Л. В. Дубовцева

АВТОМАТИКА

И ВЫЧИСЛИТЕЛЬНАЯ ТЕХНИКА

Учебное пособие
по английскому языку

МИНИСТЕРСТВО ОБРАЗОВАНИЯ И НАУКИ РФ
ГОСУДАРСТВЕННОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ
ВЫСШЕГО ПРОФЕССИОНАЛЬНОГО ОБРАЗОВАНИЯ

ВЯТСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ
Гуманитарный факультет
Кафедра иностранных языков

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Учебное пособие включает в себя теоретический материал и практический курс, нацеленные на формирование базовых умений работы с литературой по специальности на английском языке, дополнительный текстовый материал для совершенствования сформированных умений в условиях самостоятельной работы, а также справочный материал.

Учебное пособие предназначено для студентов технических специальностей факультета автоматики и вычислительной техники и факультета прикладной математики и вычислительной техники.

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Содержание

INTRODUCTION

THE INTEGRATION OF SCIENCES

In order to be a good biologist now, for instance, you have to know not only what might be called school physics, but quite a lot of really modern physics - quantum physics and so forth - and a great deal of chemistry as a basis for biochemistry. Conversely the physicist himself, even if biology is not part of his subject, is obliged to know something of it because he may find a great deal of his work will be concerned with biophysics. The problem for a physicist, rather than for physics as a subject, arises because physics is increasingly penetrating into all the other parts of science. This is already evident in the names of the new hybrid subjects. We have long had one called physical chemistry; now we have a subject called chemical physics which is different, not so much in the proportion of physics and chemistry that come into it, as in its central interest of helping chemistry in the first case and of extending the range of physics in the second. Now we also have biophysics and biochemistry. It appears that physics is spreading towards biology.

THE SEPARATION OF SCIENCES

When modern science was growing up, from the time of Galileo to the time of Newton, all the sciences were very much joined together. A single man like Cooke could do absolutely first-class in pure mathematics, in physics, in chemistry and even in biology. Towards the end of that time the sciences were just beginning to separate and after that they continued to separate more and more. Just at this moment we are witnessing a great convergence of all the sciences. The mathematical aspect of physics is becoming much more marked, especially now that we have a growing symbiosis between physics and mathematics in computers, for the computer contains both the purely physical element in its actual component and mathematical logic in their arrangement. To develop and make the microcircuit needs a great deal of physics, but although the connections between the computers are actually made with circuits, their lay-out and set-up are really pure mathematics.

UNIT 1. LESSON 1

СПРЯЖЕНИЕ ГЛАГОЛОВ

to be - быть, находиться

	Present	*Past*	*Future*	
I	**am**	\	\	
he, she, it	**is**	**- was**	**- will be**	a student.
we, you, they	**are**	**- were**	/	students.
			(*shall* - I, we)	

to have - иметь, обладать

	Present	*Past*	*Future*	
he, she, it	**has**	\	\	a diploma.
I, we, you, they	**have**	**- had**	**- will have**	diplomas.

Exercise 1. Вставьте *to be* в нужном времени.

1. Nick ... a pupil last year. 2. But now he ... not a pupil any longer. 3. He ... a first-year student. 4. All of you ... not pupils now. 5. You ... first-year students. 6. But last year you ... pupils. 7. In five years you ... engineers. 8. I think you ... good specialists. 9. Your friends from other groups ... specialists too. 10. All of you ... group-mates now.

Exercise 2. Вставьте *to have* в нужном времени.

1. My friend ... many interesting books. 2. They ... a big house in the country next year. 3. His family ... a nice garden. 4. She ... a good trip to London last month. 5. I ... a dog. 6. We ... much work last year. 7. You ... three exams this summer. 8. Her parents ... a comfortable flat. 9. John ... a diploma in five years. 10. The students ... four lessons every day. 11. His brother ... a computer at home. 12. Mary ... two brothers.

Exercise 3. Дайте краткий ответ на вопросы.

1. Have you a computer at home? 2. Have you a brother? 3. Has your brother children? 4. Had he a car last year? 5. Have you a friend? 6. Have you any English books at home? 7. Had our city two universities two years ago? 8. Has the moon an atmosphere? 9. Will the moon have an atmosphere in thousands years? 10. Has the word 'dog' 5 letters? 11. Have you a university diploma now? 12. Will you have a diploma in five years?

ОБОРОТ There + be

1) На русский язык предложение переводится с конца: Где?, Когда? -> Что?
   There are some books on the table. *There will be a test tomorrow.*
   На столе есть несколько учебников. *Завтра будет тест.*
2) There + was/were - было
   There + will be - будет
3) There + is, are/exist - имеется, есть, находится, существует
   There exist many difficulties in space research.
   Существует много трудностей в исследовании космоса.
4) There + смысловой глагол
   There will come a day - Наступит день.
   Once there lived .... - Жили-были ....

Exercise 4. Вставьте *to be* в нужной форме.

1. There ... a TV-set in this room. 2. There ... no mistakes in his last dictation. 3. There ... no garden near his new house next year. 4. There ... two pictures in my sister's room. 5. There ... a lot of French books in her library last year. 6. There ... no English newspaper on the table. 7. There ... coffee in my cup when I had breakfast. 8. There ... a telephone in my flat next month. 9. There ... no maps on the walls of our classroom. 10. There ... no ink in my pen. 11. There ... four classes yesterday. 12. There ... an English lesson tomorrow.

Exercise 5. Прочитайте и переведите предложения на русский язык.

1. There are many satellites in orbit at the present time. 2. There is no atmosphere on the sun. 3. There were no computing machines before 1940. 4. There happened a great fire last year. 5. There existed no human beings on Mars. 6. There will come a day when people will travel from one planet to another. 7. There is no progress without hard work. 8. There were dinosaurs on the earth millions years ago. 9. There is no light in space. 10. There are 12 months in a year.

БЕЗЛИЧНЫЕ ПРЕДЛОЖЕНИЯ С it.

It is necessary to study. - Необходимо учиться.
It was summer. - Было лето.

Exercise 6. Составьте предложения, используя следующие фразы:

far from my home, evening, terrible, 7 o'clock, time to go home, cold, Saturday, a long distance, autumn, dark, late.

Осень. Суббота. Вечер. 7 часов. Пора идти домой. Холодно. Темно. Поздно. Далеко от дома. Долго идти. Страшно.

Exercise 7. Переведите на русский язык.

1. It's difficult to speak English. 2. It's necessary to study English. 3. It's easy to do nothing. 4. It's important to know a foreign language. 5. It's pleasant to read this book. 6. It was interesting to hear the news. 7. It will be fine to see him here. 8. It is nice to meet you. 9. It will be obligatory to learn new words. 10. It was terrible to listen to his story. 11. It is good you've come. 12. It will be bad not to come.

ВЫДЕЛИТЕЛЬНАЯ КОНСТРУКЦИЯ It is .... that ....

Служит для выделения отдельных членов предложения:

It is/was ... that/when/who/whom ...

При переводе появляются наречия: *именно, лишь, это, как раз, же, ведь.*

It was in Russia that the first sputnik was launched in 1957.

Это в России был запущен первый спутник в 1957 году.

It was the first sputnik that was launched in Russia in 1957.

Именно первый спутник был запущен в России в 1957 году.

It was in 1957 when the first sputnik was launched in Russia.

Как раз в 1957 году в России был запущен первый спутник.

Exercise 8. Прочитайте и переведите предложения на русский язык.

1. It is with the help of the radio that we get the news. 2. It was the Russian scientist Lodygin who invented the electric lamp. 3. It was in April when the magazines were brought to the library. 4. It was his brother who brought me the letter yesterday. 5. It was yesterday when we discussed the plan. 6. It is the force of gravity that keeps the planets around the sun. 7. It was Nick who told me the news. 8. It was last week when we saw this film. 9. It was last month when I met him in the university. 10. It was Einstein who gave a new conception of time, space and gravitation. 11. It is in this article that you will find the necessary data. 12. The work was difficult and it was only due to your help that I could finish it.

Exercise 9. Выделите по очереди подчеркнутые члены предложения.

In 1869 for the first time in the history D.I.Mendeleyev classified the chemical elements according to their atomic weights in the Periodic table. (6 предложений)

СУФФИКСЫ СУЩЕСТВИТЕЛЬНЫХ

основа гл. + *-er/-or* = сущ.: - лицо, производящее действие
- орудие действия

to teach - teacher (учитель) *to mix - mixer (смеситель)*

to generate (генерировать) - generator, to distribute (распределять) - distributor, to clean (чистить) - cleaner, to cool (охлаждать) - cooler, to time (регулировать) - timer, to lead (руководить) - leader, to govern (управлять) - governor, to read (читать) - reader, to think (мыслить) - thinker, to write (писать) - writer, to listen (слушать) - listener, to operate (оперировать) - operator

основа гл., сущ. + *-ist* = сущ.: представитель профессии, учения

journal (журнал) - journalist (журналист)

copyist, liberalist, sociologist, typist, realist, activist, naturalist, technologist, geologist, ecologist

основа сущ. + *-ian/-an* = сущ.: род деятельности, национальность

India (Индия) - Indian (индиец)

European, Asian, Hungarian, Bulgarian, Brazilian, electrician, archaeologian, republican, librarian, musician

МНОГОЗНАЧНОСТЬ it

1) Личное местоимение "он, она, оно", родительный падеж "его, ее":
This is a book. It is thick. Give it to me. Это книга. Она толстая. Дай ее мне.
2) Указательное местоимение "это": *What is it? Что это?*
3) Формальное подлежащее: *It is 9 o'clock. Сейчас 9 часов.*
4) В устойчивых выражениях (не переводится): *It is said that...Говорят,что....*
5) Выделительная конструкция: *It is ... that* ("*именно, как раз, только*")

Exercise 10. Переведите предложения.

1. It is a very interesting book, I like it very much. 2. Our club is open, everybody can visit it. 3. Don't give me that magazine, I have already read it. 4. It was late. 5. It is impossible to do our work today, we'll do it tomorrow. 6. It was Newton who discovered the law of universal gravitation. 7. It was the Moscow University that was founded by Lomonosov. 8. It is my friend. 9. Do you see it? 10. It is said that he is a good friend.

ОТКРЫТЫЙ СЛОГ

m<u>e</u>, b<u>y</u>e

a-[ei] s**a**me, p**a**le, sn**a**ke, c**a**ke, **a**te, h**a**te, f**a**te, pl**a**ce, sp**a**ce

e-[i:] b**e**, m**e**, h**e**, c**e**de, m**e**ter, d**e**cent, del**e**te, r**e**gion, m**e**dium

i,y-[ai] m**i**ne, f**i**ne, n**i**ce, pr**i**ce, sk**y**, l**i**ne, cr**y**, b**y**e, m**i**le

o-[ou] h**o**le, n**o**se, g**o**, r**o**pe, v**o**te, b**o**ne, d**o**se, p**o**le, s**o**

u-[ju:] t**u**ne, f**u**se, am**u**se, m**u**sic, st**u**dent, t**u**tor, d**u**ke, c**u**e, c**u**te

АРТИКЛЬ

Служебная часть речи, являющаяся определителем существительного.

Неопределенный артикль *a/an* употребляется для введения нового лица или предмета в ед. числе. *A* ставится перед согласным звуком: *a table, a University*; *an* ставится перед гласным звуком: *an apple*. Если впервые упоминается много предметов, то артикль не употребляется.

Определенный артикль *the* употребляется со всеми существительными. Предмет или лицо, впервые упомянутое с неопределенным артиклем, далее употребляется с определенным, т.к. обозначает уже известный предмет. [ðə] употребляется перед согласным звуком: *the table*; [ði:] используется перед гласным звуком: *the end*.

Неопределенный *a/an*	I see *a* lake. Я вижу (какое-то, одно) озеро.
	I see lakes. Я вижу (какие-то) озера.
Определенный *the*	I see a table. Я вижу (какой-то) стол.
	The table is big. (Этот) стол - большой.

Exercise 11. Вставьте правильный артикль, где нужно.

1. I live in ... modern city. 2. I live in ... big new house. 3. .... house is in ... centre of ... city. 4. I am ... student. 5. I study at ... State University. 6. My friend is ... first-year student too. 7. We are ... good friends. 8. Last year I was ... pupil. 9. I have finished ... school this year. 10. In summer I passed ... exams. 11. I got ... good marks. 12. My … family is small. 13. I have ... parents and ... sister. 14. My mother is ... economist. 15. My father is ... clerk. 16 ... my sister is twenty five. 17. She is ... clerk in ... bank. 18. She likes ... music. 19. I like ... detectives and ... horror films. 20. We are ... friendly family.

UNIT 1. LESSON 2

Exercise 1. Запомните чтение гласных в открытом слоге.

a - [ei] c**a**pable, d**a**ta, m**a**ke, mist**a**ke, m**a**de, t**a**ke, w**a**ve, pl**a**te

e - [i:] P**e**te, **e**ve, sc**e**ne, b**e**, m**e**te, compl**e**te, **e**ven

i/y - [ai] b**y**, div**i**de, l**i**e, s**i**de, w**i**de, t**y**pe, m**y**, st**y**le

o - [ou] n**o**te, cl**o**se, st**o**ne, **o**pen, n**o**, h**o**pe, h**o**me

u - [juː] **u**se, comp**u**ter, t**u**be, h**u**ge, h**u**man, **u**nit

Exercise 2. Вставьте глагол *to be* или *to have* в нужной форме.

1. My friend ... a good student. 2. We ... good engineers. 3. I ... a good pupil. 4. My hobby ... football. 5. Ann ... a lot of work tomorrow. 6. We ... four classes today. 7. Our study at the University ... interesting. 8. Last year I ... four in physics. 9. Nick's school mark in English ... excellent. 10. He ... busy.

Exercise 3. Переведите на английский язык.

1. Я - студент. 2. У нее была интересная работа. 3. Вы будете хорошими инженерами. 4. Мое хобби - музыка. 5. Его школьной оценкой по английскому было отлично. 6. У нас будет четыре занятия каждый день. 7. У моих друзей есть много интересных книг. 8. Он будет врачом. 9. Вы хорошие студенты. 10. У меня будет отлично по английскому языку.

Exercise 4. Переведите предложения с *there + be*.

1. There are many books on physics in our library. 2. There are different articles in this magazine. 3. There were no foreign delegations in our college. 4. There will be many interesting reports at the conference. 5. There are different types of computers nowadays. 6. There were ten computing machines in our classroom. 7. There will be other ways of solving this problem. 8. There was a necessary material in the journal. 9. There is a computer on that table. 10. There is much work today.

Exercise 5. Переведите безличные и выделительные предложения.

1. It's late. 2. It is a computer that makes a machine a robot. 3. It was evening. 4. It will be interesting. 5. It is necessary to study a foreign language. 6. It was John McCarthy who worked at the theory of computing machines. 7. It's time to go. 8. It will be a computer that will assist us in the future. 9. It is you who must know how to use a computer. 10. It was difficult to enter the College.

Запомните следующие слова.

ACTIVE VOCABULARY

term	[tW°m]	термин
mean	[mJn]	обозначать
device	[dJ'vais]	прибор
capable	['keipqbl]	способный
perform	[p°W°fo:m]	выполнять
calculation	[,kxlkju'lei~Sn]	вычисление
human being	['hjumqn 'bi:iN]	человек
involve	[in'vOlv]	вовлекать
data	['deitq]	данные
process	['prouses]	обрабатывать
store	[sto:]	хранить
feed	[fi:d]	подавать
complicated	['kOmplJkeitJd]	сложный
add	[xd]	складывать
subtract	[sqb'trxkt]	вычитать
multiply	['mAltJplai]	умножать
divide	[dJ'vaid]	делить
digit	['didZJt]	цифра
circuit	['s°W°kJt]	схема, цепь
brain	[brein]	мозг
solve	[sOlv]	решать
large-scale integrated	['lRdZskeil ,intJ'greitJd]	большая интегральная
chip	[tSip]	микросхема
design	[dJ'zain]	конструировать
purpose	['p°W°pqs]	цель
scientific	[,saiqn'tJfJk]	научный
use	[jHs]	использование
necessary	['nesJsqri]	необходимый
accurate	['xkjurJt]	точный
complex	['kOmpleks]	сложный

Exercise 6. Прочитайте и переведите интернациональные слова:

computer, automatic, calculation, human, intervention, practice, machine, program, procedure, operation, information, instruction, phenomenally, mathematical, arithmetical, electronic, programming, process, progress, system, temperature, direct, director, table.

Прочитайте текст и переведите его со словарем.

1A. THE DEFINITION OF A COMPUTER

The term "computer" literary means any automatic device capable of performing calculations without human intervention. In actual practice a computer is used as a part of a system involving other machines, programs, human beings, and procedures. The operations performed by a computer are called data processing, or computing.

An electronic computer is a machine that can perform mathematical work and can store and select information that has been fed into it. Such a machine can do a great amount of complicated work in a phenomenally short time.

A computer, for example, can add or subtract hundreds of thousands times a second, multiply thousands times a second, divide hundreds times a second. Specialists have estimated that in making arithmetical calculations man makes one mistake per 200 digits. Electronic computers make one mistake in milliards of digits.

Electronic circuits work thousands times more rapidly than nerve cells in the human brain. A problem that might take the human brain two years to solve can be solved by a computer in one minute.

The heart of the electronic computer lies in its large-scale integrated circuits or chips. A computer must be given certain instructions to work properly. This process is called "programming".

Computers can be designed for specialized purposes, such as directing manufacture of tools and parts, guiding airplane flights, solving mathematical problems, keeping bank accounts, even playing chess.

Many types of scientific work have been greatly speeded up by the use of computers. If there were no computers to make the necessary mathematical calculations, it would have taken years to complete some scientific research work.

A good example of this is the study of fusion process which progresses much more rapidly than expected thanks to specially designed computers. Computers have made weather forecast more accurate by quick analysis of complex data of temperature, humidity, air pressure, winds and rainfall.

Exercise 7. Прочтите следующие слова:

information, calculation, computation, intervention, operation, instruction, revolution, evolution, automation, function.

Exercise 8. Найдите в тексте английский эквивалент.

Буквально означает, вмешательство человека, обработка данных, большое количество сложной работы, сотни раз в секунду, нервные клетки, может занять два года, управление производством, решение математических задач, научно-исследовательская работа, заняло бы годы, благодаря компьютерам, быстрый анализ, если бы не было ЭВМ.

Exercise 9. Закончите предложения.

1. A computer is ... 2. The operations performed by a computer are ... 3. A computer can do a great amount of ... 4. The heart of a computer is ... 5. The process of giving instructions to a computer is ... 6. Computers can solve ... 7. A computer can store and ... 8. An example of computer use in scientific research work is ... 9. Computers are designed ... 10. Computers are used for quick analysis of ...

Exercise 10. Переведите на английский язык.

1. Компьютер это автоматический прибор. 2. Компьютер используется для вычислений. 3. Операции, выполняемые компьютерами, называют обработкой данных. 4. Компьютер решает задачу за одну минуту. 5. Микросхемы это сердце компьютера. 6. Этот процесс называется программированием. 7. Существуют разные типы компьютеров. 8. В компьютере есть много электронных схем. 9. Существует много примеров использования компьютеров. 10. Компьютеры выполняют программы.

Exercise 11. Вставьте *have* в нужной форме Present.

1. A computer ... electronic circuits. 2. Human brains ... nerve cells. 3. Computers ... chips. 4. A human ... a heart. 5. Computers ... special purposes. 6. Scientists ... much work. 7. Computers ... certain programs. 8. A man ... computers. 9. Computers ... large memories. 10. Humans ... great memories.

Exercise 12. Ответьте на вопросы.

1. What does the term computer literary mean? 2. How are the computer operations called? 3. What is a computer? 4. What can computers do? 5. What is the heart of a computer? 6. What is programming? 7. How can computers be used? 8. Are computers used in scientific research work? 9. How are they used in research? 10. How are

computers used in weather forecast?

