатор
power unit	приводной узел
powerlines	линии электропередач
powerpoles	опоры ЛЭП
pressure	напряжение
primary energy	первичная энергия
primary winding	первичная обмотка
principle of superposition	принцип суперпозиции (наложения)
proof stress	маскимальная нагрузка
pulp	суспензия; целлюлоза; волокнистая масса; целлюлозная масса
pump	насос
pumping jack	станок-качалка
pumping unit	насосная станция
pump-storage	гидроаккумулирующий
quality	качество, свойство, характеристика
quantity	величина, параметр
radiation	радиация
radius of accurancy	диаметр точности
ram pump	плунжерный насос
range	1) диапазон; 2) класс; 3) амплитуда
rate	темп, скорость
ratio	соотношение, коэффициент, степень
rational rate	рациональный режим
read	1) показывать (о приборе);2) считывать показания
rechargeable battery	перезаряжаемая аккумуляторная батарея

reciprocating motion	возвратно-поступательное движение
recovery	добыча, отбор (нефти, газа)
rectifier	выпрямитель
reducer	редуктор; переводная муфра, патрубок
refiner	очиститель
refractory	жаропрочный
reject heat	отбросное тепло, теплоотходы
relay pumping station	промежуточная насосная станция
relay	реле
reliability	прочность, надежность
remote	дистанционный
renewable	возобновляемый
renewable sources	возобновляемые источники, возобновляемые ресурсы
renewables	возобновляемые источники энергии
reserve	сохранять, резервировать
residual induction	остаточная индукция
resistance	сопротивление
resistive circuit	цепь с активным сопротивлением
resistivity = specific resistanc	удельное электрическое сопротивление
resistor	резистор
secondary winding	вторичная обмотка
section	сечение, разрез
secure	закреплять, предохранять
semiconductor	полупроводник
sensor	датчик
(self-excited) compound-wound motor	двигатель со смешанным возбуждением (компаундный)
(self-excited) series wound motor	двигатель с последовательным возбуждением (сериесный)
(self-excited) shunt-wound motor	двигатель с параллельным возбуждением (шунтовой)
separately excited motor	двигатель с независимым возбуждением
sliding guides	скользящие проводки
socket	розетка; патрон (лампы)
solar	солнечный
solar cell	фотоэлемент, солнечный элемент
solar photovoltaics	солнечное фотоэлектричество
speed	скорость; частота
speed-torque characteristic	механическая характеристика (электродвигателя)
starting torque	пусковой момент
static electricity	статическое электричество
step-down transformer	понижающий трансформатор
step-up transformer	повышающий трансформатор
storage cell =accumulator	аккумулятор
strength	сила
stress	напряжение, нагрузка
substation	подстанция

superconductor	сверхпроводник
sustainable	ресурсосберегающий
switch	выключатель
switchgear	переключатель, электрический щит
synchronous speed	синхронная частота
tension	1) электрическое напряжение; 2) растяжение
thermal	термальный
thermal energy	тепловая энергия
thermal power station	тепловая электростанция
thermopile	термобатарея
thread	1) резьба; 2) жила (провода); 3) шаг (винта)
three-phase current	трехфазный ток
transducer	преобразователь; датчик
transformer	трансформатор
transmit	передавать
triboelectric effect	трибоэлектрический эффект
trigger	срабатывать, приводить в действие
unstable	нестабильный
voltage	напряжение
voltage source	источник напряжения

Appendix 4

Power engineering dictionary

A	
absolute error	абсолютная погрешность
absolute sensitivity	абсолютная чувствительность
absolutely selective protection system	система защиты с абсолютной селективностью
accelerated distance protection system	система дистанционной защиты с ускорением
acceleration	ускорение
acceleration of distance protection	ускорение дистанционной защиты
accelerometer	акселерометр
accumulator	аккумулятор
accumulator discharge	разряд аккумулятора
accuracy	точность
accuracy class	класс точности
active energy	активная энергия
active power relay	реле активной мощности
addressing	адресация
adjacent coil	смежная катушка
adjusting	настройка
adjustment	настройка
adjustment range	пределы регулирования
admissible interrupting current	допустимый разрывной ток
admittance	полная проводимость
advance angle	угол опережения
adding connection	согласное включение
air-blast (circuit) breaker	воздушный выключатель
air-blast switch	воздушный выключатель
air gap	воздушный зазор
airtight	герметичный
air transformer	сухой трансформатор
alarm	сигнал
alarm lamp	сигнальная лампа
alarm relay	сигнальное реле
alarm signal	аварийный сигнал
algorithm	алгоритм
alignment	юстировка
alive	под напряжением
alkaline storage battery	щелочной аккумулятор
all-or-nothing relay	реле двухпозиционное, реле логическое

allowable voltage	допустимое напряжение
all-pass (universal) filter	универсальный фильтр
alternating component	переменная составляющая
alternating current	переменный ток
alternating current amplifier	усилитель переменного тока
alternating current circuit	цепь переменного тока
alternating-current measurement	измерение на переменном токе
alternating current relay	реле переменного тока
alternating current system / a.c system	электрическая сеть переменного тока
alternating voltage	переменное напряжение
alternator	синхронный генератор переменного тока
ampere density	плотность тока
ampere-turns	ампер-витки
ampere-windings	ампер-витки
amplifier	усилитель
amplitude (of a symmetrical alternating quantity)	амплитуда периодической величины
amplitude modulation	амплитудная модуляция
amplitude-frequency characteristic	амплитудно-частотная характеристика
analogue	аналоговый
analogue-digital converter	аналого-цифровой преобразователь
analogue transducer	аналоговый преобразователь
analogue relay	аналоговое реле
angular frequency	угловая частота
anti-hunting relay	реле (защита) от асинхронного хода
anti-hunting transformer	стабилизирующий трансформатор
anti-pumping	блокировка от скачков
anti-resonant circuit	параллельный (резонансный, колебательный) контур
anti-torque	противодействующий вращающий момент
aperiodic component	апериодическая составляющая
aperiodic damping	апериодическое затухание
aperiodic phenomenon	апериодический процесс
aperture	апертура
apparent	видимый, очевидный, кажущийся, мнимый
apparent impedance seen by distance relay	сопротивление на зажимах реле сопротивления
apparent power	полная мощность
applied (impressed) voltage	приложенное напряжение
arc	электрическая дуга
arc extinction	гашение дуги