Exercise 13. Прочитайте и переведите следующие существительные:

computer, calculator, designer, operator, user, selector, player, researcher, director, tester, keeper, reader; specialist, scientist, tourist, physicist, chemist, activist, finalist, medalist, biologist, darvinist, terrorist; mathematician, academician, technician, politician, Italian, American, Australian, German, practician, parliamentarian, Latvian, mechanician.

Exercise 14. Переведите предложения с глаголом *to be*.

1. It is a computer that helps us in research work. 2. It is necessary to use computers in industry. 3. A computer is a complicated automatic device. 4. There are different types of computers. 5. There were no computers before the 1940s. 6. The first computer was a large complicated device of a room-size. 7. There will be computers of a pocket-size. 8. It was the work of scientists that made an electronic machine a computer. 9. It is programming that makes the work of computers accurate. 10. There is much information that we must process. 11. There will be a number of modern computers in our new laboratory. 12. It was my friend who helped me with the calculations. 13. It is important to use computers in scientific research work. 14. The operation of computers is very accurate. 15. It will be necessary to use computers in medicine.

Exercise 15. Переведите предложения с местоимением *it*.

1. Read this book. It is interesting. 2. What is this? It is a new device. 3. It is necessary to finish this work. 4. It is known that he is a good scientist. 5. There is a thing very important for research. It is a computer. 6. Take the book and give it to me. 7. It is not a very difficult problem, you can solve it. 8. It was late and he finished his work. 9. It was John McCarthy who created LISP. 10. It was necessary to test a new program. 11. It is said that computers are used in motorcars. 12. It's an easy test. 13. A computer can store information that has been fed into it. 14. It will be necessary to use computers in research work. 15. It would have taken years to solve this problem.

UNIT 1. LESSON 3

Read the text without a dictionary.

TEXT 1B. MINIATURIZATION

Microelectronics is the branch of electronics which is concerned with the design, production and application of electronic components, circuits and devices of extremely small dimensions. It also includes the technique of putting large numbers of electronic elements on silicon chips when making electronic devices. Many of the technical achievements of the past decades are due to microelectronics.

Making the device small or smaller than small has several advantages.

Weight. Take a modern plane, for example. It carries a lot of electronic apparatus. If it is possible to make any of these smaller and therefore lighter, the plane can carry a heavier load. This is also applied to space satellites, spaceships, and all kinds of computers. Sometimes weight is particularly important. But weight is not the only factor.

Speed. There are several advantages in making, say, computers as small as one can. The smaller the computer, the faster it can work. The signals go to and fro (back and forth) at a very high but almost constant speed. So if one can scale down all dimensions to, let us say, one-tenth, the average length of the current-paths will be reduced to one-tenth. So very roughly speaking, the decreasing all the linear dimensions in the ratio of one to ten gives a valuable advantage: the speed of operation is scaled up 10 times.

The increase in operational speed is a real advantage. There are some situations which require very fast reply time. For example, the automatic blind landing of aircraft requires continuous computer calculations which result in control of the aircraft flight. The more immediate the responses are, the more stable that control can be.

Less power is required. Another advantage is that less power is required to run the computer. In space satellites and spaceships this is an important factor but even in an ordinary situation we need not waste power. Sometimes a computer took so much power that cooling systems which required still more power had to be installed to keep the computer from getting too hot, which increased the risk of faults (failures) developing. So a computer which did not need to be cooled saved power.

Reliability. Another advantage is reliability. Minicomputers and all sorts of microelectronic devices have been made possible because of the development of microelectronics.

It is hard to see how space programmes could have been accomplished without the smallness (compactness), lightness and high reliability of electronic devices on board a spaceship. All the systems of electronic devices on board the cosmic stations and orbital laboratories have proved to be highly reliable. They help astronauts carry out different scientific experiments, among them a number of experiments with semiconductor crystals which are so essential for microelectronics.

Satellites are now intricate (complex) cybernetic apparatus with their own computer systems. At the same time they are much smaller than before, with all their systems having been microminiaturized.

COMPREHENSION TEST

I. Say whether the following statements are true or false.

1. Microelectronics is the branch of electronics.
2. Microelectronics is used for modern technology.
3. Small size of equipment has some advantages.
4. Weight is not important in the modern world.
5. Small computers work faster than large ones.
6. Modern computers require much power.
7. Cooling systems of old computers were very effective.
8. Reliability is an important advantage of minicomputers.
9. Electronic devices on board a spaceship must be compact, light and reliable.
10. Astronauts carry out scientific research with the help of computers.

II. Find the answers to the following questions.

1. What is the field of microelectronics study?
2. Where is the weight of a device very important?
3. Why is the size of a computer important for its working speed?
4. Where is the operational speed needed?
5. What kind of machines were first computers?
6. Where are small and light electronic devices most important?
7. What kind of experiments do astronauts perform?
8. What are the modern satellites?
9. How are satellites controlled?
10. What are the main advantages of miniaturization?

Translate the text into English. Entitle the text.

TEXT 1C

Компьютер - это автоматический прибор. Он способен выполнять вычисления без вмешательства человека. Компьютер - это часть системы вместе с другими приборами, программами, операторами и процедурами. Операции, выполняемые компьютером, называются обработкой данных.

Компьютер - это прибор, который может выполнять математическую работу. Он может складывать, вычитать и выполнять другие арифметические операции.

Сердце компьютера - это микросхемы. Человек дает инструкции компьютеру. Этот процесс называется программированием.

Компьютеры используются в промышленности и научно-исследовательской работе. Компьютер - это сложное электронное устройство.

TEXT 1D. MODERN WORLD OF SCIENCE

Our epoch is an epoch of scientific and technological revolution when new ideas are being born and new discoveries and inventions are being made at an ever increasing rate. Man has entered space and reached out to the Moon, Venus and Mars; he has created complex cybernetic machines, and made computers work for him. Scientists have developed modern automatic production lines, initiated microminiaturization technology, and produced new types of computers.

Our present activities range from the very basic to the very practical, and include research programmes in advanced automation, communication systems, computer-aided design, human-computer interaction, information science systems, systems and control, man-machine systems, studies of the computer environment.

The most critical need today is not the addition of instrumentation to existing processing and manufacturing machines. Automation must be considered as an inseparable part of general improvement programmes and advances in process technology. Automation, properly coordinated with other phases of technology, can substantially contribute to high productive efficiency.

The future paths for automation are various, and it's difficult to say what the main ones are. It may be the perfection of the highly mechanized material handling systems, the improvement of the self-corrective automatic control technique, commonly referred to as "feedback", the automation of production operations, information handling, and data processing. The work on the problem of automation in the research process is being held.

Computer technology plays a most important role in the progress of science. Computers have considerably multiplied the range of complicated tasks that can now be solved. This has stimulated scientific thought and given rise to new trends in computations. Computational methods are being effectively introduced in all spheres of science and industry.

Without computational science the development of technology would be impossible. Notable progress has been made in the field of mathematical logic, the theory of information and programming. All this has been important for the contemporary revolution in computing techniques.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 1E

Listen to the text and complete the sentences.

1. Electronics surrounds us ... : television, tape-recording, radio-receiving.
2. Extremely complicated electronic systems ... the work of huge plants, enterprises and power stations.
3. Electronic computers are widely used in scientific ... and industrial designing.
4. Now mankind is in the new decade of the ... era: it was in 1957 that the first man-made satellite was launched in Russia.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 2. LESSON 1

СТЕПЕНИ СРАВНЕНИЯ ПРИЛАГАТЕЛЬНЫХ И НАРЕЧИЙ

положительная	*сравнительная*	*превосходная*
long	longer	the longest
interesting	more interesting	the most interesting
good, well	better	the best
bad, badly	worse	the worst
much, many	more	the most
little	less	the least
far	farther/further	the farthest/furthest

1. Усилители сравнительной степени: *much, still, far* - намного, гораздо.
   This film is *much more interesting* than the book.
2. The + сравнительная степень, the + сравнительная степень - Чем ..., тем ...
   The sooner, the better. - Чем быстрее, тем лучше.
3. Парные союзы: *as ... as* - такой же ... как; *not so ... as* - не такой ... как.
   He is *as* clever *as* the others. She is *not so* smart *as* her friend.

Exercise 1. Вставьте нужную степень прилагательного.

1. London is the (large) city in Europe. 2. One of the (fine) streets in London is Regent Street. 3. We can find the (big) London shops there. 4. The climate of England is far (good) than in Finland. 5. Winters are still (cold) than autumns. 6. It's getting (dark) and (dark). 7. This problem is the (important) in our work. 8. I live much (far) from the University than you. 9. He likes summer the (well). 10. Is this dictation (difficult) than it was yesterday?

Exercise 2. Переведите на русский язык.

1. The more you read, the better. 2. The less you read, the less you learn. 3. The more you travel, the more you see. 4. The later you start, the longer you stay here. 5. The more difficult the problem is, the more interesting it is to study. 6. Practice is as important as theory. 7. The nights in summer are not as long as in winter. 8. This colour is as bright as that one. 9. Plastics are as useful as metals. 10. The weather now is not so pleasant as it was in the morning, but it was much better yesterday.

ЧИСЛИТЕЛЬНЫЕ

numbers:

382 - three hundred and eighty-two
3,200 - three thousand two hundred
2,045,418 - two million forty-five thousand four hundred and eighteen

dates:

in 1999 - in nineteen ninety-nine
in 1901 - in nineteen o [ou] one
April 21, 2002 - April the twenty-first, twenty o [ou] two

fractions:

1/2 kilometre - half a kilometre
1/4 mile - a quarter of a mile
1/3 ton - one third of a ton
0.02 - point o [ou] two
4.825 - four point eight two five

Exercise 3. Прочитайте следующие числительные:

888; 2561; 717; 35359; 247,012; 54207; 276; 1,000,001; 34,700,200; 376; 0.17; 1/5; 5/8; 35.001; 7.24; 7/9; 0.064; 356.1; 2/17; 7/55; in 1971; in 1066; in 305; in 2001; January 1, 1999; May 27, 2025.

МОДАЛЬНЫЕ ГЛАГОЛЫ

Modal Verb	*перевод*	*эквиваленты*
can (could)	мочь, уметь	be able to
may (might)	можно, разрешается	be allowed/permitted to
must -	должен, нужно, следует	be to; have to; should

	Present	**Past**	**Future**
Способность или возможность совершения действия	He can do it. He is able to do it.	He could do it. He was able to do it.	- He will be able to do it.
Разрешение или предположение	You may do it. You are allowed to do it.	You might do it. You were allowed to do it.	- You will be allowed to do it.
Долженствование	I must do it. I have to do it. I am to do it. I should do it.	- I had to do it. I was to do it. -	- I will have to do it. - -

1. Модальные глаголы употребляются со смысловым глаголом без частицы *to*, не имеют неличных форм (инфинитива, герундия, причастия), не спрягаются, не требуют вспомогательного глагола в вопросе, образуют отрицательную форму путем добавления частицы *not*.

2. *There + can/may be* - может быть; *There + must be* - должно быть.

3. Модальные глаголы + Infinitive Passive:

This method	*can/may* be used.	Этот метод *можно* использовать.
	must be used.	*нужно*
	cannot/may not be used.	*нельзя*
	must not be used.	*не следует*

Exercise 4. Сравните модальные глаголы и их эквиваленты.

1. I can translate this article. I am able to translate this article from Russian into English. 2. He could translate foreign magazines. He was able to translate the article in time. We were able to translate two articles. 3. She will be able to read texts in her speciality. They will be able to read these English texts. 4. You may use dictionaries at the test. You are allowed to translate the text with the dictionary. 5. He might use his notes at the lesson. He was allowed to use the dictionary at the lesson. You were allowed to translate the article at home. 6. She will be allowed to take these books. The students will not be allowed to use dictionaries at the exam. 7. He must study a foreign language. He has to study English. 8. He had to study two foreign languages. He will have to study German at the University. 9. I am to come in time. I was to come in time yesterday. 10. They must come at nine o'clock. They should come to the university tomorrow.

Exercise 5. Переведите предложения с *there* и Infinitive Passive.

1. These processes cannot be automated. 2. There can be some mistakes in this text. 3. The new material may be used in this process. 4. There must be necessary materials in this article. 5. This rule must be remembered. 6. There cannot be other ways of solving the problem. 7. The work must not be stopped. 8. All instruments must be kept in the laboratory. 9. This work was to be done yesterday. 10. Any day a new star may be discovered. 11. There cannot be any mistakes in this program. 12. This electronic element is to be used in the complex device.

СУФФИКСЫ СУЩЕСТВИТЕЛЬНЫХ

основа гл.+ *-tion/-sion/-ion* =сущ.: *to include(включать) - inclusion(включение)*

to examine (экзаменовать) - examination, to continue (продолжать) - continuation, to produce (производить) - production, to consider (рассматривать) - consideration, to accumulate (накапливать) - accumulation, to define (определять) - definition

основа гл. + *-ment* = сущ.: *to move (двигать) - movement (движение)*

to govern (управлять) - government, to treat (лечить) - treatment, to establish (учреждать) - establishment, to replace (заменять) - replacement, to punish (наказывать) - punishment, to equip (оборудовать) - equipment, to manage (управлять) - management

основа прил. + *-ty/-ity* = сущ.: *safe (безопасный) - safety (безопасность)*

local (местный) - locality, regular (регулярный) - regularity, plastic (пластичный) - plasticity, rare (редкий) - rarity, real (реальный) - reality, popular (популярный) - popularity

основа гл. + *-ance/-ence* = сущ.: *differ (различаться) - difference (различие)*

to insist (настаивать) - insistence, to depend (зависеть) - dependence, to correspond (соответствовать) - correspondence, to resist (сопротивляться) - resistance, to attend (присутствовать) - attendance, to signify (значить) - significance

СЛОВА-ЗАМЕСТИТЕЛИ СУЩЕСТВИТЕЛЬНЫХ
one(s), that (those)

Употребляются во избежание повторения одного слова несколько раз:
- с одиночными существительными: *This is a black pen and I need a red one.*
- с зависимыми словами: *The density of water is 1 and that of air is less.*

Exercise 6. Переведите на русский язык.

1. The new map is larger than the old one. 2. This diagram is more interesting than the one I saw yesterday. 3. I have read these books, give me the new ones. 4. The results of the experiment obtained today are better than those obtained last week. 5. The atmosphere of Venus is entirely different from that of Earth. 6. The house of my father was near the road and that of my aunt stood on the bank of the river. 7. The day on Mars is longer than that on Earth. 8. The planet Mars is less massive than our planet but its density is greater than that of the Earth. 9. Most countries use units of metric system and not those of imperial one. 10. The territory of Russia is larger than that of Great Britain. 11. What other methods will they use? The ones they used were not very effective. 12. The speed of a rocket is much greater than that of a plane.

ЗАКРЫТЫЙ ТИП СЛОГА

b<u>a</u>d, m<u>i</u>ddle

a - [æ] m**a**d, f**a**n, f**a**ntasy, c**a**t, r**a**t, p**a**ckage

e - [e] p**e**t, sp**e**ll, c**e**ll, b**e**lt, n**e**st, v**e**ssel, br**e**d

i,y - [i] s**i**n, r**i**sk, p**i**nk, sp**i**ndle, cl**i**ck, f**i**ll, r**i**ddle

o - [ɔ] d**o**g, sm**o**g, l**o**ss, **o**ff, s**o**lvent, b**o**ttle, sl**o**p

u - [ʌ] b**u**s, b**u**tter, th**u**s, sh**u**t, **u**s, pl**u**s, s**u**n

НУЛЕВОЙ АРТИКЛЬ

Артикль не ставится:

1) перед неисчисляемыми существительными, не имеющими множественного числа:

This is chalk. Это мел. Give me the chalk, please. Дай мне (этот) мел.

2) перед днями недели, названиями языков, to have + lunch, etc.:

It's Sunday. I study French. He has dinner at 12.

3) перед существительными, за которыми следует количественное числительное:

Take bus 25. Open books to page 17.

4) перед существительными, обозначающими абстрактные понятия:

We want peace and friendship among people.

5) при отвлечении от материального содержания объекта (имеется в виду не объект, а деятельность, с ним связанная):

Go to bed. We go there by bus. He is at work and she's at home.

6) перед собственными именами, названиями городов и стран, спортивными играми с глаголом to play, учебными предметами и отраслями науки, в обращениях:

I saw Joe yesterday. He is from France. I like physics.

Porter, take the bag, please. I play tennis.

Exercise 7. Вставьте артикль, где нужно.

1. I wake up at 7 o'clock in ... morning . 2. I have ... lunch at 12. 3. I have ... coffee, ... bread and ... butter for ... breakfast. 4. I go to ... school by ... bus. 5. I usually take ... bus 15. 6. I like ... maths and ... music. 7. I learned ... English at ....school. 8. You know that ... London is ....capital of ....England. 9. In ... evening I usually play ... chess with ... my brother. 10. We live in ....peace. 11. "Let's go to ... school, ... brother." 12. On ... Sunday I'll stay at ....home.

UNIT 2. LESSON 2

Exercise 1. Запомните чтение гласных в закрытом слоге.

a - [æ] c**a**n, **a**spect, c**a**rry, ex**a**ct, h**a**nd, cap**a**city, bl**a**ck, m**a**n

e - [e] d**e**sk, l**e**ss, dir**e**ctly, acc**e**pt, el**e**ctrical, f**e**d, n**e**xt

i/y - [i] d**i**git, s**y**mbol, ar**i**thmetic, s**y**stem, s**i**ft, b**i**g, tr**i**p

o - [ɔ] n**o**t, st**o**p, b**o**x, p**o**t, d**o**t, l**o**ng, pr**o**blem, s**o**lve

u - [ʌ] b**u**t, m**u**st, r**u**n, f**u**nction, n**u**mber, s**u**ch

Exercise 2. Переведите предложения со степенями сравнения.

1. Computers work more rapidly than humans. 2. Their work takes a shorter time. 3. It was an easier exercise. 4. This problem is more important than the last one. 5. It's important to make devices smaller. 6. You have far greater possibilities than your group-mates. 7. It was a much more interesting article than that one. 8. These materials are of still better quality than those ones. 9. The wider we use computers of the latest types, the more effective becomes our work. 10. The less you study, the worse.

Exercise 3. Прочтите следующие числительные:

4; 14; 40; 7; 17; 70; 12; 13; 20; 57; 90; 105; 137; 564; 1,242; 2,007; 423,281; 0.35; 4.2; 5.3; 0.2; 7.6; 1/2; 1/4; 2/3; 5/6; 1/8.

Exercise 4. Переведите предложения с модальными глаголами.

1. Different work can be performed by computers. 2. It may take years to solve this problem. 3. A computer must be given the data. 4. Computers can be designed for specialized purposes. 5. This problem can be solved by a computer in a minute. 6. You must learn hard. 7. The text cannot be translated without a dictionary. 8. We don't know what kinds of computers may be in the future. 9. Robots may become our assistants. 10. Must you know English?

Exercise 5. Переведите предложения с эквивалентами модальных глаголов.

1. We were to design the device in time. 2. The engineers had to study the problem of speed calculations. 3. Computers will be able to do all the necessary work in the nearest future. 4. First computers were to add and subtract figures. 5. He was allowed to use this computer. 6. You will not be allowed to use dictionaries at the examination. 7. Specialists are able to play chess with computers. 8. Engineers are to make devices smaller. 9. Computers are able to control satellites. 10. You will have to create new computers.

Запомните следующие слова.

ACTIVE VOCABULARY

classify	[ˈklæsɪfaɪ]	классифицировать
according to	[əˈkɔːdɪŋ tuː]	согласно
special-purpose	[ˈspeʃəlˈpɜːpəs]	специализированный
general-purpose	[ˈdʒenrəlˈpɜːpəs]	универсальный
efficient	[ɪˈfɪʃənt]	эффективный
fast	[fɑːst]	быстрый
restrict	[rɪsˈtrɪkt]	ограничивать
application	[ˌæplɪˈkeɪʃn]	применение
carry out	[ˈkærɪ aʊt]	проводить, выполнять
variety	[vəˈraɪətɪ]	разнообразие
employ	[ɪmˈplɔɪ]	использовать
analog	[ˈænəlɒg]	аналоговый
digital	[ˈdɪdʒɪtəl]	цифровой
exact	[ɪgˈzækt]	точный
number	[ˈnʌmbə]	число, цифра, количество
represent	[ˌreprɪˈzent]	представлять
quantity	[ˈkwɔntɪtɪ]	количество, величина
measure	[ˈmeʒə]	мера
solution	[səˈluːʃn]	решение
equation	[ɪˈkweɪʒn]	уравнение
investigation	[ɪnˌvestɪˈgeɪʃn]	исследование
accept	[əkˈsept]	принимать
scale	[skeɪl]	шкала
record	[rɪˈkɔːd]	записывать
connect	[kəˈnekt]	соединять
sort out	[sɔːt aʊt]	сортировать
sift	[sɪft]	проверять
compare	[kəmˈpeə]	сравнивать
capacity	[kəˈpæsɪtɪ]	объем, мощность
mainframe	[ˈmeɪnfreɪm]	базовая ЭВМ

Exercise 6. Прочитайте и переведите интернациональные слова:

classify, aspect, special, function, efficient, programmer, form, physical, differential, symbol, arithmetic, mechanical, scale, logical, analysis, regulation, minicomputer, microcomputer, personal, business, examine, examination, test.

Прочитайте текст и переведите его со словарем.

2A. TYPES OF COMPUTERS

Computers can be classified according to some aspects. First of all, they may generally be divided into special-purpose machines and general-purpose machines.

Special-purpose computers are able to perform only a certain number of functions. They are usually highly efficient and faster than general-purpose computers but more restricted in their application.

The general-purpose computer is capable of carrying out a wide variety of instructions. Programmers use their expertise and ingenuity to employ the instructions in any way that they choose.

The second way of classifying computers is the following. There are two classes of electronic computers: analog, which are faster but less accurate, and digital, which are slower but more exact.

In analog computers numbers are represented by physical quantities. These numbers are the measures of those quantities. Analog machines are specialized for solving particular problems, such as solution of differential equations.

On the other hand, digital computers work directly with numbers in digital form. In other words, they count numbers ("digit" means a symbol for a number). They can perform the operations of arithmetics: addition, subtraction, multiplication and division.

Analog computers are widely used for the investigation of mechanical processes in the system of automatic regulation. They are designed to accept physical forces such as electrical voltage, weights, pressures, speeds of rotation, or temperature, and record them along a scale.

Digital machines have a wider application. They can be used in any process connected with counting or what is known as "logical analysis", such as sorting out, sifting, and comparing information. The instructions - translated into mathematical terms - must be fed into the machine.

A third way of classifying computers is by capacity. Medium and large-scale computers are usually called mainframes. Next in size are business minicomputers. Smallest of all are the microcomputers, often called personal computers.

Exercise 7. Прочтите следующие слова:

special, specialize, efficient, differential, function, equation, application, solution, regulation, addition, subtraction, multiplication.

Exercise 8. Найдите в тексте английский эквивалент.

Классифицировать согласно, прежде всего, определенное количество, широкое разнообразие, компетентность и изобретательность, физические величины, особые проблемы, с другой стороны, другими словами, считать числа, физические силы, записывать на шкале, логический анализ, перевести на язык математики.

Exercise 9. Вставьте подходящее по смыслу слово из списка:

personal computers, count, logical analysis, fed, operations, perform, investigation, translated, instructions, accept.

1. Special-purpose computers ... only a limited number of functions. 2. General-purpose computers carry out different ... . 3. Computers can perform the ... of arithmetics. 4. Analog computers are used for ... of mechanical processes. 5. They are designed to ... physical forces. 6. Digital computers ... numbers. 7. The instruction must be ... into the machine. 8. There are mainframes, minicomputers and ... . 9. The instructions must be ... into mathematical terms. 10. ... is comparing information.

Exercise 10. Определите, о каком типе компьютера идет речь.

1. ... are able to perform only a certain number of functions. 2. ... are often called microcomputers. 3. ... can perform arithmetical operations. 4. ... are used for the research of physical forces. 5. ... are the medium- and large-scale computers. 6. ... carry out a wide variety of instructions. 7. ... count numbers. 8. ... are less restricted in operation. 9. ... are fast computers. 10. ... use numbers represented by physical quantities.

Exercise 11. Ответьте на вопросы.

1. What is the first way of classifying computers? 2. What can special-purpose computers do? 3. What do general-purpose computers do? 4. What is the difference between these types? 5. What is the second classification? 6. How do analog computers work? 7. What do digital computers do? 8. What is the difference between analog and digital machines? 9. What is the third way of classifying computers? 10. What kinds of computers are there according to this classification?

Exercise 12. Прочитайте и переведите следующие существительные:

education, classification, application, solution, division; development, achievement, enjoyment, improvement, employment; equality, possibility, productivity, similarity, difficulty; importance, convenience, assistance, resemblance, performance.

Exercise 13. Прочитайте и переведите предложения.

1. We can classify computers according to their capacity. 2. Special-purpose computers are able to perform certain functions. 3. The general-purpose computer is able to carry out different instructions. 4. Computer programmers had to use their expertise and ingenuity to create complicated programs. 5. Special-purpose computers are faster than general-purpose ones. 6. The faster is the work of a computer, the easier is our life. 7. Computer operators must feed information into the machine. 8. You may use analog computers in your work. 9. PCs may become the effective means of solving difficult problems. 10. He was to translate the instruction into mathematical terms before feeding it into the machine. 11. Nobody could solve that equation without a computer. 12. The smaller is the computer, the less space it takes. 13. Analog computers are still faster than digital ones. 14. The more accurate is the computer, the more exact is its work. 15. Digital computers are able to perform far more operations than analog ones.

Exercise 14. Переведите предложения с *one(s), that (those)*.

1. These new computers are much better than the old ones. 2. This apparatus is more powerful than the one installed in our laboratory. 3. We have no scientific journals, so I can give you only the technical ones. 4. Analog computers work faster than digital ones. 5. The special-purpose machine is as helpful as the general-purpose one. 6. The capacity of a mainframe is larger than that of a PC. 7. The year on Earth is twice as short as that on Mars. 8. These drawings are better than those of yours. 9. The functions of cars are different from those of lifts. 10. This view on the computers is the one accepted today. 11. This student is not so experienced as that one. 12. The lab assistant tested this device as well as the other ones. 13. These equations are not so difficult as the differential ones. 14. We call mainframes either large-scale computers or the medium-scale ones. 15. His investigation is more complex than that of our professor.

UNIT 2. LESSON 3

Read the text without a dictionary.

2B. MINI-COMPUTER REVOLUTION

Some years ago, the calculator that could fit a vest pocket was still a dream. But thanks to rapid advances in semiconductor technology, the thousands of transistors and other components required to perform the four basic arithmetic operations have been placed in a single integrated circuit about the size of two postage stamps.

But these calculators are only a hint of things to come. We're going to see a true pocket computer in the near future. There appear programmable calculators, machines that can accept complex instructions and use them to automatically perform mathematical operations - just like a computer. The major limitation for vest-pocket computers is the size of the keyboard, not the electronics which is required.

Improved memory technology will provide calculators with almost unbelievable capabilities during the next ten years of the calculator evolution. Even existing memories offer truly incredible storage possibilities. Scientists predicted existing technology could be used to build a memory capable of storing an incredible hundreds of millions bits of information. The memory would occupy a volume of only one cubic inch.

With only a million-bit memory it is possible to use a pocket calculator as a combination of computer, telephone directory, diary, note pad, appointment calendar and dictionary. Frequently used formulas, equations, hard-to-spell words, phone numbers, addresses, names, business contacts and data are stored in the machine's memory simply by keying in the appropriate data. Readout is achieved by a paper tape which rapidly and silently prints the requested information when an encoded instruction is keyed into the machine.

These capabilities are already available in existing pocket machines. The business calculator - a shirt-pocket-size device - incorporates a 200-year calendar in its memory. The miniature paper tape printers have already been developed and are in use on several machines slightly larger, but small enough to fit in the side pocket of a jacket.

Only the keyboard size will limit the miniaturization of vest-pocket computers. The keyboard will require keys for the entire alphabet, the ten digits and various function, memory and instruction keys. Even with a special shift key to double the function of each key, as many as 35 to 40 keys will be required. A typical pocket calculator today has from 7 to 10 keys. Vest-pocket computers will require new kinds of keyboards or perhaps a stylus which is manually touched to various labelled contacts.

Already many people are efficiently using low cost add-subtract-multiply-divide pocket calculators to simplify income tax calculations, count calories, plan budgets and figure gasoline mileage.

Thus, the most significant achievement of modern science has been the appearance of fast-calculating and computing devices and in connection with this, theories on the control and the execution of various processes.

COMPREHENSION TEST

I. Put in the missed word.

1. ... the advances of semiconductor technology we can place the thousands of transistors in a single integrated circuit.
2. Machines ... complex instructions and use them immediately.
3. The major ... is the size of a keyboard.
4. Existing technology is used to build ... capable of storing a lot of information.
5. We may use a pocket calculator as a ... of computer, dictionary and note-pad.
6. You can store appropriate ... in the machine's memory.
7. The business calculator ... a 200-year calendar in its memory.
8. The ... will require keys for the entire alphabet.
9. Various function, memory and instruction ... must be on a keyboard.
10. You will be able to ... touch to contacts by stylus.

II. Find the answers to the following questions.

1. What is the main advantage of minicomputer revolution?
2. What kinds of calculators are already in use?
3. What operations can they perform?
4. What can you say about the existing memories?
5. Where can we use a pocket calculator?
6. What information can be stored in the machine's memory?
7. What capabilities are already available in existing pocket machines?
8. What will limit the miniaturization of vest pocket computers?
9. Why can this limitation appear?
10. What is the way out of this problem?

Translate the text into English. Entitle the text.

TEXT 2C

Компьютеры можно разделить на специализированные и универсальные машины. Специализированные ЭВМ выполняют только определенные функции. Они очень эффективны, но ограничены в своем применении. Универсальные компьютеры выполняют различные инструкции.

Компьютеры можно классифицировать как аналоговые и цифровые машины. Аналоговые ЭВМ быстры. Они используются для решения определенных задач. Цифровые компьютеры точнее. Они выполняют различные арифметические операции. Аналоговые ЭВМ могут использоваться в исследовании механических процессов. Цифровые ЭВМ могут использоваться для логического анализа.

Существуют также большие и средние ЭВМ и персональные компьютеры. Сейчас персональные компьютеры широко используются.

2D. COMPUTER GENERATIONS

The growing demand for instant data has resulted in the invention of the electronic computer system for processing records. In many respects it is a revolutionary system. Besides that it is a rapid one, it makes maximum use of the automation principle.

Electronic digital computers have progressed through three generations.

The first generation was composed of vacuum tube machines. They came in several models and sizes. Their most notable feature - aside from the revolution they affected in business, government, military and scientific methods - was that they were the banks of vacuum tubes they contained. These tubes generated and manipulated the electronic impulses with which the computers operated. But they also gave off a considerable amount of heat and burned out occasionally. As a result, an integral part of most early computer installations was a large air-conditioning system, plus the necessity for having a customer engineer or maintenance man readily available at all times.

The second generation - the so-called solid-state machines - eliminated vacuum tubes in favour of transistors, resistors, diodes and similar semiconductor components. Most of the computers of this generation fell into this category. They required less power, threw off considerably less heat, took up less space and were far more reliable than their predecessors. In addition, most of them were faster, had greater memory capacity and were generally easier to program than first-generation machines.

Third-generation computers are featuring still smaller internal components, faster operating speeds, increased memory capacity and new concepts in data processing.

Most computers, it is important to note, are built as general-purpose machines and can be adapted to almost any one of the jobs.

It is the stored program that separates the electronic digital computer from all other types of counting devices. By storing instructions within the machine the computer can go about its work without manual intervention.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 2E

Listen to the text and find out which antonym appears in the text.

1. Machines could make operations much better, much slower and at lower cost than factory workers did.
2. The first industrial revolution freed man's hands from hard and exciting labour.
3. The invention of electronic computers made it possible to free man's brain from the leisure of measurement and computation.
4. Accurate measurement and exact computation are the bases of ancient engineering and scientific research.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 3. LESSON 1

ВРЕМЕНА ГРУППЫ Indefinite Active

Действие происходит в настоящем, прошлом или будущем независимо от определенного момента времени (констатация факта).

Present Indefinite Active

- Действие регулярное, повторяющееся;
- обстоятельства времени: *usually, always, sometimes, often, every day;*

- утверждение:	*I,we,you,they* ask.	*He,she,it* asks.
- вопрос:	Do *I,we,you,they* ask?	Does *he,she,it* ask?
- отрицание:	*I,we,you,they* do not ask.	*He,she,it* does not ask.

- переводится глаголом настоящего времени.

Past Indefinite Active (2-я форма гл.)

- Действие произошло в законченный период времени;
- обстоятельства времени: *yesterday, two days ago, last month;*

- утверждение:	*I,we,you,they,he,she,it* asked.
- вопрос:	Did *I,we,you,they,he,she,it* ask?
- отрицание:	*I,we,you,they,he,she,it* did not ask.

- переводится глаголом прошедшего времени.

Future Indefinite Active

- Действие непременно произойдет в будущем;
- обстоятельства времени: *tomorrow, in two days, next month;*

- утверждение:	*I,we,you,they,he,she,it* will ask.
- вопрос:	Will *I,we,you,they,he,she,it* ask?
- отрицание:	*I,we,you,they,he,she,it* will not ask.

- переводится глаголом будущего времени.

(В придаточных предложениях после союзов if/when вместо формы Future Indefinite употребляется форма Present Indefinite.)

ВРЕМЕНА ГРУППЫ Indefinite Passive

be + Participle II (3-я форма гл.)

Страдательный залог указывает на то, что предмет или лицо, являющееся подлежащим, подвергается действию.

John asked a question. - The question was asked by John.

Present Indefinite Passive

- утверждение:	*I* am asked.	*He,she,it* is asked.	*We,you,they* are asked.
- вопрос:	Am *I* asked?	Is *he,she,it* asked?	Are *we,you,they* asked?
- отрицание:	*I* am not asked.	*He,she,it* is not asked.	*We,you,they* are not asked.

- способы перевода: *Houses are built here. Дома строят/строятся здесь.*

Past Indefinite Passive

- утверждение:	*I,he,she,it* was asked.	*We,you,they* were asked.
- вопрос:	Was *I,he,she,it* asked?	Were *we,you,they* asked?
- отрицание:	*I,he,she,it* was not asked.	*We,you,they* were not asked.

- способы перевода:

The house was built last year. Дом был построен/построен/построили … .

Future Indefinite Passive

- утверждение:	*I,we,you,they,he,she,it* will be asked.
- вопрос:	Will *I,we,you,they,he,she,it* be asked?
- отрицание:	*I,we,you,they,he,she,it* will not be asked.

- способы перевода:

The house will be built next year. Дом построят/будет построен/будет строиться … .

- Для указания, *кем* производится действие, используется предлог *by, чем - with*.

The work was done by John. (Джоном)

The test was written with a pen. (ручкой)

Exercise 1. Переведите, обращая внимание на время сказуемого.

1. I took this book from the library last week. 2. I wanted to read this book in the original. 3. She often helps you with maths. 4. He usually spends his holidays on the seaside. 5. They will go to the theatre next Sunday. 6. We understood English speakers when we were in England. 7. I don't know where the library is. 8. We will discuss this film after classes. 9. He did not tell me how to use that dictionary. 10. They will return the books on Saturday.

Exercise 2. Переведите и определите время сказуемого.

1. Some weather sputniks will be launched this year. 2. The St. Petersburg Academy of Sciences was established in 1725. 3. Atomic energy is used for peaceful purposes. 4. Last year a scientific expedition was sent to the North Pole. 5. The book is divided into ten chapters. 6. An interesting problem will be discussed at the next lecture. 7. The experiments will be conducted next Monday. 8. Much time is given to the study of the

new methods. 9. The lectures on mathematics are attended by all the students. 10. He was asked many questions at the examination.

Exercise 3. Сравните пары предложений.

1. He published his new article in this journal. Many new articles are published in this journal. 2. We use new materials in our research work. Various materials will be used in our research. 3. Programmers write new programs for computers. Different new programs are written by specialists. 4. The plant produces steel of high quality. Iron and steel are produced from iron ore. 5. This plant provides very accurate instruments. Our lab will be provided with all the necessary instruments.

ОСОБЕННОСТИ ПЕРЕВОДА СТРАДАТЕЛЬНОГО ЗАЛОГА

1. Подлежащее переводится косвенным падежом:

This book was given to me. Эту книгу мне дали.

2. Послелог за сказуемым в страдательном залоге при переводе ставится перед подлежащим:

The design of the new house was much worked at.

Над проектом нового дома много работали. (См.с.200.)

3. При переводе английских глаголов, не требующих послелога, но нужных в русском языке, появляющийся предлог ставится перед подлежащим:

All the questions were answered __ after the lecture.

На все вопросы ответили после лекции. (См.с.200.)

Exercise 4. Сравните сказуемое в действительном и страдательном залогах.

1. The teacher asks the students many questions. The students are asked many questions. 2. He told them an interesting story. He was told an interesting story. 3. She visited her friends. She was visited by her friends. 4. They will show us an interesting laboratory. We will be shown an interesting laboratory. 5. The students listened to his speech attentively. His speech was listened to attentively. 6. I'll give you a good book. I'll be given a good book. 7. They will show us a new film tomorrow. A new film will be shown to us tomorrow. 8. We'll answer all the questions. All the questions will be answered at the lesson. 9. Several young men joined the excursion. The excursion was joined by several young men. 10. The lecture will follow the seminar. The lecture will be followed by the seminar.

Exercise 5. Переведите предложения, начиная перевод с предлога.

1. Good books are always referred to. 2. The new book was not spoken about. 3. Modern buildings are always looked at with interest. 4. Every object is acted on by the gravitation force. 5. The secretary was sent for. 6. The plan was carefully worked at. 7. The poem was much spoken about. 8. He was listened to with great pleasure. 9. All his questions were answered. 10. The theory will be followed by experimental work. 11. The delegates were addressed in English. 12. The new problem will be dealt with next month.

СУФФИКСЫ СУЩЕСТВИТЕЛЬНЫХ

основа гл.,сущ. + *-age* = сущ.: *ton (тонна) - tonnage (тоннаж)*

store (хранить) - storage, short (не хватать) - shortage, cover (покрывать) - coverage, link (связывать) - linkage, pilot (пилот) - pilotage

основа гл.,сущ. + *-ism* = сущ.: течение, учение, направление

terror (террор) - terrorism (терроризм)

nationalism, tourism, darvinism, conservatism, idealism, professionalism

основа прил. + *-ness* = сущ.: *dark (темный) - darkness (темнота)*

lightness, deepness, freshness, kindness, brightness, whiteness

-ure - сущ.: *culture (культура)*

literature, manufacture, architecture, lecture, pleasure, picture, sculpture

-ics - сущ.: раздел науки, знаний *physics (физика)*

mechanics, automatics, statics, dialectics, synthetics, optics

МНОГОЗНАЧНОСТЬ do

1) Смысловой глагол "делать": *I do my homework.*
2) Вспомогательный глагол в Present Indefinite Active: *Do I do my homework?*
3) Усиление действия: *I do come at 7. Я действительно приду в 7.*
4) Заменитель глагола: *We speak English and they do.*

СЛОВА-ЗАМЕСТИТЕЛИ СУЩЕСТВИТЕЛЬНЫХ

the former (первый), the latter (последний из двух названных)

Употребляются, когда два понятия или объекта сравниваются в предложении:

Andrew and John are brothers, *the former* is dark-haired and *the latter* is blond.

(the former - Andrew, the latter - John)

Exercise 6. Переведите предложения.