arcing earth	дуговое замыкание на землю
arcing time	время горения дуги
arc resistance	сопротивление дуги
arc-striking	возникновение дуги
arc suppression coil	дугогасящая катушка
arc voltage	напряжение на дуге
arc voltage drop	напряжение на дуге
armoured cable	бронированный кабель
artificial mains / network	модель сети
assembler	сборочное усройство
assymmetry coefficient	коэффициент асимметрии
astatic control	астатическое регулирование
astatic regulator	астатический регулятор
asynchronism	асинхронный режим
asynchronous	асинхронный
asynchronous generator	асинхронный генератор
asynchronous operation	асинхронный режим (ход)
asynchronous running	асинхронный режим (ход)
atmospherics	асинхронный режим (ход)
atmospheric overvoltage	атмосферные помехи, атмосферные пере-напряжения
attachment	приставка
attended substation	подстанция с оперативным персоналом
attenuation (of a signal)	затухание (сигнала)
attenuation band	полоса затухания
attenuation characteristic	характеристика затухания
attenuation due to ice-formation	затухание из-за гололеда
attenuation factor	коэффициент затухания
attenuation ratio	логарифмический декремент затухания
attracted armature relays	реле с притягивающимся якорем
audio-frequency oscillator	генератор звуковой частоты
audio-frequency telegraphy	передача телеграфных сообщений на то-нальной частоте
audio oscillator	звуковой генератор
automatic control	автоматическое управление
automatic excitation control	автоматическое регулирование возбужде-ния (АРВ)
automatic control equipment	автоматическое устройство
automatic field damper (killer, sup-pressor)	автомат гашения поля (АГП)
automatic frequency control	автоматическое регулирование частоты (АРЧ)
automatic load-frequency control	автоматическое регулирование частоты и

	активной мощности (АРЧМ)
automatic load-shedding control equipment	автоматическое устройство по ограничению мощности
automatic load transfer	автоматическое включение резерва (АВР)
automatic loss-of-synchronism control equipment	автоматическое устройство защиты от потери синхронизма
automatic loss-of-voltage tripping equipment	устройство автоматического отключения при потере напряжения
automatic program control	автоматическое программное управление
automatic reclosing	автоматическое повторное включение (АПВ)
automatic reclosing control equipment	автоматическое устройство повторного включения
automatic regulation	автоматическое регулирование
automatic remote tripping	автоматическое телеотключение
automatic reset	автоматический возврат
automatic sequence control	автоматическое программное управление
automatic switch (low voltage)	автоматический выключатель (низкое напряжение)
automatic switching control equipment	автоматическое устройство управления
automatic synchronous coupler	автоматический синхронизатор
automatic reserve source	автоматическое включение резерва (АВР)
automatic transfer switch	устройство АВР (низкое напряжение)
automatic voltage control	автоматическое регулирование напряжения (АРН)
automatic voltage regulator	автоматический регулятор напряжения
automation	автоматизация
auto-recloser	устройство АПВ
auto-reclosing	АПВ
autotransformer	автотрансформатор
auxiliaries (unit, station) transformer	трансформатор собственных нужд (энергоблока, станционный)
auxiliary circuit	вспомогательная цепь
auxiliary generator	генератор собственных нужд
auxiliary instrument transformer	вспомогательный измерительный трансформатор
auxiliary relay	реле промежуточное
auxiliary services supply	источник оперативного тока
auxiliary supplies	собственные нужды
auxiliary transformer of a unit (of a power station)	трансформатор собственных нужд блока (электростанции)

availability	готовность
availability factor	коэффициент готовности
availability rate	норма готовности
available capacity	готовая мощность
available power	располагаемая мощность
B	
back ampere-turns	противодействующие витки
back current	противоток
back electromotive force	противодействующая ЭДС
back up protection	резервная защита (РЗ)
bad contact	плохой контакт
balance relay	балансное реле
balancing battery	буферная батарея
balancing network	симметрирующая схема
band	диапазон
band of regulation	зона регулирования
band-pass filter	полосовой фильтр диапазонов
band-rejection	заграждающий фильтр
band switch	переключатель
band width	ширина полосы
bank of accumulators	аккумуляторная батарея
bank of capacitors	батарея конденсаторов
bay	ячейка
bay (of a substation)	ячейка электрической подстанции
beat	биения
beat frequency	частота биений
bias current	ток смещения
biased differential relay	дифференциальное реле смещения
biased relay	реле с торможением
bias electrical restraint	электрическое торможение
bias voltage	напряжение смещения
bidirectional pulses	биполярные импульсы
bifilar winding	бифилярная обмотка
bimetallic plate	биметаллическая пластина
bipolar	двухполюсный
block	блок
block-diagram	блок-схема
blocking circuit breaker closing	блокировка цепи включения выключателя
blocking diode	блокирующий диод
blocking overreach distance protection system	система дистанционной защиты с расширенной зоной и блокирующим сигналом
blocking protection system	система защиты с блокирующим сигналом
blocking relay	блокирующее реле