1. Do they speak German? 2. You don't understand French. 3. I do speak English. 4. He writes letters to his friend, and she doesn't. 5. The students of group 11 write a test paper today, and those of group 12 do too. 6. Don't you see the mistake? 7. Does he study physics? 8. This method does provide necessary results. 9. Jane and Julie are sisters, the latter is more beautiful. 10. Gold and silver are precious metals. I like the former better. 11. I don't know what to choose: cheese or ham. The latter is tastier, I think. 12. I've read a detective story and a thriller. The former was dull and the latter was interesting.

III ТИП СЛОГА

гласный + r: c**ar**, t**ur**n

a [ɑ:]	b**ar**, f**ar**, p**ar**tner, **ar**ticle, f**ar**m, ch**ar**m, st**ar**ter, ch**ar**t, sm**ar**t, **ar**m
e,i,y,u [ɜ:]	f**ur**, f**ir**m, conv**er**t, c**ir**cuit, p**ur**ple, b**ir**th, b**ir**d, h**er**, s**er**ver, n**ur**se
o [ɔ:]	l**or**d, n**or**th, n**or**m, b**or**n, f**or**th, f**or**mer, f**or**mal, sh**or**tly, st**or**m, n**or**

ПОРЯДОК СЛОВ В АНГЛИЙСКОМ ПРЕДЛОЖЕНИИ

утвердительное: *подлежащее сказуемое дополнение обстоятельство*

___*определение*___/

			I	read	English	books	every day.	
			Я	читаю	английские	книги	каждый день	
общий вопрос:		Do	I	read	English	books	every day?	
специ-	What	do	I	do	-	-	every day?	(read) - к сказуемому
альный	What	do	I	read	-	-	every day?	(books) - к дополнению
вопрос:	What books	do	I	read	-	-	every day?	(English) - к определению
	When	do	I	read	English	books?		(every day)-к обстоятельству
			Who	reads	English	books	every day?	(I) - к подлежащему

Exercise 7. Задайте общие и специальные вопросы к предложениям.

1. He is often asked at the English lessons. 2. Such questions are not usually discussed at our meeting. 3. He was given an American magazine yesterday. 4. I was offered some interesting work at a new lab. 5. They showed him the modern equipment of their lab. 6. They spoke much about the research work at the conference. 7. The article will be discussed tomorrow. 8. Some important research work was carried out by a group of students last year. 9. When something is difficult for students they are helped by the teacher. 10. Many people visit our library.

UNIT 3. LESSON 2

Exercise 1. Запомните чтение гласных в III типе слога.

a - [ɑ:]	c**ar**, h**ar**d, l**ar**ge, p**ar**t, c**ar**d, enl**ar**ge, p**ar**ty
o - [ɔ:]	perf**or**m, f**or**m, sh**or**t, s**or**t, p**or**t, supp**or**t, imm**or**tal
e,i,u,y - [ə:]	s**er**ve, t**er**m, c**ir**cuit, f**ir**st, p**ur**pose, t**ur**n, m**yr**tle

Exercise 2. Поставьте глагол в нужной форме Indefinite.

1. We (to classify) computers as analog and digital machines. 2. Programmers (to use) their best in the future. 3. Numbers (to represent) by physical quantities. 4. Computers (to use) as electronic brains in space exploration. 5. Arithmetical operations (to perform) by digital computers. 6. Engineers (to employ) analog computers in industry. 7. Several years ago scientists (to use) only mainframes in research. 8. They (to connect) computers to other pieces of equipment. 9. My friend (to design) a computer-translator. 10. First computers (to design) to perform simple functions.

Exercise 3. Переведите предложения в Passive.

1. Computers can be classified according to some aspects. 2. They may be divided into analog and digital machines. 3. Operations were performed by big electronic devices. 4. The design of the new apparatus was much worked at. 5. The program was fed into the computer two days ago. 6. The article of this well-known scientist is often referred to. 7. Mainframes were followed by minicomputers. 8. The computer was addressed in BASIC. 9. The operation is influenced by this procedure. 10. The small electronic devices will be followed by the smaller ones.

Exercise 4. Задайте вопросы к предложению и подчеркнутым словам.

1. Many <u>various</u> subjects are included in the programme of higher education. 2. <u>The significance</u> of this complex equipment will be shown at the conference. 3. A variety of new computers was shown <u>at the exhibition</u>. 4. Each branch of technology will be given on its <u>scientific</u> basis of production. 5. People must <u>understand</u> the immense significance of computers. 6. The possibilities of scientific <u>achievements</u> are immense. 7. The production of complex equipment <u>shows</u> the achievements of our science. 8. Complex devices <u>are used</u> in every laboratory. 9. Modern installations were introduced <u>into production</u>. 10. New <u>technology</u> will be worked out.

Запомните следующие слова.

ACTIVE VOCABULARY

huge	[hjHdZ]	огромный
fill	[fil]	заполнять
completely	[kqm'pliJtlI]	полностью
refer to	[rI'fW°tu]	ссылаться на
improve	[Im'prHv]	усовершенствовать
occupy	['Okjupai]	занимать
fraction	['frxkSn]	доля; дробь
require	[rI'kwaiq]	требовать
circuitry	['sW°kItrI]	цепь, схема, элемент
contain	[kqn'tein]	содержать
processor	['prousesq]	процессор
unit	['jHnIt]	устройство
memory	['memqrI]	память, ЗУ
hold	[hOuld]	держать
initial	[I'niSql]	исходный, начальный
register	['redZIstq]	регистр
decimal	['desImql]	десятичный знак
control	[kqn'troul]	управление
code	[kOud]	кодировать
sequence	['sikwqns]	последовательность
pulse	[pAls]	импульс
readily	['redIlI]	быстро
input	['input]	ввод
reader	['rIdq]	считывающее устройство
convert	[kqn'vW°t]	превращать, преобразовывать
hard	[hRd]	твердый, жесткий
floppy	['flOpI]	гибкий
output	['autput]	вывод
failure	['feiljq]	поломка
successfully	[sqk'sesfulI]	успешно

Exercise 5. Прочитайте и переведите интернациональные слова:

technology, occupy, fraction, contain, code, correct, pulse, operator, convert, final, printer, disc, industrial, processor, microprocessor, history, historical, generate, collect, collector, collection, diagram, illustrate, illustration, popular, experiment.

Прочитайте текст и переведите его со словарем.

3A. THE STRUCTURE OF A COMPUTER

The earliest computers were huge electronic devices filling a complete room. They were frequently referred to as "giant brains". Modern computers through improved technology occupy only a small fraction of the space required for earlier machines.

The complete electronic circuitry that is required to perform all the functions of a computer can be contained on a small electronic chip, called microprocessor, no larger than a human fingernail.

All the electronic computers, both digital and analog machines, consist of five main parts. The first part is an arithmetic unit which can perform the arithmetic operations at a very high speed.

The second part is the memory which holds the numbers forming the initial data. The memory unit is divided into a number of registers each of which holds one number. These numbers are of standard length, usually from 9 to 12 decimals.

The third part of a computer is the control unit that takes the coded instructions in the correct sequence. Inside the computer the numbers and instructions are stored as electronic pulses. A problem must be fed into the machine, however, in a form in which it can readily be prepared by human operators.

The fourth part of a computer is the unit which does the feeding. This unit is called the input. Usually the input consists of a reader, which converts information that is stored either on hard, or on laser discs into a pulse form. Both the data and the coded numerical instructions are fed into the machine by means of this unit.

The fifth part of a computer is an output unit by means of which final answers are produced. The most common forms of output in the past were punched cards, punched paper tapes, films, floppy discs and printed material. Nowadays these are compact discs and flash drives.

An electronic computer forms a large complicated device. Generally it consists of several thousands or more circuits connected together. The failure of any one part puts the machine out of operation. Computers are used successfully in research and industrial work due to their exactness and speed in calculation.

Exercise 6. Прочтите следующие слова:

microprocessor, require, giant, final, brain, contain, data, fingernail, tape, failure.

Exercise 7. Найдите в тексте английский эквивалент.

Первые компьютеры, занимать небольшую часть, заполняющие целую комнату, гигантский мозг, не больше чем, образующие исходные данные, множество регистров, стандартной длины, в правильной последовательности, быстро приготовить, в виде импульсов, с помощью, выводит из строя, благодаря точности.

Exercise 8. Определите, о какой части компьютера идет речь.

1. ... is used to produce final answers. 2. ... holds the numbers. 3. ... is the heart of a computer. 4. ... performs arithmetic operations. 5. ... converts information into a pulse form. 6. ... takes the coded instructions in the correct sequence. 7. ... is used to feed instructions into the machine. 8. ... stores the instructions in a pulse form. 9. ... uses discs or printers. 10. ... adds, subtracts, multiplies and divides numbers.

Exercise 9. Переведите предложения на английский язык.

1. Ранние компьютеры обычно заполняли целую комнату. 2. Все электронные компоненты могут содержаться на одном микропроцессоре. 3. Существуют два типа электронных машин. 4. Арифметическое устройство выполняет операции с большой скоростью. 5. Запоминающее устройство разделяется на ряд регистров. 6. Устройство управления является третьей частью вычислительной машины. 7. Входное устройство состоит из считывающего устройства, которое превращает информацию в импульсы. 8. Выходное устройство является пятой частью компьютера. 9. ЭВМ обычно состоит из нескольких тысяч элементов. 10. Авария одного элемента выводит машину из строя.

Exercise 10. Ответьте на вопросы.

1. What were the first electronic computers? 2. How many parts do all electronic computers consist of? 3. What operations can an arithmetic unit perform? 4. What is the second part of a computer? 5. What is its function? 6. What is the third part of a computer? 7. What does it do? 8. Where are the numbers and instructions stored? 9. What does the fourth part of a computer do? 10. What does the reader convert information into? 11. By what unit can we feed information into the machine? 12. What is the fifth part of a computer? 13. What are the most common forms of output?

Exercise 11. Прочитайте и переведите следующие существительные:

nature, temperature, future, failure, figure, pressure, measure, procedure; breakage, package, percentage, passage; smallness, exactness, effectiveness; liberalism, materialism, practicism; phonetics, electronics, mathematics, stylistics, dynamics.

Exercise 12. Переведите предложения в Indefinite.

1. He worked with this digital machine and made many calculations. 2. These tables hold the initial data. 3. The results were given in time. 4. The memory is divided into several registers. 5. This unit will be used in our research. 6. We will make a device which will contain an input and an output units. 7. The computer performs complicated calculations. 8. The output unit will produce final answers soon. 9. They were shown those new devices. 10. We will be given a complicated task. 11. Students will be told the theory of computation at the next lecture. 12. The laboratory assistant was sent for. 13. The theory will be followed by experimental work. 14. This text-book is often spoken about. 15. Modern computers are always looked at with interest.

Exercise 13. Переведите предложения с *do* и *the former/the latter*.

1. It did take much time to calculate this sophisticated design. 2. Does this method of computing provide us with good results? 3. Successeful experiments do occur in the field of microelectronics. 4. The computer didn't exist in the 1930s. 5. The electronic device does possess all the characteristics needed. 6. This device uses a greater amount of energy than the other one does. 7. Not all the computers operate with numbers, when they do we call them digital. 8. What will happen when we do this task? 9. Analog computers process information as do digital ones. 10. Special-purpose and general-purpose computers differ one from another more than analog and digital ones do. 11. The mainframes and PCs are used in engineering design, the latter are being employed more often. 12. The two problems are very important - mathematical and logical ones, the former is a bit easier. 13. The difference between general-purpose and special-purpose machines is that the former has the qualities that the latter lacks. 14. In designing two new devices, the scientist noted the former operated properly, but the latter did not. 15. Computer design and programming are very young branches, but the former is a bit older.

UNIT 3. LESSON 3

Read the text without a dictionary.

3B. COMPUTER MEMORY AND HUMAN BRAINS

Comparisons of computer memory with the picture of human memory emerging from psychological research suggest basic differences in modes of operation, with little likelihood that one can replace the other.

Comparisons of the structural and functional properties of computer memory and human memory have been attempted often over the years, usually by computer scientists than psychologists; but there has been an asymmetry in that engineering specifications for the computer memory are readily supplied, whereas corresponding parameters of human memory have been largely unknown.

Perhaps we can generalize a little about the comparison between man and computer. Everyone working with computers is familiar with the fact that they began as devices with an extremely specialized application. Since that time, however, they have become so diversified that it is now possible to obtain, on the one hand, a mini- or even micro-computer dedicated to some very specific task or, on the other hand, a general-purpose computer capable of dealing with a very wide variety of problems indeed. On this continuum from specialized to general purpose it begins to appear that the human memory system belongs somewhere off the top. This attribute runs through comparisons that can be made between various aspects of human and computer memory.

With regard to efficiency, the computer appears far superior to human memory as long as we make the comparison on the basis of information defined, as a computer would deal with it, as bits of items. However, the human memory system typically does not limit itself to discrete representations of discrete items, but may retain information about properties of items or events and their distribution over time that would not be taken into account in programming a computer or a computer model.

Although the efficiency of modern digital computers in storing and retrieving information is awe-inspiring to human beings, the comparisons we have made suggest that the idea of a race between man and computer is inappropriate. Even serious consideration of the possibility that computers could soon take over important functions of human memory seems premature. It is true that computers can successfully take over some intellectual functions from human beings, in particular calculation, but in these cases both computer and man are required to deal with the same inputs and produce the

same outputs.

Even more difficult is the comparison of brains and machines in computation. As late as 1959 the term "computer" is defined in the S.E.D. (Standard English Dictionary) as the "one who computes". Similarly, the word "memory" is the faculty by which things are remembered. There is no mention that this faculty is shared by machines. The use of this word by engineers has now proceeded to such a point that it can be doubted whether, strictly, a brain has a memory at all. Nevertheless, the engineering studies have been an enormous stimulus to the study of the brain's memory system.

Many differences between brains and computers arise from the fact that the former use many slow and imprecise channels in parallel, whereas computers use few and speedy ones. As a result, the computer can do its basic operations with the aid of relatively few units of equipment which are precise, bulky and expensive.

COMPREHENSION TEST

I. Find the wrong statement.

1. There are several generations of computers.
2. They are widely used now and will be used still more in future.
3. There are no principal differences between the computer and human memory.
4. The computer memory may retain data about the distribution of events in time.

II. Complete the sentence.

Computers...
1. can retain any information about all properties of a thing.
2. are studied mostly by psychologists.
3. may be dedicated to some specific task or may be a general-purpose machine.

III. Find the answers to the following questions.

1. What is the basic difference between computer memory and human memory?
2. What specialists compared these two memories?
3. Which memory do we know better?
4. What purpose are computers used for?
5. Which memory is more effective?
6. What functions can computers successfully take over from human beings?
7. How was the word 'computer' initially defined?
8. Who used the term memory about computers at first?
9. Does a human brain have a memory at all?
10. What channels are used by both memories?

Translate the text into English. Entitle the text.

TEXT 3C

Первые ЭВМ были сложными электронными приборами. Они занимали целые комнаты. Современные ЭВМ занимают лишь часть того пространства. Микропроцессор не больше размера человеческого ногтя.

Все компьютеры состоят из пяти основных частей.

Первая часть - это арифметическое устройство. Оно выполняет арифметические операции с высокой скоростью. Вторая часть - это запоминающее устройство. Оно содержит числа и информацию. Третья часть компьютера - это устройство управления. Оно применяет инструкции в нужной последовательности. Четвертая часть компьютера - это устройство ввода. Оно осуществляет ввод информации. Пятая часть компьютера - это устройство вывода. Оно выдает окончательные ответы.

ЭВМ - это сложное устройство, состоящее из множества элементов. Неполадки любой части могут вывести машину из строя.

3D. IT'S A SMALL WORLD

What change is electronics undergoing now? The evolution of electronic technology over the past decade has been so rapid that it is sometimes called a revolution.

Microelectronics has changed our lives beyond recognition. Small and reliable sensing and control devices are essential elements in the complex systems that have landed on the Moon and are exploring cosmic space. Microelectronic devices are also the essence of new products, ranging from communication satellites to hand-held calculators and electronic watches.

More significant is the effect of microelectronics on the computer. The first computer had 18,000 valves and weighed 30 tons. Now matchbox-sized computers are being built. The capacity of the computer for storing, processing and displaying information has been greatly increased due to microelectronics. So how did the era of microelectronics begin?

1) Valves. Anyone who has looked inside an old radio-receiver will remember the large heavy valves and other components, joined together by numerous wires. It was once the universal practice to manufacture each of the components separately and then assemble the complete device by wiring the components together with metallic conductors. A lot of soldering work was required to put the parts together. That was the earliest step in the development of radioelectronics - the era of electronic vacuum tubes.

2) Transistors. The first "revolution" came in the late forties with the advent (appearance) of the first solid state device - the transistor. It was in fact the starting point of modern electronics.

Transistors revolutionized radio engineering and electronics because they had many advantages over vacuum tubes. They were smaller, lasted longer and were more efficient as they used less power. Without transistors the process of miniaturization could never have been started. In many situations transistors replaced large power-hungry vacuum tubes. Transistors were perfect for a lot of purposes. They offered reduced size, lower consumption of power and higher reliability than vacuum tubes.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 3E

Listen to the text and find out which words are left out.

1. ... computes by using physical analogs of numerical measurements.
2. ... computes by using the numbers (digits) and yeses and noes expressed usually in 1's and 0's.
3. ... are known as input, storage, arithmetic and logic, output, and control.
4. ... appear so simple that one of the inventors says: "The machine does practically nothing, but it does ‘nothing’ very well".

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 4. LESSON 1

ВРЕМЕНА ГРУППЫ Continuous Active

be + смысл.гл.-*ing*

Действие происходит в определенный момент или отрезок времени в настоящем, прошлом или будущем (процесс совершения действия).

Present Continuous Active

- Действие происходит в настоящий момент или отрезок времени;
- обстоятельства времени: *now, at the present moment, while I'm reading;*

- утверждение:	*I* am asking.	*He,she,it* is asking.	*We,you,they* are asking.
- вопрос:	Am *I* asking?	Is *he,she,it* asking?	Are *we,you,they* asking?
- отрицание:	*I* am not asking.	*He,she,it* is not asking.	*We,you,they* are not asking.

- переводится глаголом настоящего времени несовершенного вида.

Past Continuous Active

- Действие происходило в определенный момент или отрезок времени;
- обстоятельства времени: *yesterday at 3, when I came, while I was reading, all the evening, from 10 to 12,* etc.;

- утверждение:	*I,he,she,it* was asking.	*We,you,they* were asking.
- вопрос:	Was *I,he,she,it* asking?	Were *we,you,they* asking?
- отрицание:	*I,he,she,it* was not asking.	*We,you,they* were not asking.

- переводится глаголом прошедшего времени несовершенного вида.

Future Continuous Active

- Действие будет происходить в определенный момент или отрезок времени;
- обстоятельства времени: *tomorrow at 3, when I come, while I am reading, the whole day, for two hours,* etc.;

- утверждение:	*I,we,you,they,he,she,it* will be asking.
- вопрос:	Will *I,we,you,they,he,she,it* be asking?
- отрицание:	*I,we,you,they,he,she,it* will not be asking.

- переводится глаголом будущего времени несовершенного вида.

ВРЕМЕНА ГРУППЫ Continuous Passive

be + *being* + Participle II (3-я форма гл.)

Страдательный залог указывает на то, что предмет или лицо, являющееся подлежащим, подвергается действию.

Pete was reading the text. - The text was being read by Pete.

Present Continuous Passive

- утверждение:	*I* am being asked.	*He,she,it* is being asked.	*We,you,they* are being asked.
- вопрос:	Am *I* being asked?	Is *he,she,it* being asked?	Are *we,you,they* being asked?
- отрицание:	*I* am not being asked.	*He,she,it* is not being asked.	*We,you,they* are not being asked.

Past Continuous Passive

- утверждение:	*I,he,she,it* was being asked.	*We,you,they* were being asked.
- вопрос:	Was *I,he,she,it* being asked?	Were *we,you,they* being asked?
- отрицание:	*I,he,she,it* was not being asked.	*We,you,they* were not being asked.