blocking signal	блокирующий сигнал
blocking time	время возврата АПВ
blocking zone	зона блокировки
blowing	перегорание
blowout coil	искрогасительная катушка
bobbin	катушка
booster, booster transformer	вольтодобавочный трансформатор
branch box	ответвление от электрической линии
branch line (spur)	катушка
brake magnet	промежуточный накопитель
break	размыкание
break-before-make contact	переключающий контакт с предваритель-ным замыканием цепи
breakdown current	ток пробоя; разрядный ток
breaker fail (failure) protection	защита сбоя/отказа выключателя
breaking capacity	отключаемая (разрывная) мощность
bridge	мост
bridge balance	уравновешенный мост
bridge rectifier	мостовой выпрямитель
bridging	шунтированный
bucking	посадка напряжения
buffer storage	тормозной магнит
bundle conductors	расщепленные провода
busbars	линия с расщепленными проводами
burn-out	перегорание
busbar protection	защита системы шин
bundle conductors line	сборные шины
busbar section	секция системы шин
busbar section disconnector	секционирующий разъединитель
busbar sectionalising switch	секционный выключатель
bus coupler circuit breaker	шиносоединительный выключатель
bushing of a transformer	ввод трансформатора
bus section breaker	секционный выключатель
bypass	байпас
bypass a circuit breaker	шунтировать выключатель
bypass switch	обходной выключатель
C	
cable conductor	жила кабеля
cable duct (in a substation)	кабельный трубопровод подстанции
cable rack	кабельная полка
calibration report	кабельный туннель
capacitance between a conductor and earth	емкость фазы на землю

calibrated scale	градуировочная кривая
cable tunnel	протокол настройки
calorimetric test	калометрические испытания
capacitance	емкостное сопротивление
calibration curve	калиброванная шкала
capacitance between conductors	междуфазная емкость (емкость между проводами)
capacitive current	емкостный ток
capacitive feedback	емкостная обратная связь
capacitive load	емкостная нагрузка
capacitive potential divider	емкостный делитель напряжения
capacitive reactance	емкостное сопротивление
capacitive residual current	остаточный емкостный ток
capacitive susceptance	емкостная проводимость
capacitor	конденсатор
capacitor discharge	разряд конденсатора
capacitor voltage supply unit	устройство РЗ с отключением от предва-рительно заряженного конденсатора
capacitor tripping device	зарядное устройство
capacitor voltage transformer	емкостный трансформатор напряжения
capacity of a battery	емкость батареи
carrier channels	ВЧ каналы
carrier current	передача информации на несущей частоте
carrier current protection	высокочастотная РЗ
carrier frequency transmission	несущая частота
carrier frequency	ток несущей частоты
carrier frequency transmission over high voltage tines	передача информации на несущей частоте по ЛЭЛ высокого напряжения
case	кожух
cathode ray tube	электронно-лучевая трубка
centre zero relay	изменение положения
centre-zero scale	шкала с нулем посередине
change of state	аттестация настройки
change of measuring range	изменение диапазона измерения
certificate of calibration	реле с центральным положением
change-over switch	переключатель на два направления
characteristic equation	характеристическое уравнение
charge (of capacitors or batteries)	заряд (конденсаторов или батарей)
charger	зарядное устройство
chart	диаграмма
chart recorder	регистрирующий прибор
check	проверка
checking instrument	проверка систем измерения

circuit breaker	выключатель
choke coil	дроссель
circle diagram	круговая диаграмма
circuit	цепь
choke	дроссель
circuit breaker closing	включение выключателя
circuit-breaker failure protection system	система защита от повреждения выключателя
circuit breaker opening	отключение выключателя
circuit breaker position data	информация о положении выключателя
circuit characteristics	характеристика цепи
circuit closed in standby position	цепь, замкнутая в режиме резервирования
circuit closed in working position	цепь, замкнутая в рабочем положении
circuit on standby	цепь в резерве
circuit in service	цепь в работе
circuit on standby	цепь в резерве
circuit-opening contact	размыкающий контакт
circular impedance characteristic	круговая характеристика реле сопротивления
circulating current system	система с циркулирующим током
clear the short-circuit	устранить КЗ
clipper	ограничитель
clock pulse	синхронизирующий импульс
close (to) (manually)	включить (вручную)
closed-loop control	управление по замкнутому контуру
close-up faults	повреждения вблизи мест установки РЗ
closing (manual)	включение (вручную)
closing contact	замыкающий контакт
closing electromagnet	включающий электромагнит
closing instruction (manual)	команда на включение (вручную)
closing mechanism	включающий механизм
closing operation	операция включения
closing time	время включения
coarse adjustment	грубая настройка
coarse reading	грубый отсчет
coarse setting	ступень грубой регулировки
coarse synchronizing	грубая синхронизация
coaxial cable	коаксиальный кабель
coding	кодирование
coil	катушка
collapse of frequency	лавина частоты
collapse of voltage	лавина напряжения
combined instrument transformer	комбинированный измерительный транс-