Future Continuous Passive - не употребляется.

Exercise 1. Определите время сказуемого и переведите предложения.

1. At this moment they are testing a new device. 2. I was working all day yesterday. 3. She is singing a popular song now. 4. We will be listening to the concert this time tomorrow. 5. They were going to the University when I met them. 6. She will be translating the article from 9 to 11 tomorrow. 7. Listen to him. He is telling interesting things. 8. She was having her dinner when her friend came. 9. At this moment my parents are watching TV. 10. I will be making my report for 20 minutes.

Exercise 2. Выберите глаголы в соответствующем времени.

1. When I came home he (was sleeping, slept). 2. They (made, were making) the experiment at 6 o'clock yesterday. 3. At present the automation of industrial processes (was playing, is playing) a very important role. 4. I (waited, will be waiting) for you from 9 till 10 tomorrow. 5. The lecturer (demonstrates, will be demonstrating) an experiment for an hour at the next lesson.

Exercise 3. Поставьте глагол в скобках в нужном времени.

1. It is evening. They (to listen) to the latest news. 2. He (to do) his homework for two hours yesterday. 3. She (to translate) the text when you come. 4. I (to make) my report at the lecture that time yesterday. 5. We (to listen) to the concert over the radio at 5 o'clock tomorrow.

Exercise 4. Вставьте нужную форму глагола в страдательном залоге.

1. The exercise ... written now. 2. The device ... used at the present moment. 3. The texts ... analyzed the whole lesson yesterday. 4. The experiment ... carried out from 8 till 10 two days ago. 5. What articles ... translated by the students now? 6. The industrial processes ... studied by us for two weeks. 7. The plan ... discussed now. 8. He ... told this story the whole night.

Exercise 5. Переведите предложения в страдательном залоге.

1. New organic materials are being widely introduced. 2. The motor was being tested when the chief engineer came. 3. A new school is being built in our street. 4. A new article is being read by the students now. 5. I am being asked now by the teacher. 6. The first-year students were being examined in physics from 9 till 12. 7. The object is being acted upon by two forces. 8. The experiments were still being made in some laboratories when the new term began. 9. Many questions are being considered by a commission. 10. A new tunnel was being built in London for 3 months.

Exercise 6. Переведите, обращая внимание на залог и время.

1. The use of Continuous Tenses is being explained now. 2. We will be discussing this tense the whole lesson tomorrow. 3. The motor will be tested next week. 4. The new equipment is always looked at with pleasure. 5. We were asked to show a new device. 6. This building was being built for 8 months last year. 7. He was showing them the latest devices. 8. Many new programs are being created in our lab. 9. This text is being read by the students now. 10. I was listening to the news when you came.

Exercise 7. Скажите, о каких видах работы над текстом идет речь.

1. The text is being discussed. 2. The text is being analyzed. 3. The text is being listened to. 4. The text is being translated. 5. The text is being written down. 6. The text is being summarized. 7. The text is being divided into parts. 8. The text is being rendered into Russian. 9. The text is being read. 10. The text is being retold.

Exercise 8. Переведите, начиная с предлога.

1. This project is being referred to now. 2. The news was being much spoken about yesterday the whole evening. 3. All the questions were being answered from 10 till 12 yesterday. 4. He is being listened to attentively now. 5. The plan was being carefully worked at when I came. 6. The reaction was being influenced for two hours.

СУФФИКСЫ ПРИЛАГАТЕЛЬНЫХ

основа гл. + *-able/-ible* = прил.: возможность совершения действия

-less = прил.: невозможность совершения действия

to count (считать) – countable (исчислимый), countless (неисчислимый)

to permit (позволять) - permissible, to reproduce (воспроизводить) - reproducible, to adjust (регулировать) - adjustable, to rely (надеяться) - reliable, to solve (решать) - solvable, to drink (пить) - drinkable, to accept (принимать) - acceptable

to imagine (воображать) - imaginable, imagineless; to resist (сопротивляться) - resistible, resistless

основа сущ. + - *ful* = прил.: наличие качества

- *less* = прил.: отсутствие качества

use (польза) - useful (полезный), useless (бесполезный)

thankful, thankless; hopeful, hopeless; harmful, harmless; tasteful, tasteless; heartful, heartless; meaningful, meaningless

основа сущ. + *-y* = прил. *noise (шум) – noisy (шумный)*

stormy, silvery, frosty, thirsty, hungry, dirty, lucky, dusty

НЕОПРЕДЕЛЕННЫЕ МЕСТОИМЕНИЯ some, any, no, every

There are *some* books on the table.
Are there *any* books on the table?
There are *not any* books on the table. \
There are *no* books on the table. /

*some*thing что-то	*some*one/body кто-то	*some*where где-то
*any*thing что-либо	*any*one/body кто-либо	*any*where где-либо
*no*thing ничто	*no* one/body никто	*no*where нигде
*every*thing все	*every*one/body все	*every*where везде

*some*how как-нибудь *some*way каким-либо образом
*any*how как-либо *any*way во всяком случае
no-how никак *no*-way ни в коем случае

Exercise 9. Переведите предложения.

1. Something important took place there. 2. Nobody failed in this examination yesterday. 3. I wasn't shown any interesting photographs. 4. Have you got any questions? 5. Can anybody show me the way to the station? 6. He didn't try to do anything. 7. The commission has found nothing wrong. 8. They made no changes in the

working plan. 9. Nothing interesting happened while I was away. 10. No traffic was allowed along the street because of the accident. 11. He could think of nothing really interesting. 12. Some new safety rules were considered by the committee. 13. I couldn't understand anything from his letter. 14. The old man didn't get any education. 15. Everything was fine.

IV ТИП СЛОГА

глас.+ r + глас.: care, cure

a -[ɛə]	h**are**, d**are**, comp**are**, prep**are**, v**ari**ous, **are**a, sn**are**, f**are**, squ**are**
e -[iə]	s**eri**es, p**eri**od, sinc**ere**, s**ere**, p**eri**odic, s**eri**ous
i,y -[aiə]	B**yro**n, sat**ire**, t**yra**nt, m**iry**, asp**ire**, adm**ire**, s**ire**n
u -[juə]	p**uri**ty, f**uri**ous, c**uri**ous, l**ure**, p**ure**, b**uri**n, d**ura**bility
o -[ɔ:]	**ore**, sh**ore**, b**ore**, t**ore**, p**ore**, m**ore**, sn**ore**, ad**ore**, b**ori**ng

ПОРЯДОК СЛОВ В ПРЕДЛОЖЕНИИ

		I	read	English	books	every day.
		Я	читаю	английские	книги	каждый день
разделит.вопрос:		I	read	English	books	every day, do not I?
альтерн.вопрос:	Do	I	read	English or French	books	every day?
отрицание:		I do not	read	English	books	every day.
краткий ответ:		Yes, I do.		No, I do not.		
косвенный	Ask if	I	read	English	books	every day. - к предложению
вопрос:	Ask what	I	read	-		every day. (books) - к дополнению
	Ask who	reads		English	books	every day. (I) - к подлежащему

Exercise 10. Задайте вопросы к предложениям.

1. He is often asked at the English lessons. 2. Such questions are not usually discussed at our meeting. 3. He was given an American magazine yesterday. 4. I was offered some interesting work at a new lab. 5. They showed him the modern equipment of their lab. 6. They spoke much about the research work at the conference. 7. The article will be discussed tomorrow. 8. Some important research work was carried out by a group of students last year. 9. When something is difficult for students they are helped by the teacher. 10. Many people visit our library.

UNIT 4. LESSON 2

Exercise 1. Запомните чтение гласных в IV типе слога.

a - [ɛə] c**are**, sp**are**, squ**are**, r**are**, f**are**, b**are**, st**are**

e - [iə] h**ere**, sph**ere**, m**ere**, s**ere**, m**ere**ly

i/y - [aiə] w**ire**, t**ire**d, f**ire**, h**ire**, t**ire**, des**ire**, t**yre**, l**yre**

o - [ɔ:] st**ore**, m**ore**, c**ore**, f**ore**, bef**ore**, expl**ore**, sc**ore**

u - [juə] c**ure**, p**ure**, sec**ure**, imp**ure**, l**ure**, d**ura**ble, d**uri**ng

Exercise 2. Поставьте глагол в нужной форме Continuous.

1. He (to carry out) a research in computer design. 2. Scientists (to improve) men's lives. 3. The student (to make) calculations when I came into the class. 4. She (to take) an exam tomorrow from 10 till 12. 5. These numbers (to form) initial data now. 6. The necessary information (to feed) at the moment. 7. The calculations (to make) the whole day yesterday. 8. The failure of this chip (to put) the machine out of operation. 9. The number (to be) of 9 decimals. 10. The memory (to save) information now.

Exercise 3. Сравните предложения в Indefinite и Continuous.

Active: 1. The computer processes data every day. The computer is processing data now. 2. The computer processed data last week. The computer was processing data the whole day yesterday. 3. The computer will process data in a minute. The computer will be processing data when we come.

Passive: 1. Necessary data are processed every day. Necessary data are being processed now. 2. The data were processed yesterday. The data were being processed when the professor came. 3. The data will be processed tomorrow. —

Exercise 4. Переведите предложения в Continuous.

1. The University is making an important research. 2. An interesting research in the field of microelectronics is being done with the help of computers. 3. The computers are doing the computations. 4. Now the computations are being done with the help of a pocket calculator. 5. Programmers were studying the results of data processing. 6. The information about these computations was being studied by the research group for a week. 7. The computer is translating a technical text now. 8. The engineer was testing a new device when I came in. 9. Professor N. will be delivering a lecture on electronics at 5 o'clock tomorrow. 10. This new machine language is being worked at by specialists.

Запомните следующие слова.

ACTIVE VOCABULARY

apply	[qp'lai]	применять
various	['vFqriqs]	различный
branch	[brRntS]	отрасль, сфера
widely	['waidlI]	широко
thanks to	['Dxnks tu]	благодаря
due to	['djH tu]	благодаря
accuracy	['xkjurqsi]	точность
movement	['muvmqnt]	движение
job	[dZOb]	работа
science	['saiqns]	наука
size	[saiz]	размер
typewriter	['taip,raitq]	пишущая машинка
limit	['limIt]	ограничение
save	[seiv]	сохранять
leisure	['leiZq]	досуг
extremely	[Iks'trJmlI]	крайне
relate	[rI'leit]	относиться
order	['Ldq]	порядок
use	[ju:z]	использовать
useful	['jHsfu l]	полезный
routine	[rH't Jn]	заведенный порядок
overestimate	['ouvqr'estImeit]	переоценивать
monotonous	[mq'nOtnqs]	однообразный
dull	[dA l]	скучный
type	[taip]	печатать
universal	[,jHnI'vW sq l]	универсальный
installation	[,instq'lei Sn]	установка
certain	['sW tn]	определенный
increase	[In'kri:s]	увеличивать
efficiency	[I'fi Sqnsi]	эффективность

Exercise 5. Прочитайте и переведите интернациональные слова:

rocket, industry, sport, medicine, limit, accurately, routine, fact, clerical, document, modern, office, universal, organization, role, efficiency, visit, physics, mechanics, mathematics, optics, cybernetics, globe, global, energy, specialist, expert, cycle.

Прочитайте текст и переведите его со словарем.

4A. COMPUTER APPLICATION

There are different kinds of computers and they are applied differently in various branches of human life. All computers are used largely in research and industrial work thanks to their accuracy and calculation speed.

Some do only one job ever and ever again. These are special-purpose computers. One such computer automatically controls the movements of anti-aircraft cannon. It was built for this purpose alone, and cannot do anything else.

But there are some computers that can perform many different jobs. They are called general-purpose computers. These are the "big brains" that solve the most difficult problems of science. They answer the questions about rockets and planes, bridges and ships long before these things are even built.

Today there are computers small enough to carry in one's pocket or about the size of a typewriter. These new computers are called personal computers. We use them in our everyday life.

Computers help space programmes, armed forces, business and industry, sports and medicine, art and education. Computers are the most efficient servants man has ever had and there is no limit for their application in improving men's lives and saving time for leisure.

Computers are capable of doing extremely complicated work in all branches of learning. They can solve the most complicated mathematical problems or put thousands of unrelated facts in order. As computers work accurately and at high speeds, they save research workers years of hard work.

Electronic computers have become very useful at routine clerical work in offices and factories. You can find computers on every desk in the modern office. We cannot overestimate their role in performing monotonous and dull work of typing and retyping different documents and letters.

The computer is a universal information processing machine. The installation of computers in certain organizations has already greatly increased their efficiency. Computers are a million times faster than humans in performing computing operations.

Exercise 6. Прочтите следующие слова:

rocket, plane, bridge, ship, pocket, typewriter, space, force, business, industry, sport, medicine, art, education, office.

Exercise 7. Найдите в тексте английский эквивалент.

Различные области, благодаря точности, снова и снова, только для этой цели, что-нибудь еще, задолго до того как, достаточно малы размером, которых человек когда-либо имел, нет предела, экономия времени для отдыха, крайне сложную работу, несвязанные между собой факты, расставить в порядке, годы упорной работы.

Exercise 8. Подберите синонимы из каждой группы.

A: apply, monotonous, perform, fast, complicated, research, plant, exact, application.

B: use, investigation, complex, routine, accurate, employ, works, do, quick.

C: exploration, factory, use, precise, carry out, rapid, employment, dull, sophisticated.

Exercise 9. Замените подчеркнутое слово синонимом.

1. Computers are applied in different branches of human life. 2. All computers are used for industrial work. 3. We use computers in space programmes. 4. Electronic devices are very useful in plants. 5. We feed the necessary data into a computer. 6. Specialists employ universal computers in their work. 7. Computers are used due to their exactness. 8. Computers are faster than humans. 9. Scientists employ computers in investigations. 10. It's the most complex problem.

Exercise 10. Задайте все типы вопросов.

1. Some computers can perform many different jobs. 2. Computers were capable of doing extremely complicated work. 3. Computers will completely replace people in making monotonous and dull work.

Exercise 11. Ответьте на вопросы.

1. How are different types of computers used in human life? 2. Why do we use computers? 3. What kind of job can special-purpose computers perform? 4. What kind of work do general-purpose computers fulfill? 5. In what spheres are computers being applied now? 6. Is there any limit for the computer application? 7. Why do research workers use computers in their research? 8. What job is being done by the computers in offices? 9. What is a computer? 10. Why do computers increase the efficiency?

Exercise 12. Прочитайте и переведите следующие прилагательные:

eatable, comparable, suitable, capable, possible, probable, movable, measurable, changeable, breakable, usable; colourful - colourless, powerful - powerless, careful - careless, helpful - helpless; easy, sunny, funny, rainy, windy.

Exercise 13. Переведите предложения в Continuous.

1. Microelectronics is playing an important part in the development of science and industry. 2. A complex research programme is being realized now to increase the efficiency of computing machines. 3. The technology of the production and the design of various devices are being improved nowadays. 4. Much attention was being given to the theory of programming. 5. Specialists are developing new methods of calculations. 6. Microchips are being widely used in the modern generations of computers. 7. We were testing various devices for our experiment when the professor came. 8. The input unit was being incorrectly used when the laboratory assistant checked it. 9. I will be carrying out an important experiment tomorrow at 11 o'clock. 10. This article is being referred to at the moment. 11. The lecture was being listened to with great attention yesterday for two hours. 12. Rockets and airplanes will be widely used for carrying heavy loads. 13. I am doing an extremely complicated work now. 14. The problems were being solved immediately. 15. He will be preparing this report on computers tomorrow the whole evening.

Exercise 14. Переведите предложения с *some, any, no, every*.

1. There are some devices in the laboratory. 2. I don't see any installations here. 3. No one can use this computer. It's out of order. 4. Everybody turned to see the professor. 5. No human being can calculate with such a speed. 6. Tell me everything about computers. 7. Do you have any scientific journals at home? 8. I saw something interesting in that paper. 9. Any computer can do this job. 10. Everything was in order. 11. It's of no use. 12. We can use computers everywhere. 13. Was there anything important in that article? 14. Everybody knows nothing about this failure. 15. He cannot do anything else.

UNIT 4. LESSON 3

Read the text without a dictionary.

4B. THE TINY, FOOLPROOF TOOLS OF ELECTRONICS

When the first truly modern electronic computer went into operation in 1946, its 19,000 tubes and miles of wires filled a room big enough for a tennis court. By 1958 the substitution of transistors and printed circuits for tubes and wires had shrunk a computer of similar capacity to the size of a desk. Later, using hundreds of integrated circuits engineers can make such a computer almost as small as a typewriter.

Small size is only the obvious merit of these integrated-circuit "chips". Because each combines into one solid piece scores of electronic elements it is far more foolproof than the old conglomeration of parts. The integrated circuit's combination of great reliability and small size makes it possible to cram sophisticated equipment, including a TV camera, radiation detectors and a device to measure magnetic fields, into the roughly four-by-nine foot body of the 'Mariner' spaceship that studied Mars. Now integrated circuits, applied to everyday life, can produce practical wrist radios, hearing aids implanted underneath the skin and even - if anyone wants to watch a screen the size of a coin - a pocket-sized TV set.

Computers are widely applied in other braches of human life. 'The Reading Evening Post' is a newspaper that was born only thanks to computers. Up to the moment when the reporters' stories are ready so as to set them in type, everything is like in any other newspaper, but from then it is unique. Instead of the usual noisy, dirty typesetting machines, there are 12 operators in clean white collars sitting at a typewriter keyboard and these 12 operators perform such a quantity of work which would have required 23 men using ordinary typesetting machines.

Kyoto University reported that it had developed a computer that "talks and translates" English into Japanese. The university said that the computer refused to translate any questions put in bad English. "It simply keeps quiet if someone asks a question in bad English," said the professor, head of the group that had developed the computer.

It took five years to develop the machine. 8000 English words, 4000 English phrases and their Japanese equivalents were built into the computer, which sorts out sentences which are fed in with a keyboard and supplies a vocal translation within 20 seconds.

The newspaper 'The Times' (London) writes: "Time is money" is one of the foundations of the Ministry of Transport approaches to transport problems - if we can save a lot of people time on their daily journeys to work, then we are saving a part of

the nation's money". That is why a computer-controlled traffic experiment was carried out in West London. One of the objects of the experiment was to make more efficient use of road space.

The scheme involves more than 100 sets of signals which are connected to a computer in New Scotland Yard. More than 500 detectors count the cars passing over them and display the information on a master panel. The computer adjusts traffic signals and gives a free flow of traffic. In future when the system is fully developed the computer will hold in its memory different traffic conditions, for example morning and evening rush hours.

Computing machines even may play draughts and chess. Computers are going to be the driving force behind a second industrial revolution, just as the steam was in the first.

COMPREHENSION TEST

I. Select the correct answers to the questions:

1. When did the first modern computer start working? (1946, 1958)
2. What helps engineers make a small-sized computer? (tubes and wires, transistors and printed circuits)
3. What parts were included into the 'Mariner' spaceship? (TV camera, wrist radio, a device to measure magnetic fields, a pocket-sized TV set)
4. What makes a chip reliable? (scores of electronic components, old conglomeration of parts)
5. What is the heart of the computers? (motors; chips)
6. What must a computer have for its work? (programming; text books)
7. How are the problems in analog computers solved? (by counting; by analogy)
8. How are the problems in digital computers solved? (by counting; by analogy)
9. What are the data of the problems converted into? (electrical pulses; mechanical actions)
10. How much time were Japanese scientists developing their computer? (some months; some years)
11. What experiment was carried out in West London? (for controlling traffic; for printing newspapers)
12. What was the driving force in the second industrial revolution? (steam; computers)

Translate the text into English. Entitle the text.

TEXT 4C

Компьютеры по-разному используются в различных областях жизни человека. Компьютеры успешно применяются в промышленности. Компьютер может управлять движениями самолета. Кроме этой работы он может делать различные вычисления и производить логические операции.