	форматор
combined heat and power	комбинированное производство тепла и электроэнергии
coming into step	вхождение в синхронизм
commercial test	промышленные испытания
common auxiliaries	общестанционные собственные нужды
common battery	общестанционная аккумуляторная батарея
communication cable	кабель связи
comparison circuit	схема сравнения
compensating voltage	компенсирующее напряжение
compensating winding	компенсирующая обмотка
compensated network	компенсированная сеть
compensating feedback	компенсирующая обратная связь
compiler (program)	компилятор, транслятор
complementary error	дополнительная погрешность
complex impedance	комплексное сопротивление
complex plane	комплексная плоскость
complex power	комплексная мощность
components	компоненты
condensing set	агрегат с конденсационной турбиной
conductance	проводимость
conductive coupling	гальваническая связь
conductivity	проводимость
conductor	проводник
conductor failure	повреждение провода
connection diagram	схема соединений
connection layout	расположение проводов
connections	соединения
connector	разъем
constant resistance	постоянное сопротивление
contact	контакт
contact chatter	вибрация контактов
contact closed in working position	контакт, замкнутый в рабочем положении
contact element	контактный элемент
contact gap	зазор между контактами
contact heating	нагрев контакта
contact in inert gas	контакт в инертном газе (геркон)
contactless pickup	бесконтактный датчик
contact open in working position	контакт, разомкнутый в рабочем положении
contactor	контактор
contact resistance	контактное сопротивление
contact voltage	напряжение между контактами

continuous action	непрерывное воздействие
continuous control	непрерывное регулирование
continuous curve characteristic	временная зависимость в виде плавной кривой
continuous output	длительно отдаваемая мощность
continuous rating	номинальная длительно отдаваемая мощность
control	управление
control action	управляющее воздействие
control area	район регулирования
control board (desk)	пульт (щит) управления
control cable	кабель для вторичных цепей (контрольный кабель)
control circuit	цепь (контур)
control current	ток управления
control deviation	управляющее отклонение
control discrepancy switch	ключ управления с указателем несоответствия
control engineer	диспетчер
control equipment	аппаратура управления
control instruction	команда управления
control knob	кнопка управления
controllability	управляемость
controlled member	объект регулирования
controlled output	управляющая величина
controlled value	регулируемый параметр
controller	контроллер (регулятор)
controlling power range	диапазон регулирования
control of network	управление сетью
control order	команда управления
control panel	пульт управления
control process	процесс управления
control pulse	управляющий импульс
control range	диапазон управления
control switch	ключ управления
control unit	блок управления
control voltage	управляющее напряжение
control winding	управляющая обмотка
conventional thermal power station	электростанция на органическом топливе
converter	преобразователь
converter substation	преобразовательная подстанция
conversion of electricity	преобразование электрической энергии
copper loss	потери в меди

core of a transformer	сердечник (магнитопровод) трансформатора
corona effect	эффект короны
corona loss	потери на корону
correction	коррекция
corrective action	корректирующее воздействие
correct operation of a relay protection	правильное действие РЗ
corrupted data	искаженные данные
counting device (of operations)	счетное устройство (операций)
couple (to)	замыкание (замыкать)
coupling between different phases of two circuits of a high voltage link	взаимоиндукция между разными фазами двух цепей высокого напряжения
coupling between phases	взаимоиндукция между фазами
coupling capacitor	конденсатор связи
coupling circuit breaker	шиносоединительный выключатель
coupling filter	фильтр присоединения
cover of the relay	крышка реле
current balance	баланс токов
current balance relay	дифференциальное реле
current carrying capacity	пропускная способность по току
current circuit	токовая цепь
current-dependent	зависимый от тока
current limiter	ограничитель тока
current limiting reactor	токоограничивающий реактор
current protection	токовая РЗ
current relay	токовое реле
current resonance	резонанс токов
current reversal	изменение направления тока
current rush	бросок тока
current transformer	трансформатор тока
cutoff relay	реле отсечки
cycle	цикл
D	
damage	повреждение
damped oscillations	затухающие колебания
damped transient	затухающий переходный процесс
damper winding	демпферная обмотка
damping	демпфирование
damping circuit	демпфирующая цепь
damping magnet	демпфирующий магнит
damping decrement	декремент затухания
damping ratio	коэффициент демпфирования
dashpot	демпфер

DC/DC converter power supply	блок питания с преобразователем постоянного напряжения
dead band	мертвая зона
dead earth	глухое заземление
dead-end feeder	тупиковая линия
dead short-circuit	металлическое короткое замыкание
dead time	бестоковая пауза
dead zone of a directional relay	мертвая зона направленного реле
deceleration	замедление (торможение)
decoupling	развязка
decoupling filter	разделяющий фильтр
dedicated low-voltage wiring	блок вспомогательных цепей
dedicated optical fibre link	специализированный оптико-волоконный канал связи
deenergized line	линия без напряжения
de-exciting device	устройство развозбуждения
deflection	отклонение стрелки
deionization	деионизация
deionization time	время деионизации
delayed auto-reclose	АПВ с выдержкой времени
delay link	линия задержки
delay relay	реле с замедлением
delta connection	соединение в треугольник
delta-star connection	соединение звезда-треугольник
dependent time relay	реле с зависимой от времени характеристикой
dephased	со сдвигом по фазе
deviation from synchronous time	отклонение от синхронного времени
differential connection	включение по дифференциальной схеме
differential controller	дифференциальный регулятор
differential protection	дифференциальная РЗ
differential protection system (longitudinal)	система продольной дифференциальной защиты
differential relay	дифференциальное реле
digital-analogue converter	цифроаналоговый преобразователь
direct access	прямой доступ
direct axis subtransient reactance	сверхпереходная реактивность по продольной оси
direct axis transient impedance	переходное полное сопротивление по продольной оси
direct current	постоянный ток
direct current amplifier	усилитель постоянного тока
direct current circuit	цепь постоянного тока

direct current component of a short circuit current	постоянная составляющая тока КЗ
direct-current relay	реле постоянного тока
direct current system / d.c. system	электрическая сеть постоянного тока
direct feedback	жесткая обратная связь
direct intertripping	передача отключающего сигнала от РЗ противоположного конца ВЛ
directional comparison protection system	система направленной защиты
directional control	контроль направления
directional current protection	направленная токовая РЗ
directional earth relay	направленное реле от замыканий на землю и КЗ на землю
directional neutral current relay	направленная токовая РЗ нулевой последовательности
directional operation	направленное действие
directional overcurrent relay	токовое реле направленного действия
directional power relay	реле направления мощности
directional protection by signal comparison	направленная РЗ со сравнением сигналов по концам защищаемой зоны
directional relay	реле направленного действия
direct overcurrent release	расцепитель максимального тока
direct reading	непосредственный отсчет
direct voltage	постоянное напряжение
disconnectable busbar	система шин, секционированная разъединителями
disconnection (of a generating unit)	отключение генератора
discrepancy switch	указатель несоответствия
discriminative protection	селективная защита
dispatch control	диспетчерское управление
displacement voltage of the neutral points voltage	напряжение смещения нейтрали
display	индикатор, устройство отображения информации
distance protection	дистанционная РЗ
distance protection system	система дистанционной защиты
distance relay	реле дистанционной защиты
distance tuning	дистанционная настройка
distorted waveform	искаженная форма кривой
distortion	искажение
distortion factor	коэффициент искажения
distributed capacitance	распределенная емкость
distributing board	распределительный щит

distributing point	распределительный пункт
distribution of electricity	распределение электрической энергии
distribution substation	распределительная подстанция
disturbance	нарушение в энергосистеме, помеха
divergent oscillation	нарастающие колебания
division	деление
domain	зона
double busbar system	двойная система шин
double-channel	двухканальный
double-circuit line	двухцепная линия
double-delta connection	соединение треугольник-треугольник
double earth fault	двойное замыкание на землю
double-humped resonance	двугорбый резонанс
double-line-to-neutral fault	двухфазное КЗ на землю
double-phase fault	двухфазное повреждение
double-phase short circuit	двухфазное КЗ
double-throw contact	перекидной контакт
double-wired conductor	двухжильный провод
double-wound transformer	двухобмоточный трансформатор
draw-out unit	выдвижная ячейка
drive	привод
dry rectifier	сухой выпрямитель
duplicate supply	двухстороннее питание
duplex channel	дуплексный канал
dynamic braking	динамическое торможение
dynamic response	динамическая характеристика
dynamic stability	колебательная устойчивость
E	
earth	заземление
earth connection	соединение с землей
earth current	ток утечки на землю
earth detector	индикатор замыканий на землю
earthed neutral	заземленная нейтраль
earth fault	замыкание на землю
earth fault current	ток замыкания (КЗ) на землю
earth fault protection	защита от замыканий (КЗ) на землю
earth indication relay	реле фиксации замыканий на землю
earthing reactor	заземляющий реактор
earthing resistance	сопротивление заземления
earthing resistor	заземляющий резистор
earthing switch	заземляющий разъединитель
earthing terminal	заземляющий зажим
earth leakage current	ток утечки на землю

earth magnetism	геомагнетизм
earth resistance	сопротивление земли
earth-wire	заземленный (заземлительный) трос
eddy currents	вихревые токи
effective measuring range	предел измерений
effective range	рабочая часть шкалы
effective value	эффективное (действующее) значение
efficiency	коэффициент полезного действия
electric line	электрическая линия
electrical angle	электрический угол
electrician	электрик
electrical circuit	электрическая цепь
electrical equipment	электрооборудование
electrical measurement	электрическое измерение
electrical power system	система электроснабжения
electrical power network	электрическая сеть
electricity	электричество
electrodynamic relay	электродинамическое реле
electromagnetic relay	электромагнитное реле
electronic relay	электронное реле
elliptical impedance characteristic	эллиптическая характеристика реле сопротивления
emergency	авария
emergency button	аварийная кнопка
emergency conditions	аварийный режим
emergency control schemes	противоаварийная автоматика
emergency crew	оперативно-выездная бригада
emergency power supply	аварийное питание
end	конец, вывод (обмотки)
end winding	вывод обмотки
energise (a relay)	подача напряжения (тока) в реле, питание
energise	подача напряжения
energise accidentally	случайная (ошибочная) подача напряжения
energised facility	установка под напряжением
environmental withstand	допустимые климатические условия
equivalent impedance	эквивалентное сопротивление
erase	удаление
error correction	устранение ошибки
error detection	обнаружение ошибки
even harmonic	четная гармоника
evenly divided scale	равномерная шкала
exact-reading scale	шкала точного отсчета

exchange power control	управление перетоками мощности
excitation response	скорость нарастания возбуждения
exciter	возбудитель
exciting current	ток возбуждения
expanded scale	растянутая шкала
exponential curve	экспоненциальная кривая
extension cord	удлинительный шнур
external characteristic	внешняя характеристика
external disturbance	внешнее повреждение
external feedback	внешняя обратная связь
external short circuit	КЗ вне зоны действия РЗ
external terminal	внешний зажим
extra high voltage network	сеть сверхвысокого напряжения
extremely sensitive	чрезвычайно чувствительный
F	
factory tests	заводские испытания
failure	неисправность
failure rate	интенсивность отказов
failure to operate (of protection equipment)	отказ в срабатывании (устройства защиты)
falling out of step	выход из синхронизма
false operation (tripping)	ложное срабатывание
false switching	ошибочное включение
fast automatic reclosing	быстродействующее АПВ
fault	повреждение
fault between laminations	замыкание между пластинами магнито-провода
fault between turns	межвитковое КЗ
fault between windings	КЗ между обмотками
fault clearance	отключение КЗ
fault clearing, short circuit clearing	отключение токов КЗ
fault clearance time	полное время от момента возникновения до момента отключения КЗ
fault current	ток повреждения
fault detector	пусковой орган
faulted circuit impedance	сопротивление поврежденной цепи
fault impedance	полное сопротивление в месте повреждения
fault rate	интенсивность отказов
fault resistance	активное сопротивление в месте повреждения
fault signaling	аварийная сигнализация
faults in rotor winding	повреждения в обмотке ротора