Универсальные ЭВМ используются везде - в научных исследованиях, транспорте, промышленности. Их применяют для создания самолетов, ракет, мостов, зданий, кораблей и автомобилей.

Сегодня чаще всего используются персональные компьютеры для космических исследований, в искусстве, образовании. Спорт, медицина, бизнес и промышленность пользуются помощью компьютеров.

В офисах и на заводах персональные компьютеры экономят время для отдыха и другой интеллектуальной работы, так как компьютеры работают во много раз быстрее, чем человеческий мозг.

4D. THE WORLD BECOMES SMALLER

3) The integrated circuit (IC). But scientists never stop trying to improve what might seem to be perfect. The second "revolution" was the semiconductor integrated circuit, a major step forward towards miniaturization. The concept of the IC had begun to take shape (to develop) only a few years after the invention of the transistor. Scientists saw that one might further exploit the characteristics of semiconductors such as germanium and silicon that had been exploited to make the transistor. Today, thousands of circuit elements are simultaneously fabricated on a thin chip (small piece) of silicon.

It is now generally accepted that the revolutionary step from transistors to integrated circuits is causing a considerably greater change in a much shorter time than did the earlier step from radio valves to transistors. Many solid state devices, small as they may be to the eye, are still much larger than they need to be to do the jobs they have to do. The problem was one of finding ways of making them smaller and smaller.

4) Large scale integration. And such ways have been found with the computers as an example. The complexity of the integrated circuit and the level of integration are being increased year by year. Fourth generation computers use large scale integration (LSI). That offers still greater advantages in reliability, size and cost. LSI based equipment generally requires less power both to manufacture and to operate. It is possible to place millions of circuits elements on a single chip at a cost hardly higher than that of a single

vacuum tube.

The device density can increase and increase, with no end in sight (without limit). Human brains have more than 1000 million cells per cubic centimetre and there is no reason to think that we cannot pack solid state device more densely than that though there are different opinions about it. Some scientists think there is a limit beyond which device density can't be increased.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 4E

Listen to the text and translate into English.

1. Они вычисляют from the given факторов such as weight, height, speed, engine power эффективность нового самолета.

2. Они также supply точные формулы about структуре сложных chemical molecules.

3. Они могут вычислить in advance тысячи возможных комбинаций through the electronic brains.

4. Даже теперь возможности электронного мозга are by no means exhausted.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 5. LESSON 1

ВРЕМЕНА ГРУППЫ Perfect Active

have + Participle II (3-я форма гл.)

Действие произошло к определенному моменту времени в настоящем, прошлом или будущем (завершенность действия).

Present Perfect Active

- Действие произошло
  к настоящему моменту времени, но нас интересует его результат;
  в незаконченный период времени: *today, this year, this month*, etc.;
- обстоятельства времени: *already, yet, not yet, just, lately/recently;*

- утверждение:	*I,we,you,they* have asked.	*He,she,it* has asked.
- вопрос:	Have *I,we,you,they* asked?	Has *he,she,it* asked?
- отрицание:	*I,we,you,they* have not asked.	*He,she,it* has not asked.

- переводится глаголом прошедшего времени совершенного вида.

Past Perfect Active

- Действие произошло к определенному моменту в прошлом;
- обстоятельства времени: *yesterday by 3 o'clock, before I came;*

- утверждение:	*I,we,you,they,he,she,it* had asked.
- вопрос:	Had *I,we,you,they,he,she,it* asked?
- отрицание:	*I,we,you,they,he,she,it* had not asked.

- переводится глаголом прошедшего времени совершенного вида.

Future Perfect Active

- Действие произойдет к определенному моменту в будущем;
- обстоятельства времени: *tomorrow by 3, before I come;*

- утверждение:	*I,we,you,they,he,she,it* will have asked.
- вопрос:	Will *I,we,you,they,he,she,it* have asked?
- отрицание:	*I,we,you,they,he,she,it* will not have asked.

- переводится глаголом будущего времени совершенного вида.

ВРЕМЕНА ГРУППЫ Perfect Passive

have + *been* + Participle II (3-я форма гл.)

Страдательный залог указывает на то, что предмет или лицо, являющееся подлежащим, подвергается действию.

Ann has translated the article. - The article has been translated by Ann.

Present Perfect Passive

- утверждение:	*I,we,you,they* have been asked.	*He,she,it* has been asked.
- вопрос:	Have *I,we,you,they* been asked?	Has *he,she,it* been asked?
- отрицание:	*I,we,you,they* have not been asked.	*He,she,it* has not been asked.

Past Perfect Passive

- утверждение:	*I,we,you,they,he,she,it* had been asked.
- вопрос:	Had *I,we,you,they,he,she,it* been asked?
- отрицание:	*I,we,you,they,he,she,it* had not been asked.

Future Perfect Passive

- утверждение:	*I,we,you,they,he,she,it* will have been asked.
- вопрос:	Will *I,we,you,they,he,she,it* have been asked?
- отрицание:	*I,we,you,they,he,she,it* will not have been asked.

Exercise 1. Переведите предложения со сказуемым в Perfect Active.

1. He has just returned from the College. 2. She has seen her friend today. 3. I have never been to Paris. 4. She has already written her letter. 5. We have not had dinner yet. 6. He has just graduated from the University. 7. "Have they come back from Bonn?" – "No, they haven't". 8. I have been a student for two years now. 9. Mary has recently gone out for a walk. 10. We have been friends since we began to study at the University.

Exercise 2. Поставьте глагол в скобках в Present Perfect / Past Indefinite.

1. I (to pass) my exam in English this week. 2. When you (to pass) your exam in physics? I (to pass) it yesterday. 3. They already (to complete) their experiments. The results are very interesting. 4. On April 12, 1961, mankind (to enter) the new era of mastering space. 5. This year the scientists (to launch) some new satellites. 6. The astronauts (to place) automatic devices on the Moon. 7. They already (to apply) this new method in their work.

Exercise 3. Вставьте Participle II.

1. I remembered that I had (to leave) the textbook on the table. 2. He said that he had never (to meet) such interesting people. 3. By the end of the year the workers had (to change) all the old motors. 4. I did not know that you had (to spend) three weeks at the seaside. 5. Before he entered the University he had (to go) to school.

Exercise 4. Составьте предложения, используя Future Perfect.

1. By the end of the year (they, graduate, from the College). 2. Before I come home (he, do, his homework). 3. By the time you return (Bob, make, his report). 4. Before you see me again (I, visit, our common friends). 5. Before I see you next time (you, be, to, Moscow). 6. By the next year (the workers, construct, this building).

Exercise 5. Упорядочите форму сказуемого в скобках.

1. The speed of calculations (have, been, increased, will) by the end of the task. 2. The book (translated, has, been) into Russian this year. 3. The telegram (been, had, sent) before we got his letter. 4. We (have, been, will, instructed) by that time. 5. This new magazine (received, just, been, has).

Exercise 6. Поставьте глагол в нужном времени и залоге.

1. A number of modern houses (to build) in this district this year. 2. Recently he (to publish) an article in a scientific journal. 3. His article (to publish) recently in a journal. 4. The experiment (to finish) tomorrow. 5. The experiment (to finish) by tomorrow. 6. They (to use) only natural rubber before synthetic rubber was invented. 7. After synthetic rubber (to invent), people began to use it for a number of industrial purposes.

Exercise 7. Сравните предложения в Continuous - Perfect.

Active: 1. She is making an experiment now. She has just made the experiment. 2. She was making the experiment when we came. She had made the experiment before we came. 3. She will be making this experiment all the evening tomorrow. She will have made this experiment by the evening tomorrow.

Passive: 1. The house is being built in this street now. The house has already been built. 2. A new house was being built for 6 months or so. The house had been built by new methods by last summer. 3. ---. The house will have been built by the next year.

Exercise 8. Переведите предложения, обращая внимание на залог.

1. I have told them about his coming today. I have been told about his coming today. 2. We have brought many books from the library. We have been brought many books from the library. 3. She has left her children at home. She has been left at home by her parents. 4. He had sent the equipment before the telegram came. He had been sent to Paris before the telegram came. 5. The development of electronics has greatly influenced the progress of science. The development of electronics has been greatly influenced by miniaturization. 6. The pupils have answered many questions. The pupils have been answered all the questions. 7. The students have left the laboratory. Some students have been left in the laboratory to finish the experiment.

СУФФИКСЫ ПРИЛАГАТЕЛЬНЫХ

основа сущ.+ *-al* = прил.: *mathematics - mathematical (математический)*
educational, theoretical, practical, industrial, electrical, ideal, actual

основа сущ.+ *-ic* = прил.: *cube - cubic (кубический)*
metallic, atomic, basic, microelectronic, hydraulic, historic, magnetic, economic

основа гл.+ *-ive* = прил.: *imitate - imitative (подражательный)*
regulative, illustrative, passive, demonstrative, corrective, communicative, prospective

основа сущ. + *-ous* = прил.: *monotony - monotonous (монотонный)*
nervous, ceremonious, harmonious, religious, glorious, curious

основа гл. + *-ant/-ent* = прил.: *depend - dependent (зависимый)*
different, insistent, correspondent, assistant, significant

МНОГОЗНАЧНОСТЬ since, for, that, as

that - что; то, что; который
as - так как, поскольку; как; когда, по мере того как; как, в качестве
since - так как, поскольку; с тех пор как; с, со времени; с тех пор
for - для; за; в течение; так как, ибо; для того чтобы

Exercise 9. Переведите предложения.

1. We know that there are different kinds of computers. 2. He tested the results that were obtained last week. 3. That he was an astronaut was known to everybody. 4. Since we know much about computers, we can use them properly. 5. He hasn't seen his parents since he moved to another town. 6. Two years passed since her graduating from the University. 7. They finished school last year and I haven't seen them since. 8. This is a book for you. 9. She didn't come yesterday for she was ill. 10. We can use computers properly for we know much about them. 11. As the task was very complex, they had to consult a specialist. 12. As we know, microelectronics is very important in the progress of science. 13. The speed of calculations changes as the capacity of a computer grows. 14. Work is defined as the product of force and distance.

ГЛАСНЫЕ В БЕЗУДАРНОМ СЛОГЕ

a,o,u - [ɘ]	**a**pply, c**o**ntrol, c**o**nvert, s**u**ccess, decim**a**l, process**o**r, **a**ccept, s**u**btract
i,y - [ɪ]	greatl**y**, **i**ncrease, widel**y**, un**i**t, **i**mprove, **i**nertial
e - [ɘ]	prop**e**rly, movem**e**nt, sequ**e**nce, ess**e**nce
\ [ɪ]	r**e**late, **e**quation, r**e**cord, r**e**strict, nec**e**ssary

Exercise 10. Прочтите правильно следующие слова:

difficult, faculty, develop, understand, instrument, laboratory, material, apparatus, universal, examination, consultation, college.

МЕСТОИМЕНИЯ

Единственное число					**Множественное число**				
	личные	**притяжат.**		**возврат.**		**личные**	**притяжат.**		**возврат.**
I	me	my	mine	myself	we	us	our	ours	ourselves
you	you	your	yours	yourself	you	you	your	yours	yourselves
he	him	his	his	himself	they	them	their	theirs	themselves
she	her	her	hers	herself	**общ.**	**объект.**			
it	it	its	its	itself	**падеж**				
общ.	**объект.**								
падеж									

Exercise 11. Выберите правильную форму местоимения.

1. (We, us) are in the lab. 2. There are some students in (it, its). 3. There are tape recorders in front of (they, them, its). 4. Helen is a student. (She, her) is in (her, she) fourth year. 5. Next year (she, her) will get (her, she) diploma. 6. Nick is (our, we) monitor. 7. Now (he, him) is sitting behind (me, I). 8. (He, him) is (my, mine) friend. 9. (Our, us) students like (him, himself) very much. 10. I clean (my, mine) teeth and wash (my, myself) every day. 11. Programming is a science in (it, itself). 12. He is the best friend of (ourselves, ours).

Exercise 12. Вставьте пропущенное местоимение.

1. I washed ... face. 2. The dog eats ... meal. 3. He writes ... letter. 4. She has a cat. The cat is ... . 5. You are opening .... books. 6. She likes ... new dress. 7. I've been known Nick for a long time. He is an old friend of ... 8. We were told of ... mistakes. 9. He washed ... . 10. They knew ... marks for the dictation.

UNIT 5. LESSON 2

Exercise 1. Запомните чтение гласных в безударном слоге.

a,o,u - [ɵ] cap**a**ble, dat**a**, m**a**chine, diffic**u**lt, purp**o**se, c**o**mputer

i,y - [ɪ] disc**i**pl**i**ne, cit**y**, lim**i**t, dig**i**t, princ**i**ple, memor**y**

e - [ɵ] syst**e**m, probl**e**m, us**e**r, p**e**rform, numb**e**r, compon**e**nt

\ [ɪ] **e**lectronic, r**e**serve, m**e**chanical, **e**conomic, r**e**side

Exercise 2. Поставьте глагол в нужной форме группы Perfect.

1. Computers (to change) our lives. 2. They (to become) very useful in routine work. 3. The installation of computers already greatly (to increase) the efficiency. 4. By 1958 transistors (to reduce) a computer to the size of a desk. 5. The University certainly (to develop) a translating machine by that time. 6. The results not (to save) yet. 7. All the operations (to perform) before the professor came. 8. The problem (to solve) by the next week. 9. Efficiency greatly (to increase). 10. Computers widely (to use).

Exercise 3. Переведите предложения в Perfect.

1. All the necessary information had already been fed into the machine. 2. Has the problem been calculated by the computer? 3. Great changes have been made since the 1940s. 4. Personal computers have been designed for a wider application of computing techniques. 5. The experiment will have been finished by 5 o'clock. 6. The research team will have designed this device by the end of the year. 7. The engineer hasn't tested the new apparatus yet. 8. I have never read such an interesting article before. 9. He will have completed the experiment by tomorrow. 10. He had worked at this device much long before he came to work here.

Exercise 4. Сравните предложения в Indefinite и Perfect.

Active: 1. The computer processes data every day. The computer has processed data by the moment. 2. The computer processed data last week. The computer had processed data by the evening yesterday. 3. The computer will process data in a minute. The computer will have processed data before we come.

Passive: 1. Necessary data are processed every day. Necessary data have been processed recently. 2. The data were processed yesterday. The data had been processed before the professor came. 3. The data will be processed tomorrow. The data will have been processed by the next experiment.

Запомните следующие слова.

ACTIVE VOCABULARY

appear	[q'piq]	появляться
complexity	[kqm'pleksIti]	сложность
general	['dZenrql]	общий, основной
root	[rHt]	корень
regard	[rI'gRd]	считать, относиться
permit	[pq'mit]	позволять
user	['jHzq]	пользователь
computation	[,kOmpjH'teiSn]	вычисление
behaviour	[bI'heivjq]	поведение
enable	[In'eibl]	позволять
obtain	[qb'tein]	получать
approximate	[q'prOksImIt]	приблизительный
ease	[Jz]	легкость
include	[In'klHd]	включать
typically	['tipIkqlI]	обычно
consist (of)	[kqn'sist qv]	состоять из
principal	['prinsqpql]	главный, основной
core	[kL]	сердечник
contents	['kOntqnts]	содержание, содержимое
available	[q'veilqbl]	доступный
enter	['entq]	вступать, входить
reservoir	['rezqvwR]	резервуар, хранилище
storage	['stLridZ]	память, хранилище
reside	[rI'zaid]	находиться
simulation	[,simju'leiSn]	моделирование
actual	['xktjuql]	действительный
component	[kqm'pounqnt]	составная часть
dynamics	[dai'nxmIks]	динамика
motion	['mouSn]	движение
variation	[,vFqri'eiSn]	изменение

Exercise 5. Прочитайте и переведите интернациональные слова:

course, complexity, type, centre, combination, fundamental, mass, compensate, actual, simulation, component, biological, economic, dynamics, variation, principal, reservoir, magnetic, cube, finance, financial, economical, object, objective, subject, subjective.

Прочитайте текст и переведите его со словарем.

5A. GENERAL-PURPOSE AND SPECIAL-PURPOSE COMPUTERS

The first electronic computers appeared in 1945. In the course of half a century scientists learned to solve problems of great complexity using these machines. Electronic computers can be classified into two general types: general-purpose computers and special-purpose machines.

General-purpose computers are electronic machines that do all types of arithmetical computation - add, subtract, multiply, divide, square root. In addition, general-purpose computers are capable of performing a large number of other operations. A general-purpose computer can be regarded as a data-processing centre.

From a machine point of view, a general-purpose computer is a combination of devices. From the functional point of view, it is a system which permits the user to process data for a large number of purposes. General-purpose computers can be further classified according to size and the speed of computation.

Special-purpose electronic computers are limited either to the type of computations they can make or to the functions they can perform. Special computation is applied to solving the behaviour of any system. Some kind of special computation enables the engineer to obtain approximate solutions to his problems with a speed and ease.

Apart from cases that include simulation with actual components, any mechanical, electrical, biological or even economic system dynamics involving motion or variation in time may be studied.

The accuracy of operation of any special-purpose computer is much below than that of a general-purpose computer, but there are several compensating advantages that special-purpose machines possess.

A computer memory of both types typically consists of two principal components: a core memory, whose contents are very readily available to enter into logical or arithmetical computations, and a larger reservoir of stored information, or "mass storage", usually residing on magnetic tapes or discs.

Exercise 6. Прочтите следующие слова:

appear, learn, solve, classify, add, subtract, multiply, divide, root, regard, perform, process, limit, apply, obtain, involve, include, enter, reside.

Exercise 7. Найдите в тексте английский эквивалент.

В течение, большой сложности, вдобавок, можно считать, с точки зрения машины, согласно (по), или ... или, приблизительные решения, быстро и легко, компенсирующие преимущества, кроме случаев, намного ниже, быстро доступна, находящиеся на дисках.

Exercise 8. Выберите нужное слово в скобках.

1. The first computer (created, appeared) in 1940s. 2. Their problems were of great (complexity, stability). 3. Electronic machines can do all the (functions, types) of computation. 4. Computers are capable of (performing, solving) various operations. 5. This system permits the user to (count, process) data. 6. Computation enables the engineer to (give, obtain) solutions to the problems. 7. The (accuracy, exactness) of operation is a great advantage. 8. There are some cases that (include, consist of) simulation with actual components. 9. Mass storage usually (involves, resides) on magnetic discs. 10. A computer memory consists of two principal (parts, roles).

Exercise 9. Закончите предложения.

1. Scientists learned ... 2. Electronic computers can be classified ... 3. A general-purpose computer can be regarded ... 4. A general-purpose computer permits ... 5. Special-purpose computers solve ... 6. Special computations enable ... 7. Some cases include ... 8. A computer memory consists of ... 9. Contents of a core memory enters ... 10. 'Mass storage' resides ...

Exercise 10. Ответьте на вопросы.

1. When did the first electronic computers appear? 2. How long did the scientists learn to solve complex problems with the help of computers? 3. What kind of computers can do all types of arithmetical computations? 4. How can we generally regard general-purpose computers? 5. What are the two main viewpoints on them? 6. Who needs to process data for a large number of purposes? 7. What limits special-purpose computers? 8. Which computers are more exact? 9. In what cases cannot system dynamics be studied? 10. What are the two main parts of a computer memory?

Exercise 11. Прочитайте и переведите следующие прилагательные:

cultural, political, national, mechanical, physical; pneumatic, atomic, basic, electronic, academic; active, constructive, attractive, protective, progressive; various, dangerous, famous, numerous, prosperous; pleasant, constant, magnificent, present, important.

Exercise 12. Переведите предложения с Perfect.

1. Scientists have learned how to solve a very complicated problem using a computer. 2. The computer has already done all the computations. 3. The research team had completed the testing of a new device. 4. The computer has been addressed with a series of instructions. 5. The arithmetical calculation had been followed by the logical analysis. 6. Computers will have been widely applied by the next decade. 7. The engineer hadn't finished his design before the inspectors came. 8. The problem hasn't been solved yet. 9. They had processed the data yesterday by 5 o'clock. 10. The problem has been divided into several parts. 11. Computers will have been combined with a TV camera before the experiment starts. 12. Electronic computing systems will have been taught to translate any languages by the end of the current decade. 13. The accuracy of operation has compensated all the failures. 14. Special computations have enabled the engineer to obtain needed results. 15. The system dynamics has been studied recently.