faults recorder	аварийный осциллограф
fault situation	аварийный режим
fault statistics	статистика повреждения
fault throwing switch	короткозамыкатель
feedback	обратная связь
feedback amplifier	усилитель с обратной связью
feedback control	управление с обратной связью
feedback ratio	коэффициент обратной связи
feeder	питающая линия
feeder bay	присоединение распределительного электрического устройства
feeder circuit-breaker	линейный выключатель
feeder disconnector	линейный разъединитель
feeding transformer	питающий трансформатор
ferrit core	ферритовый сердечник (магнитопровод)
ferroresonance	феррорезонанс
ferroresonance voltage regulator	феррорезонансный регулятор напряжения
fiber optics	оптоволокно
fidelity	качество воспроизведения
field suppression	гашение поля
field circuit	распределительная сеть
field winding	обмотка возбуждения, обмотка подмагничивания
figure of merit	добротность
fine reading	точный отсчет
fine setting	ступень точной регулировки
first harmonic	первая гармоника
five-legged transformer	пятистержневой трансформатор
fixed contact	неподвижный контакт
fixed setpoint control	управление с фиксированной установкой
fixed value control	управление по параметру
flash-overcurrent	ток перекрытия
fleeting indication	следящее показание
flexible cable	гибкий кабель
flip-flop	триггер
floating point	плавающая запятая
float switch	поплавковое реле
flow diagram	структурная схема
flush mounting	утопленный монтаж
foam fire extinguisher	пожаротушение с помощью пены
follow-up control	следящее регулирование
follow-up system	следящая система
forced control	сильное регулирование

forced outage	вынужденное отключение
frame fault	замыкание на корпус
frame leakage protection system	система защиты от замыкания на корпус
frame protection	защита от замыкания на корпус
free oscillation	свободные колебания
frequency band	полоса частот
frequency changer	преобразователь частоты
frequency control	регулирование частоты
frequency converter	преобразователь частоты
frequency converter substation	подстанция, преобразующая частоту
frequency division	деление частоты
frequency drift	дрейф частоты
frequency interval between channels	частотный интервал между каналами
frequency meter	частотомер
frequency modulation	частотная модуляция
frequency multiplication	умножение частоты
frequency reduction	снижение частоты
frequency relay	реле частоты
frequency response	частотная характеристика
functional block	функциональный блок
fundamental error of measurement	основная погрешность измерения
fundamental wave	основная гармоника
fuse link	плавкая вставка
G	
gain	коэффициент усиления
gain-bandwidth product	произведение коэффициента усиления на ширину полосы пропускания
galloping of conductor	пляска проводов
galvanometer	гальванометр
gang(ed) control	групповое управление
gapless	без воздушного зазора
gas insulated metal-enclosed substation	бронированная подстанция с газовой изоляцией
gas-pressure cable	газонаполненный кабель
gas turbine	газовая турбина
gas turbine set	газотурбинный агрегат
gate	логический элемент
general operating test	полная проверка
generator operation	генераторный режим
generator protection	защита генератора
general-purpose instrument	универсальный измерительный прибор
generating capacity	установленная мощность генератора
generating set	электрогенерирующий агрегат

generating unit	энергоблок
generation	генерация
generation of electricity	производство электроэнергии
generation system	генерирующая система
generator	генератор
generator protection	защита генератора
generator-transformer	генератор-трансформатор
generator-transformer protection	защита генератора-трансформатора
geothermal power station	геотермическая электростанция
governing equipment	управляемое оборудование
grading margin	ступень селективности
group drive	групповой привод
H	
half-cycle	полупериод
half-wave	полупериод
half-wave rectifier	однополупериодный выпрямитель
hall-effect	эффект Холла
harmonic	гармоника
harmonic component	гармоническая составляющая
harmonic content	содержание гармоник
harmonic function	гармоническая функция
harmonic oscillation	гармоническое колебание
heavy conditions	утяжеленный (послеаварийный) режим
high-frequency power line carrier blocking	блокировка по ВЧ каналу
high-frequency cable	высокочастотный кабель
high-frequency generator	высокочастотный генератор
high frequency disturbance test	проверка помехоустойчивости
higher harmonic	высшая гармоника
higher harmonic voltage	напряжение высших гармоник
high impedance differential protection	продольная дифференциальная защита с реле, имеющим большое сопротивление
high set	грубая ступень
high-speed automatic reclosing	быстродействующее АПВ
high-speed automatic reclosing device	устройство быстродействующего АПВ
high-speed excitation system	быстродействующая система возбуждения
high voltage	высокое напряжение
high-voltage d.c. link / HVDC link	электропередача (вставка) постоянного тока
high-voltage installation	установка высокого напряжения
high-voltage network	сеть высокого напряжения
high-voltage side	сторона высокого напряжения

high-voltage switchgear	распределительное устройство (электро-оборудование) высокого напряжения
high-voltage winding	обмотка высокого напряжения
holding winding	удерживающая обмотка
hunting	качания (в энергосистеме), колебания (в системе регулирования)
hydroelectric set	гидроагрегат
hydroelectric power station	ГЭС
hysteresis	гистерезис
hysteresis loop	петля гистерезиса
hysteresis losses	потери на гистерезис
I	
ideal rectifier	идеальный выпрямитель
ideal synchronizing	точная синхронизация
idle	отсутствие нагрузки
idling	на холостом ходе
idling conditions	условия холостого хода
ignition	1) зажигание, воспламенение; вспышка; запал; 2) прокаливание
immobilization	вывод из работы
impedance earthed (neutral) system	электрическая сеть с заземленной через сопротивление нейтралью
impedance protection	дистанционная защита
impedance relay	реле дистанционной защиты
impedance voltage (of a transformer)	напряжение короткого замыкания (транс-форматора)
impulse counter	счетчик импульсов
impulse voltage test	проверка изоляции
inadvertent operation	неправильное срабатывание
incorrect operation of relay protection	неправильное действие защиты
independent time relay	реле с независимой выдержкой времени
indicating relay	реле указательное
indicator lamp	сигнальная лампа
indicator of sense of rotation	указатель направления вращения
indoor apparatus	аппаратура внутренней установки
indoor substation	закрытая подстанция
indoor switch-gear	закрытое распределительное устройство
induced voltage	наведенное напряжение
inductance	индуктивность
induction relay	индукционное реле
industrial interference	индустриальные помехи
inertia constant	постоянная инерция
inexhaustible	неистощимый, нескончаемый, неисчер-

	паемый
inherent feedback	внутренняя обратная связь
infancy	ранняя стадия развития; период становления; начальная стадия процесса
influence	влиять
infrared heating	нагрев инфракрасным излучением
initially	в начальной стадии, в начале
innovative	новаторский, передовой, рационализаторский
installation	установка; сборка; инсталляция
instant	мгновение, миг, момент
integrate	совмещать; объединять; интегрировать
intermediate	промежуточный, переходный
invoke	осуществлять, способствовать осуществлению
involve	включать в себя, содержать
iron ore	железная руда
irrigation	орошение
isotope	изотоп
K	
kernel	ядро; сердцевина
kind	вид, сорт
L	
leakage	протечка, течь, просачивание, утечка
lift	поднимать, повышать
lignite	лигнит, бурый уголь
limestone	известняк
liquefy	плавить, растапливать; сжижать
liquid	жидкость
load	груз; загруженность; нагрузка
longitudinal	продольный
loops	петля; змеевик
low-impact	низкого воздействия
lubricating	смазывающий
M	
maintain	1) обслуживать; поддерживать; содержать в исправности; 2) эксплуатировать
manufacture	производить, изготавливать, выпускать
masonry	каменная или кирпичная кладка
measurement	измерение
melt	плавить; таять
methanol	1) метанол; 2) топливо на основе метилового спирта

mine	1) копь; шахта; горная выработка; 2) залежь, месторождение, рудник; 3) производить горные работы, добывать руду; разрабатывать месторождение
mitigation	ослабление; смягчение; подавление
modification	изменение; видоизменение; модификация, трансформация
moisture	влажность, сырость; влага, мокрота
molecule	молекула
motion	движение; перемещение; ход
multifunctional	многофункциональный
multitude	множество; большое число; масса
N	
natural gas	природный газ
neutron	нейтрон
nitrogen oxides	оксиды азота
non-replenishable	невозобновляемый
nuclear	ядерный; относящийся к атомному ядру; относящийся к ядерной энергии
nucleus	атомное ядро
O	
object	1) предмет; вещь; 2) объект, предмет; 3) цель
occur	1) встречаться, попадаться; 2) происходить, случаться, иметь место; 3) залегать (о месторождении)
operational performance	эксплуатационная характеристика
option	выбор, альтернатива, вариант
overall	полный, общий, от начала до конца
ozone depletion	истощение озонового слоя
P	
particle	частица; крупица
particulates	твердые частицы в отработавших, выхлопных газах
pellet	топливная таблетка (для ядерного реактора)
penetrate	входить, проникать внутрь; проходить сквозь, пронизывать
penstock	1) шлюз, шлюзный затвор; 2) напорный трубопровод; турбинный водовод
per capita	на человека, на душу населения
personnel	коллектив; персонал; личный состав; штат
petroleum	нефть

photocell	фотоэлемент
picosecond	пикосекунда
pipe	труба
pipeline	трубопровод; нефтепровод
plastics	пластмасса, пластик
platinum catalyst	платиновый катализатор
plug	подключать, проводить
plutonium	плутоний
portable	портативный, переносный, передвижной, транспортабельный
potassium	калий
powder-coating	порошковое покрытие; полученное покрытие, напылением порошковых материалов
power	1) мощность; 2) энергия; 3) источник энергии
power plant	1) энергетическая установка, энергоустановка 2) электрическая станция, электростанция, ЭС
preserve	сохранять, сберегать; оберегать, охранять, защищать
pressure	давление
pressurized	1) прессованный, запрессованный; 2) под давлением, находящийся под давлением; 3) герметичный
primordial	первичный, начальный
principle	правило; принцип
process	1) процесс; 2) технологический процесс;3)прием, способ
propane	пропан
proton	протон
purify	очищать
purpose	цель, намерение; замысел, стремление
qualification	квалификация; подготовленность, пригодность; навык; степень квалифицированности
quality	качество
quantity	количество
R	
radiant	лучистый, лучевой
range	варьироваться, колебаться в пределах
rarefaction	1) разрежение; разжижение; 2) разреженность

raw material	необработанный материал; сырье
reactor core	активная зона ядерного реактора
reciprocating	качающийся; поршневой; совершающий возвратно поступательное движение
recognize	распознавать; опознавать; различать
reconfigure	изменять конфигурацию, реконфигурировать
recycling industry	перерабатывающая промышленность
refinery	нефтеперегонный завод
refractory	1) огнеупор, огнеупорный материал; 2) жаростойкий; 3) тугоплавкий; плохо поддающийся переработке
refrigerant	охлаждающее вещество, охладитель
refuel	дозаправиться, пополнить запасы топлива
regard	1) расценивать, рассматривать; считать; 2) относиться; 3) касаться (кого-л. / чего-л.), иметь отношение (к кому-л. / чему-л.); 4) принимать во внимание, считаться (с кем-л. / чем-л.)
release	1) освобождать; отпускать; 2) выбрасывать; выпускать; 3) выделять (энергию, теплоту)
relevant	релевантный; значимый; существенный; важный
reliable	надежный; верный, испытанный
remain	оставаться; находиться
renewable source	возобновляемый источник
repair	ремонтировать
requirement	1) требование; необходимое условие; 2) надобность, необходимость, нужда, потребность
research department	отдел исследований
resemble	походить, иметь сходство
reserve	запас, резерв
reservoir	резервуар; бассейн; водохранилище
residential	жилой
residue	остатки, отходы
resurgence	возрождение; восстановление
reverse	менять местами
rod	стержень
rot	1) гнить; 2) разлагать(ся)
rotate	вращать(ся); поворачивать(ся)