Exercise 13. Переведите предложения со служебными словами.

1. The capacity of this computer is as large as the capacity of that one. 2. As to the procedure, you can start it. 3. All computations begin as you feed the data into the machine. 4. As the experiment was very complex, they had to consult a specialist. 5. This science has been known since the 1950s. 6. We could not finish our work since we had no necessary devices. 7. What have you been working at since I saw you last? 8. That he agreed to help in computing was quite natural. 9. She said that she would help us. 10. The question that was discussed yesterday was very important. 11. This is the text that you have to translate. 12. For years computers have assisted humans. 13. We cannot carry out the experiment for we cannot find the necessary units. 14. This new machine has been working for twelve hours without stopping. 15. This problem is not difficult for the computer.

UNIT 5. LESSON 3

Read the text without a dictionary.

5B. THE FASTEST COMPUTER

The computer Illiac IV was the fourth generation in a line of advanced machines that had been conceived and developed at the University of Illinois. Illiac I, a vacuum tube machine completed in 1952, could perform 11,000 arithmetical operations per second. Illiac II, a transistor-and-diode machine completed in 1963, could perform 500,000 operations per second. Illiac III, which became operational in 1966, was a special-purpose computer designed for automatic scanning of large quantities of visual data. Since it processed non-arithmetical data, it couldn't be compared with earlier Illiacs in terms of operational speed. Illiac IV, employing the latest semiconductor technology, was actually a battery of 64 "Slave" conductors, capable of executing between 100 million and 200 million instructions per second. Unlike its three predecessors, which solved the problems by a series of steps, Illiac IV was designed to perform as many as 64 computations simultaneously. So a typical linear programming problem that might occupy a large past generation computer for six to eight hours was solvable by Illiac IV in less than two minutes - a time reduction of at least 200 to one.

The ultimate limitation of the operating speed of a computer designed to operate sequentially was the speed with which the signal could be propagated through an electrical conductor. In practice this was somewhat less than the speed of light which takes one nanosecond to travel about one foot.

The logical design of Illiac IV, a single master control unit, sent instruction to a number of independent processing elements. Each of the 64 processing elements was a powerful computing unit and it could perform a wide range of arithmetical operations.

Each processing unit had more than 100,000 electronic components. In a system containing more than six million components one could expect a component or a connection to fail every few hours. For this reason much attention had been devoted to testing and diagnostic procedures. Each of the 64 processing units was subjected regularly to extensive automatic tests. If a unit failed one of those tests, it could be quickly unplugged and replaced by a spare, with only a brief loss of operating time.

When the defective unit had been taken out of service, the precise cause of the failure was determined by a separate diagnostic computer.

Among the practical use of Illiac IV was the establishment of natural-resource inventories. The system contained a wide range of information on the natural resources of a selected area: geodesy, hydrology, forestry and vegetation, climate, topography,

soil characteristics and current land use. For example, county administration looked for a best site for a new hospital. The search for a hospital site was reformulated in a series of commands that were presented to the computer. For instance, search all tracks that lie between town A and town B, and that are within two miles of route C; the area should be no smaller than five acres and no larger than 25 acres. If no tracts satisfied all these requirements, one or more of the less important conditions were relaxed until the site was located.

COMPREHENSION TEST

I. Fill in the following table.

Illiacs	I	II	III	IV
place of origin				
year of creation				
type of a computer				
capability of performance				
purpose of creation				
generation				

II. Find the answers to the following questions.

1. What was the difference in speed between the computers completed in 1952 and 1963?
2. How did the computer completed in 1966 differ from the two earlier computers?
3. Why was it possible to reduce computation time with Illiac IV by 200 times?
4. What were the two main parts of the logical design of Illiac IV?
5. Why were testing and diagnostic procedures important in the system of Illiac IV?
6. What was done when one of the units proved defective?
7. What was the function of a diagnostic computer?
8. In what field could Illiac IV be used?
9. What information could be stored in its memory?
10. What was the practical use of this computer?

Translate the text into English. Entitle the text.

TEXT 5C

В течение полувека ученые учились решать очень сложные проблемы с помощью компьютеров. Компьютеры делятся на универсальные и специализированные ЭВМ.

Универсальные ЭВМ выполняют любые математические вычисления. Кроме того, они выполняют и другие операции. Универсальные ЭВМ рассматриваются как центры обработки данных. С точки зрения механизма, это комбинация различных устройств. С точки зрения работы (функционирования), это система, которая обрабатывает данные с различными целями.

Специализированные ЭВМ ограничены или видом своих вычислений, или своими функциями. Специальное вычисление позволяет найти решение быстро и легко. Специализированные ЭВМ работают с высокой точностью. Они совершают моделирование различных процессов.

5D. WILL THE DESK COMPUTERS THINK INSTEAD OF US?

One of the main characteristics of the present-day global "computerization" is the boom in domestic computers. The desk computer is expected to function as your personal librarian, carry out simple optimization computations, control your budget or diet, play several hundred games, etc. Further development of the computer is believed to lead to a situation in which most of the knowledge accepted by mankind will be stored in computers and made accessible to anyone with a home computer.

Communication between man and computer will not replace man's creative abilities but will expand them. It is natural that the advent of microcomputers with extensive memories and possibilities will lead to a new higher level in information culture. The creation of the domestic computer industry will allow a lot of problems in culture and education to be solved. Among other things, we will be able to organize the education process in the colleges and universities and also in the system of school education on a new basis.

Working out computerized models of materials studied by students will allow us to see the results of this instruction on a display screen, make understanding of the material very simple and make the development of a creative approach to the studying of knowledge and its application easier.

As for the information in various traditional branches of knowledge, the application of electronics will allow side by side with the traditional printed material to have the contents of books, magazines and articles fed into the computer memory, where this

will be analyzed, arranged in a certain order, stored and produced on request as a printed computer program.

By all means, knowledge is the most valuable wealth of our times. And microcomputers will help to make it accessible to everyone in routine, monotonous and dull work.

Electronic computers cannot replace the judgment of the human brain, but they will release it from mechanical functions.

Thus, the most important development of microelectronics has been the creation of fast-calculating and computing devices and in connection with this, the theory of information technology.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 5E

Listen to the text and complete the sentences using the right word.

1. Every scientist will make numerous ... before he can say that the results of his experiments are correct.
2. For the accurate forecasting of the weather a meteorologist must make about one million of ... .
3. A computer cannot create new ... , though it may transform it into a more useful form.
4. A translator takes information in some language and makes its ... into another.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 6. LESSON 1

БЕССОЮЗНЫЕ ПРИДАТОЧНЫЕ ПРЕДЛОЖЕНИЯ

Иногда в английском языке опускаются союзные слова или союзы, присоединяющие придаточные предложения к главному. Это:

1) придаточные дополнительные предложения, отвечающие на вопрос "что?", при переводе появляется союз *'что'*:

He says [that] he knows Peter well. Он говорит, что хорошо знает Питера.

2) придаточные определительные предложения, отвечающие на вопрос "какой?", при переводе появляется союзное слово *'который'*:

Here is the pen [that] you gave me. Вот ручка, которую ты мне дал.

Послелог при переводе ставится перед союзным словом (см. с.200):

The project [which] we are speaking about was excellent.

Проект, о котором мы говорим, был отличным.

Exercise 1. Переведите бессоюзные дополнительные предложения.

1. We know this scientist lives in New York. 2. The teacher saw the student had solved the problem successfully. 3. We heard these new machines were employed in this plant. 4. My friend knew he would work at the research institute. 5. They think we made this work two years ago.

Exercise 2. Переведите бессоюзные определительные предложения.

1. The experiment he made yesterday is very important. 2. The article he has written for our journal is very interesting. 3. The woman you saw on Sunday is a programmer. 4. The building the workers started to construct last year is ready now. 5. The station the train has just passed by is a big railway junction.

Exercise 3. Переведите определительные предложения с послелогами.

1. The man I told you about has left the room. 2. The room we live in is very light. 3. The woman we spoke with teaches physics. 4. The laboratory we work in has many devices. 5. The man you asked me about is our dean.

Exercise 4. Определите тип придаточного предложения и переведите.

1. Everybody knows Lomonosov was the founder of the Academy of Sciences. 2. I think we'll go to the country on Sunday. 3. The man you see in the room is my friend. 4. We know Lomonosov's ideas are being accomplished now. 5. The weight of an atom is the number of protons and neutrons it contains. 6. Here is the picture you saw in the

gallery. 7. The phenomenon Roentgen discovered is widely used in medicine. 8. Einstein gave quite a new idea of the world we live in. 9. The problem we are dealing with is important. 10. The problem we have spent much time on is not easily solved.

CONDITIONAL SENTENCES (УСЛОВНЫЕ ПРЕДЛОЖЕНИЯ)

Придаточные условные предложения присоединяются к главному союзами *if, provided (если), unless (если не), on condition (that) (при условии, что), in case (that) (в случае если).*

Условные придаточные предложения бывают трех типов:

1. Реальные условия, относящиеся к настоящему, прошедшему и будущему.

If I *have* time, I *help* her in her work. (Present)

Если у меня есть время, я помогаю ей в работе.

If I *had* time, I *helped* her in her work. (Past)

Если у меня было время, я помогал ей в работе.

If I *have** time, I *shall help* her in her work. (Future)

Если у меня будет время, я помогу ей в ее работе.

*После if вместо формы будущего времени употребляется форма настоящего.

2. Маловероятные условия, относящиеся к настоящему и будущему; сказуемое главного предложения образуется сочетанием глаголов *should, would, might, could + смысловой глагол*; сказуемое придаточного предложения стоит в *Past Indefinite* (глагол *to be* имеет форму *were* для всех лиц). На русский язык переводится с частицей 'бы'.

If he *knew* my address, he *would visit* me tomorrow.

Если бы он знал мой адрес, он бы навестил меня завтра.

If she *were* here today, I *should speak* to her.

Если бы она была здесь сегодня, я бы поговорил с ней.

3. Нереальные условия, относящиеся к прошедшему времени; сказуемое главного предложения образуется с помощью *should, would, might, could + смысловой глагол в Perfect*; сказуемое придаточного предложения стоит в *Past Perfect*. На русский язык переводится с частицей 'бы'.

If the plans *had been devised* (last year), the project *would have been completed*.

Если бы планы были разработаны в прошлом году, то проект был бы закончен.

(Планы не были разработаны, поэтому проект не был закончен.)

ИНВЕРСИЯ В УСЛОВНОМ ПРИДАТОЧНОМ ПРЕДЛОЖЕНИИ

В условных придаточных предложениях 2-го и 3-го типа союзы *if, provided* могут быть опущены, в этом случае в придаточном предложении вспомогательный глагол (*had, were* , ...) ставится перед подлежащим.

Were I free, I should help you.

Если бы я был свободен, я бы помог вам.

Had I had a good dictionary, I could have translated the text.

Если бы у меня был хороший словарь, я мог бы перевести текст.

Exercise 5. Выберите соответствующее сказуемое.

1. If you (compare, compared) these two forces, you will see that the difference is great. 2. If you (study, had studied) this subject, you will get a good mark. 3. If we (had, had had) enough time, we should have repeated our experiment yesterday. 4. There would have been no difficulties provided this problem (had been considered, was considered) at our last lecture. 5. If she (was, were) at home, she would write a letter. 6. If you went there by sea, you (will see, would see) many interesting things. 7. If it (will rain, rains) on Sunday, I'll stay at home.

Exercise 6. Скажите, какие предложения следует перевести с частицей "бы".

1. Were they here yesterday? 2. Were he here, he would help us. 3. Had he known this formula, he would have solved the equation. 4. Had he graduated from the University by that time? 5. Had she had dinner when you came home? 6. Had they determined this substance before the reaction, the results would have been quite different. 7. Were it warm today, we should go to the country. 8. Were these problems defined? 9. Were I there I should speak to him. 10. I should go to the country if the weather were fine.

Exercise 7. Переведите, обращая внимание на *were*.

1. Were he here, I should talk to him. 2. Necessary results were obtained very quickly. 3. They were to meet at 7 o'clock. 4. If he were a good student, he would pass all the exams successfully. 5. These students were here in the morning. 6. Unless there were any mistakes in his dictation, he would have an excellent mark.

Exercise 8. Переведите, определив тип придаточного предложения.

1. We won't go out unless it stops raining. 2. If you press the button, the device will start working. 3. The design would be ready by the end of the year provided they supplied us with all necessary equipment. 4. If you helped me, I should repair the engine. 5. If we go at such a speed all the time, we'll arrive at the village before night. 6.

The canal would not have been opened in time unless the builders had worked hard. 7. If the students had been more careful, they would not have broken the new apparatus. 8. They would be able to carry out their experiment provided they received all the necessary equipment. 9. Provided I can get a good dictionary, I'll translate this article. 10. If you go to the library, you will find there all the books you need.

СУФФИКСЫ ГЛАГОЛА

основа сущ., прил. + *-ise/-ize* = гл.: *magnet - to magnetize (намагничивать)*

economize, characterize, patronize, agonize, analyze, minimize, compromize, nationalize, generalize, criticize, idealize

основа сущ., прил. + *-(i)fy* = гл.: *electric - to electrify (электрифицировать)*

purify, modify, notify, satisfy, solidify, falsify, glorify, personify, gasify, clarify

основа сущ., прил. + *-ate* = гл.: *local - to locate (определять место)*

dictate, regulate, illustrate, illuminate, operate, dominate, translate, discriminate, separate, graduate

основа прил. + *-en* = гл.: *deep - to deepen (углублять)*

darken, soften, harden, brighten, weaken, quicken, sharpen, whiten, shorten, widen

МНОГОЗНАЧНОСТЬ only, very, like, some, same

only - 1) только, лишь; 2) единственный

very - 1) очень; 2) этот самый, именно этот

same - 1) один и тот же; 2) тот же самый

some - 1) несколько; 2) около, почти; 3) какой-то; 4) некоторый

like - 1) так же как и; 2) нравиться; 3) похожий; 4) look like - выглядеть;
5) unlike - в отличие от

Exercise 9. Переведите предложения.

1. It's the only way to solve the problem. 2. Only you can help me. 3. I'm very glad to see you. 4. I live in this very house. 5. The same person can make a cup of tea and design a new robot. 6. They used the same method as we did. 7. I made some mistakes in the test. 8. Some 50 people work at this research laboratory. 9. I saw some book on the table. 10. Let's have some tea. 11. I like tea and I don't like coffee. 12. Robots like computers are the achievement of modern science. 13. He looks like his father. 14. They had the like voices. 15. Unlike me, he is a student.

ГЛАСНЫЕ БУКВОСОЧЕТАНИЯ

[i:] ee, ea, ie, ei

[e] ea

[æ] as+s,t,k,p, al+m,f, ant, ear+согл., ance,anch, aft, ath

[ɔ] wa, qua

[ɔ:] au, aw, augh, ough, al+согл., all, oor, war, quar

[u] oo+k,t,d,m, wom, wob,ou

[ʌ] r+ u,ew,ui

[ɑ:] oo, won, o, ou

[ɜ:] ear+n,d,th,l, wor

[juː] ui, ew

m**ee**t, ach**ie**ve, conc**ei**ve, s**ea**l; br**ea**d, h**ea**lth; cl**ass**, v**ast**, m**ask**, r**asp**, c**alf**, p**alm**, gr**ant**, h**eart**, r**anch**, sh**aft**, gl**ance**, f**ath**er; **qua**lity, **wa**tch; c**our**se, l**aw**, fl**oor**, **war**f, **quar**tz, t**augh**t, th**ough**t, b**all**, w**all**; l**ook**, r**oom**, g**ood**, **wom**an, **wo**lf, w**oul**d, c**oul**d, sh**oul**d; **ru**le, th**rew**, f**rui**t; **wo**nder, c**ou**sin, t**o**n, fl**oo**d; **earn**, h**eard**, **earth**, **wor**d; f**ew**, s**ui**table

МЕСТОИМЕНИЯ НЕОПРЕДЕЛЕННЫЕ one, all, each, both, other, another
ВЗАИМНЫЕ each other, one another

one - неопределенно-личное предложение

all - все, каждый

each - каждый

both - оба,

other - другой (из многих)

another - другой (из двух)

each other - друг друга

one another - один другого

Exercise 10. Переведите предложения.

1. One must do it. 2. Here one can find all one needs. 3. All of you should study English. 4. Each term students take tests and exams. 5. Each of the sisters had a family. 6. Both professors were working at the same problem. 7. Both of you can speak English. 8. We created robots, not the other way round. 9. I study physics, maths and other subjects. 10. There are two printers here, one is new, and another is a bit older. 11. We know each other very well. 12. They were asking one another about their families the whole evening.

UNIT 6. LESSON 2

Exercise 1. Запомните чтение гласных буквосочетаний:

f**ee**d, r**ea**d, f**ie**ld, rec**ei**ve; m**ea**sure, r**ea**dily, spr**ea**d; p**ass**, p**ast**, **ask**, gr**asp**, h**al**f, c**al**m, pl**ant**, h**ear**t, d**anc**e, br**anch**, cr**aft**, p**ath**; **wa**nt, **wa**s, **wa**sh, s**qua**sh, **qua**ntity; **au**tumn, dr**aw**, d**augh**ter, b**ough**t, c**augh**t, ch**alk**, c**all**, d**oor**, **war**, **quar**ter; t**oo**k, b**oo**k; **ru**de, fr**ui**t, g**rew**; bl**oo**d, **wo**n, s**o**n, c**ou**ntry; l**ear**n, **wor**k; s**ui**t, n**ew**.

Exercise 2. Переведите бессоюзные придаточные предложения.

1. I understand this work is of great importance. 2. Everybody knows computers play an important part in life. 3. Many students find English is a difficult subject. 4. I don't think they will finish the calculations today. 5. He says the computer exhibition will take place next year. 6. This is the device we must use in our experiment. 7. The research he made was very important. 8. The computer laboratory he works in is on the third floor. 9. The information you asked me about hasn't been fed yet. 10. The computer you have fed the instructions into doesn't work now.

Exercise 3. Переведите условные предложения.

1. We will translate this article if we get the dictionary. 2. He would give you this information if he were here. 3. Were he given the journal, he would translate this article. 4. Unless the conditions changed, the device would continue working. 5. If I were you, I would ask the computer for help. 6. Provided automatic control had been used, many various parameters could have been measured and controlled. 7. If you press the button, the automatic device will start working. 8. The flight of the first manned spaceship would have been impossible, unless microelectronic circuits had been invented. 9. Provided the operator's cabin had been equipped with remote control, he would have been able to work faster. 10. These devices can work for a long time provided they are made of microchips.

Exercise 4. Закончите предложения.

1. If I had a computer, ... 2. Were the computer accurate, ... 3. The mistake ... was rude. 4. I knew the computer ... 5. If you press the button, ... 6. The device won't work unless ... 7. I'll use the device ... 8. They think this device ... 9. Provided the computer had been installed, ... 10. They installed the device ...

Запомните следующие слова.