rotor	1) ротор; 2) рабочее колесо (турбины, насоса)
run out	кончаться, иссякать
S	
sample	1) образец, экземпляр; 2) проба
sandstone	песчаник
sawdust	древесные опилки
sawmill	лесопилка; лесопильный завод
selectively	выборочно, по выбору, избирательно
selfignition	1) самовозгорание; 2) самовоспламенение
separately	отдельно, поодиночке, порознь, раздельно
sequentially	1) последовательно, один за другим; 2) последовательно, логически
service	1) работа, сфера деятельности; 2) эксплуатация; 3) обслуживание; 4) услуги, сервис
setting	установка
shaft	вал; ось; стержень
significant	значительный, важный, существенный
silt	ил; наносы; осадок
sink	слив; сток
sluice	1) оборудовать шлюзами; шлюзовать; 2) спускать, выпускать воду через шлюз; вытекать, литься через шлюз
smelly	вонючий, зловонный
smelt	подвергать плавке; расплавлять, выплавлять
soapstone	мыльный камень, стеатит
sodium	натрий
solar energy	солнечная энергия
span	1) охватывать, простираться, распространяться; 2) перекрывать
spew	1) извергаться, бить ключом, фонтанировать; 2) выдавливать, выпрессовывать
spin	крутить, вертеть
split	1) раскалывать, расщеплять, разбивать на части; 2) разбивать, разрушать; 3) разделять, делить на части; распределять
spontaneous	самопроизвольный, спонтанный, беспорядочный
steam	пар
steam reforming	образование пара
store	1) запасать, накапливать; 2) хранить, складировать

strata	1) слои, пласты; 2) напластование; отложение пород
stretched	натянутый
structure	строение, структура; конструкция, устройство
subject (to)	1) подчинять, покорять; 2) подвергать (воздействию, влиянию и т.п.)
substance	вещество
sulfur	сера
sulfur dioxide	диоксид серы, сернистый ангидрид
supplemental	дополняющий, дополнительный
surface mining	1) открытые горные работы; 2) разработка открытым способом
swampy	болотистый, заболоченный, топкий
synthetic fiber	синтетическое химическое волокно
T	
tailrace	1) нижняя вода, нижний бьеф; 2) отводящий канал (водяной турбины)
tanker	1) танкер, нефтеналивное судно; 2) бак, цистерна
tar	смола; деготь; гудрон
technological advances	технический прогресс
technology	1) техника, технические и прикладные науки; 2) технология
tension	напряжение, напряженное состояние
theorize	1) теоретизировать; 2) теоретически предсказывать
thermal	тепловой, термический
tidal	связанный с приливом и отливом; приливоотливный; подверженный действию приливов
tiny	очень маленький, крошечный
tool	инструмент
top layer	верхний слой, верхний уровень
torrent	поток
total	весь, целый; общий, совокупный, суммарный
transverse	пересекающийся, поперечный
trapping	улавливание; захват, захватывание
treatment	1) (технологическая) обработка; 2) очистка
tremendous	огромный, гигантский, громадный
tremendously	очень, крайне, чрезвычайно
two-fold effect	двойной эффект

U	
ultimately	1) в конечном счете, в конце концов; 2) окончательно
underground	подземный
underground mining	1) подземные горные работы; 2) разработка подземным способом
uranium	уран
V	
vapour	пар; испарения
vehicular	транспортный
venting	вентиляция; проветривание; выпуск воздуха; подвод воздуха
versatile	универсальный
vessel	сосуд
viable	жизнеспособный
W	
waste	отходы
wicket gate	поворотный затвор
wind farm	ветровая электростанция
windmill	1) ветряная мельница; 2) ветряк, ветродвигатель; ветроэнергетическая установка
wind tunneling	1) туннельный эффект; туннельный переход; 2) туннелирование
wire	проволока, провод

ЗАКЛЮЧЕНИЕ

Использование в учебном процессе пособия «Английский язык» для обучающихся 1 курса направления подготовки 35.03.06 – Агроинженерия способствует успешному овладению дисциплиной «Иностранный язык», помогает формированию и совершенствованию межкультурной коммуникативной компетенции в сфере профессионального общения, развитию языковых навыков и речевых умений на основе межкультурного подхода, самостоятельному применению этих знаний в разнообразных ситуациях межкультурного и профессионального иноязычного общения, способствует более полному формированию профессиональных компетенций благодаря расширению возможностей использовать аутентичные источники на английском языке.

Приобретенные умения и навыки являются базой для дальнейшего изучения иностранного (английского) языка в магистратуре/аспирантуре и эффективной профессиональной деятельности.

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АНГЛИЙСКИЙ ЯЗЫК

Учебное пособие

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Санитарно-эпидемиологическое заключение № 24.49.04.953.П. 000381.09.03 от 25.09.2003 г.
Подписано в печать 09.02.2023. Формат 60×84/16. Бумага тип. № 1.
Печать – ризограф. Усл. печ. л. 13,25. Тираж 100 экз. Заказ № 143
Редакционно-издательский центр Красноярского государственного аграрного университета
660017, Красноярск, ул. Ленина, 117