ACTIVE VOCABULARY

field	[fJld]	поле, область
differ	['difq]	отличаться
fundamental	[,fAndq'mentJ]	основной
concept	['kOnsqpt]	концепция
model	['mOdJ]	модель
value	['vxJjH]	величина, значение
variable	['vFqrJbJ]	переменная
result	[rJ'zAlt]	результат
measurement	['meZqmqnt]	измерение
adapt	[q'dxpt]	приспосабливаться
range	[reindZ]	пределы, спектр
change	[tSeindZ]	изменять
interconnection	[,intWkq'nekSn]	взаимосвязь
deal with	['dJJ wiD]	иметь дело с
continuous	[kqn'tinjuqs]	непрерывный
analogy	[q'nxJqdZJ]	аналогия, сходство
force	[fLs]	сила
rotation	[rc'teiSn]	вращение
process	['prcuses]	процесс
engineering	[,endZJ'niqriN]	техника
powerful	['pauqfuJ]	мощный
single	['siNgJ]	один, отдельный
switch	[switS]	переключать
nano-	['nxncu]	одна миллиардная, нано-
major	['meidZq]	главный
operate	['Opqreit]	действовать, работать
widespread	['waid,spred]	широкораспространенный
monitoring	['mOnJtqriN]	контроль
communication	[kq,mjHnJ'keiSn]	связь
basic	['beisJk]	основной

Exercise 5. Прочитайте и переведите интернациональные слова:

concept, model, result, adapt, analogy, rotation, specific, second, minute, commerce, role, communication, chemical, station, basic, section, civilization, panel, idea, ideal, idealize, finish, fix, mix, lift, television, dynamic, unique, electric, electrify.

Прочитайте текст и переведите его со словарем.

6A. ANALOG AND DIGITAL COMPUTERS

There are two main types of electronic computers: analog and digital. Analog and digital computers are now widely used in many fields of human activities. The two types of computers differ in fundamental concept.

The analog machine may be regarded as a model of a physical or mathematical problem. The values of the variables are represented in the machine by physical quantity and the result is obtained by the measurement of another quantity.

Analog computers are usually designed for one application, although some machines can be adapted to a range of problems by changing interconnections between their various units. The analog machine, although limited by the accuracy, can deal with continuous variables.

In analog computers problems are solved by analogy. The problems which analog machines can solve are the following: mechanical forces, speeds, rotations, etc. Analog computers are used for investigation of mechanical processes. In general, they are used for specific and engineering problems in which great accuracy is not required but answers accurate enough are required quickly.

In digital computers problems are solved by counting. They may be large and powerful. All the data connected with the problem which must be solved are converted into electrical pulses and stored and counted. With modern electronic devices a single switching operation can take place in a few nanoseconds (a nanosecond is a thousand-millionth of a second).

The digital computer performs three major roles. It operates as a calculating machine and finds widespread application in all branches of science and engineering. It is also used for data processing in commerce and industry. The third role is in the monitoring and control of industrial processes and communication systems.

The basic digital computer consists of four main sections: the store, arithmetic, control and input/output units. These computers are used in chemical plants, power stations, roadtraffic control.

Exercise 6. Прочтите следующие слова:

fundamental, variable, measurement, continuous, analogy, major, commerce, monitoring, roadtraffic, control, machine.

Exercise 7. Найдите в тексте английский эквивалент.

Во многих областях, можно считать, в качестве модели, величины переменных, спектр проблем, решать по аналогии, в основном, достаточно точный, одна операция, основные функции, может происходить, широко распространенное применение, одна миллиардная доля секунды, система связи.

Exercise 8. Переведите слова в скобках на английский язык.

1. Computers (широко используются) in many fields. 2. Analog computers (сильно отличаются) from digital ones. 3. The values (представлены) by physical quantity. 4. The result (получается) by measurement of another quantity. 5. Analog computers (сконструированы) for one application. 6. Problems (решаются) by analogy. 7. Data (преобразуются) into electric pulses. 8. Information (запоминается) by a storage unit. 9. Various units (взаимосвязаны). 10. The operation (ограничивается) by the speed.

Exercise 9. Закончите предложения.

1. There are two main types of ... . 2. The two types of computers differ in ... . 3. Both types of computers are now widely ... . 4. The analog machine may be regarded as ... . 5. Analog computers are usually designed ... 6. In analog computers problems ... . 7. In digital computers problems ... 8. Digital computers may be ... . 9. The digital computer performs ... 10. The basic digital computer consists of ... .

Exercise 10. Найдите пары антонимов:

simple, to resemble, advantage, end, high, complicated, early, to differ, uncertain, beginning, low, disadvantage, late, certain.

Exercise 11. Ответьте на вопросы.

1. What are the main types of electronic computers? 2. How do the two types of computers differ? 3. What is an analog computer? 4. How are the problems solved in it? 5. Where are the analog computers used? 6. How are the problems solved in a digital computer? 7. What main roles does the digital computer perform? 8. Where is the digital computer applied? 9. What are the basic parts of a digital computer? 10. Which type of a computer is more important for industrial use?

Exercise 12. Прочитайте и переведите следующие глаголы:

realize, specialize, organize, neutralize, digitize, crystallize; classify, simplify, identify, signify, intensify; demonstrate, indicate, calculate, investigate, stimulate; lighten, fasten.

Exercise 13. Переведите бессоюзные и условные предложения.

1. Computers are the most efficient servants man has ever had. 2. You know a computer is a calculating machine. 3. The four main sections the basic digital computer consists of are the memory, arithmetic, control and input/output units. 4. The problems analog machines can solve are mechanical forces, speeds, voltages. 5. Analog computers were used for investigation scientists carried out in microelectronics. 6. The device you saw in the laboratory is of a new design. 7. Digital computers scientists invented are widely used in various branches of science. 8. The problem the computer has already solved couldn't be solved by a man. 9. We shouldn't go on, unless the problem were solved. 10. If you feed the necessary information into the machine, the computer will begin counting. 11. They would have done much last year provided they had had a powerful computer. 12. You could have found the data there, if you hadn't broken the computer. 13. The electronic computer will calculate all the data, if you type them in. 14. Were the computer general-purpose, we might use it in the experiment. 15. Had I time next year, I would design a new device.

Exercise 14. Переведите предложения с *only, very, like, some, same*.

1. Only a computer can do it. 2. This is the only problem that has not been solved yet. 3. An electronic computer is the only device capable of performing complex operations. 4. The device is in this very laboratory. 5. A digital computer is a very accurate calculator. 6. They repeated the very same experiment several times. 7. This is the same problem that the computer couldn't solve last time. 8. They made some experiments to prove this theory. 9. Some 10 people conducted some experiment some days ago. 10. Digital computers like analog ones are widely used in scientific research. 11. You can process the data any time you like. 12. They like to work with personal computers. 13. Unlike a special-purpose computer, a general-purpose machine is much more accurate in calculating. 14. Different kinds of computers have the like units. 15. What does it look like?

UNIT 6. LESSON 3

Read the text without a dictionary.

6B. THE DIGITAL COMPUTER'S WORK

There are five main units in a digital computer: an input unit which accepts the data, a memory unit for storing and holding the information until it is required, an arithmetical unit which carries out the arithmetical or logical operations with the data according to a set of coded instructions, an output unit for displaying the results of the arithmetical operations, and a control unit which coordinates the operations of the other units.

Most digital computers operate with numbers in the binary system. In the binary system of numbering there are only two ciphers: 0 and 1. The numbers 0 to 10 in the binary system are represented as follows:

Decimal	*Binary*	*Decimal*	*Binary*	*Decimal*	*Binary*
0	0	4	100	8	1000
1	1	5	101	9	1001
2	10	6	110	10	1010
3	11	7	111		

The advantage of the binary system is that only two-state devices are required to represent any number. Two-state devices such as simple switch, relay, semiconductor transistor, which are either on or off, are the simplest, cheapest and fastest components available. This is why digital computers consist mainly of very large numbers of two-state devices and these devices go from one state to the other in ordered groups and chains.

In modern digital computers the memory or store is usually a collection of a large number of tiny magnets which have two distinct magnetic states, one of them represents zero and the other unity. One state is converted very rapidly into the other by an electrical pulse and each little magnet is identified by a number called the 'address'. The control unit, consisting of a collection of electronic switches, selects numbers from the store according to a set of instructions and manipulates them as required by the calculation. The skill in using the computer is mainly in devising the best and most economical program: i.e. setting up series of instructions in the language which the machine understands, which cause the computer to carry out all necessary operations in simple steps and each is a single arithmetic operation. An instruction may be: "Add number in address 615 to number in address 670", or "Repeat previous instructions". The instructions are carried out in the arithmetic unit, which is made up of a number of

electronic circuits which serve as registers and are called accumulators. Arithmetic units are capable of addition, multiplication, subtraction and division and elementary logical operations.

Data, or information, is supplied to the computer through the input unit and may take many forms. Formerly these included punched paper tapes, punched cards, magnetic tape, magnetic cards, signals from electric typewriters, magnetic discs, data transmitted by wire among others. Now these are laser discs. Whatever the form of the input data the input unit must translate the information into digital electronic signals when the program asks for it. Modern high-speed digital computers gave tremendous appetites for information and there has been much research and effort in devising ways of feeding in data quickly and accurately.

COMPREHENSION TEST

I. Fill in the blanks selecting the appropriate variant:

1. There are ... main units in a digital computer. 1) four; 2) five; 3) three.
2. An input unit ... the data. 1) displays; 2) stores; 3) accepts.
3. A memory unit is used for ... the information. 1) storing; 2) accepting; 3) displaying.
4. An arithmetical unit ... the arithmetical or logical operations. 1) does not carry out; 2) carries out.
5. An output unit is used for ... the results of the arithmetical operations. 1) accepting; 2) storing; 3) displaying.
6. Most digital computers operate with numbers in the ... system. 1) single; 2) binary; 3) third.
7. The advantage of the binary system is that only ... devices are required to represent any number. 1) one-state; 2) two-state.
8. Two-state devices are ... components available. 1) the simplest, cheapest and fastest; 2) the most complicated, expensive and slowest; 3) the most complex, dearest and not the fastest.
9. The process occurring in the two-state devices is ... changes from one state to the other. 1) slow; 2) rapid; 3) neither rapid nor slow.
10. The control unit ... numbers from the store. 1) selects no; 2) does not select; 3) chooses.
11. Data, or information is supplied to the computer through the ... . 1) output unit; 2) input unit.
12. Modern high-speed digital computers have ... for information. 1) few requirements; 2) enormous requirements; 3) little appetite.

13. There has been much research and effort in ... ways of feeding in data quickly and accurately. 1) reading; 2) writing; 3) devising.

Translate the text into English. Entitle the text.

TEXT 6C

Два основных типа компьютеров, аналоговые и цифровые, имеют большие отличия.

Аналоговые машины считаются моделью физической или математической задачи. Их обычно конструируют для конкретного использования. Работа аналоговых ЭВМ обычно ограничивается точностью. Задачи решаются с помощью сходства с процессом. Они используются для решения специализированных и технических задач.

Цифровой компьютер решает задачи вычислением. Все данные хранятся в памяти. Цифровая ЭВМ выполняет три основные функции. Она работает как вычислительная машина, используется для обработки данных и контролирует различные процессы. Цифровой компьютер используется в различных отраслях науки и техники, промышленности, бизнесе и образовании.

6D. THE CURRENT TECHNICAL REVOLUTION

There is a revolution going on, a technical revolution. Every day, there are new changes: changes in components, products, systems, materials; changes in processes, and even in whole technologies. We are constantly evaluating, developing, testing and applying new techniques.

Research and its applications is being promoted, supported and improved. That's the reason we're involved in so many different science areas. During the last two decades emphasis has been placed on highly specialized fields of science.

Many of the achievements of contemporary science have been won by the combined efforts of scientists working in various fields. For instance, a successful launching means not only the creation of the rocket itself, although this alone is an outstanding scientific achievement. Here we can find delicate electronics, and computer technology is also needed to define the parameters of the flight. But even this is not enough. The success of the space flight is impossible without the creation of the systems of remote control by which the sputnik can be guided from the Earth, from the flight control centre, and the apparatus on board the spaceship, which guarantees obtaining different kinds of scientific information.

The rapid progress of solid state physics which began in the 50s was connected with great achievements in the semiconductor industry, i.e. with the production of electronic elements (transistors) which phased out (replaced) electron valves in second generation computers.

Achievements in the field of solid-state physics research have caused a revolution in the radio-electronics industry which has long ago undergone a change from vacuum electronic devices to semiconductor devices.

The first electronic computers using electron tubes were bulky, not very reliable and consumed much energy. They were capable of performing no more than a few thousand operations per second and were used mainly as high-speed calculators. The use of microelectronic circuits has made it possible to increase computer operation speed to several billion operations per second.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 6E

Listen to the text and decide whether these sentences appear in the text.

1. We may divide electronic computers into two groups: machines that can measure and those that cannot.
2. Besides they must be able to combine many problems and take them in one order.
3. When a question is fed into the computer, it can actually reply in a voice.
4. Laser and new plastic units are spectacular features of a memory system for recently developed computers.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 7. LESSON 1

TENSES (СИСТЕМА ВРЕМЕН)

ACTIVE VOICE (ДЕЙСТВИТЕЛЬНЫЙ ЗАЛОГ)

	Indefinite	Continuous	Perfect	Perfect Continuous
Present	*work(s)*	*is working*	*have worked*	*have been working*
Past	*worked*	*was working*	*had worked*	*had been working*
Future	*will work*	*will be working*	*will have worked*	*will have been working*
Future-in-the-Past	*would work*	*would be working*	*would have worked*	*would have been working*

PASSIVE VOICE (СТРАДАТЕЛЬНЫЙ ЗАЛОГ)

	Indefinite	Continuous	Perfect	Perfect Continuous
Present	*am/is/are done*	*am/is/are being done*	*have/has been done*	\ *используются формы Perfect* /
Past	*was/were done*	*was/were being done*	*had been done*	
Future	*will be done*	\ *используются* / *формы Indefinite*	*will have been done*	
Future-in-the-Past	*would be done*		*would have been done*	

THE PERFECT CONTINUOUS TENSES

Действие находится в процессе целый период времени до какого-то момента; оно может быть закончено к этому моменту или продолжаться.

Exercise 1. Переведите предложения в Perfect Continuous.

1. You have been reading this text for 20 minutes. 2. By 2015 scientists will have been studying this problem for over 10 years. 3. He had been learning English for five years before he passed the exam. 4. She has been studying at the University for two years. 5. They have been working at the problem for a long time. 6. It has been raining since the morning. 7. I haven't been playing the piano for a year. 8. What have you been doing all this time? 9. It made us realize how much she had been doing for us for years. 10. Doctor says that the illness will have been lasting for some days before they take him to the hospital.

THE FUTURE-IN-THE-PAST TENSES

Действие произойдет в будущем с точки зрения прошедшего момента; употребляется в косвенной речи, когда сказуемое главного предложения стоит в Past.

Exercise 2. Переведите предложения с Future-in-the-Past.

1. She said she would do it herself. 2. Did you think you would be back in time? 3. He said he would be waiting for her at that time the next day. 4. She thought that while they were watching TV she would be cooking a cake for them. 5. I said I should have

come back by the evening. 6. We thought that she would not even have begun her homework by 6 o'clock. 7. I thought that you would have finished your work by the end of the month. 8. We thought that by that time he would have been waiting for us for almost three hours. 9. He said that before sunset they would have been making the experiment for two hours. 10. I said we should have been working at that material for a month at the end of the next term.

Exercise 3. Скажите, какой залог вы бы употребили при переводе.

Все было упаковано, чемодан закрыт, и мы сели подождать Джеймса. Вдруг Джон сказал, что он забыл положить зубную щетку. Мы решили посмотреть, но ключ потерялся. Прошло немало времени, прежде чем чемодан был открыт. Оказывается, щетка была положена раньше, чем мы положили полотенце. Чемодан вновь был закрыт, но когда мы посмотрели на часы, оказалось, что поезд уже ушел. На следующий день была получена телеграмма от Джеймса, который очень удивился, что мы не пришли на станцию. Он ждал нас в буфете.

Exercise 4. Переведите предложения, обращая внимание на Passive.

1. When visitors come to our city, they are shown all the interesting places. 2. When you ask for a pencil, you are given it. 3. When somebody needs help, he is usually helped. 4. When you see a good example, you are influenced by it. 5. When the student asks a question at a lesson, he is answered by the teacher. 6. What things are looked at with pleasure: ugly or fine ones? 7. Brick houses are often met with in a modern city. 8. What is waited for at a railway station: a train or a bus? 9. Music is listened to at a concert. 10. A doctor is sent for by sick people. 11. A bus is waited for at a bus stop. 12. Students are taught a foreign language at every university.

Exercise 5. Переведите словосочетания и определите время глагола.

1. was discovered three years ago; were obtained last week
2. had been determined by 1950s; had been computed by last month
3. has already been formulated; have been recently calculated
4. will be conducted tomorrow; will be required next week
5. was being calculated for an hour; were being produced for years
6. it is developed; it was developed; it will be developed
7. the process has been finished; the process has to be finished
8. the questions were answered; the questions were to be answered

Exercise 6. Вставьте глагол в нужном времени.

1. We (finish) this work tomorrow. This work (finish) tomorrow. 2. They (speak) much about the film. The film (speak) much about. 3. The letter (send) to him last week. My parents (send) me a letter last week. 4. The magazine (bring) in a few days. They (bring) the magazine in a few days. 5. A lot of people (visit) the museum every year. The museum (visit) by many people every year.

SEQUENCE OF TENSES (СОГЛАСОВАНИЕ ВРЕМЕН)

1)	Pres.Cont.
	Pres.Ind.
Pres.	Past Ind.
Ind.	Pres.Perf.
	m.v.(Pres.)
	Fut.Ind.
	Fut.Ind.+Pres.Ind.

2)	Past Cont.
	Past Ind.
Past	Past Perf.
Ind.	Past Perf.
	m.v.(Past)
	Fut.-in-the-Past Ind.
	Fut.-in-the-Past Ind.+Past Ind.

1a)	he <u>is studying</u> new lesson	учит
	he <u>studies</u> English	изучает
We	he <u>studied</u> English at school	учил
<u>know</u>	he <u>has studied</u> new words	выучил
that	he <u>can study</u> English	может учить
	he <u>will study</u> English	будет учить
	he <u>will study</u> E. if he <u>enters</u> the U.	будет учить - поступит
2a)	he <u>was studying</u> new lesson	учит
	he <u>studied</u> English	изучает
We	he <u>had studied</u> English at school	учил
<u>knew</u>	he <u>had studied</u> new words	выучил
that	he <u>could study</u> English	может учить
	he <u>would study</u> English	будет учить
	he <u>would study</u> E. if he <u>entered</u> the U.	будет учить - поступит

Exercise 7. Переведите предложения с согласованием времен.

1. I didn't know that my friend had failed in physics. 2. They thought I could drive a car. 3. The boy said he had no money to return home. 4. I saw he was reading a book at that moment. 5. They said that they had chosen their course and nothing could turn them from it. 6. We considered that she had already got her Master's degree in maths. 7. The student said that he could not translate the article without a dictionary. 8. I did not think

that she would be refused a better room for her research. 9. He asks if he may keep this book as long as he needs it. 10. They told the child that the weather was fine and he could have a walk for two hours. 11. He asked how normal temperature was maintained underground. 12. He asked whether in the early days the trains had been driven by locomotives which burnt coal. 13. He said that entirely automatic driving would be developed.

СУФФИКС НАРЕЧИЯ

основа прил. + *-ly* = нар.: *usual (обычный) - usually (обычно)*

positively, negatively, practically, actually, temporarily, virtually, occasionally, mostly, really, probably, possibly

МАТЕМАТИЧЕСКИЕ СИМВОЛЫ

+ *plus*	± *plus or minus*	× *multiplied by*	a^b a *to the power* b
- *minus*	≈ *approximately equals*	÷ *divided by*	√ *the square root of*
= *equals*	≥ *equal to or greater than*	2^2 *two squared*	$\sqrt[3]{}$ *the cubic root of*
> *greater than*	|| *parallel with*	4^3 *four cubed*	$\sqrt[n]{}$ *the* nth *root of*
< *less than*	⊥ *perpendicular to*	6^4 *six to the fourth*	

ТЕКСТОВЫЕ ЗНАКИ

º *degree*	, *comma*	– *dash*	" " *inverted commas*	( ) *round brackets*
% *per cent*	. *point*	- *hyphen*	? *interrogation point*	[ ] *square brackets*
' *minute, foot*	: *colon*	No *number*	! *point of exclamation*	{ } *braces*
" *second, inch*	; *semicolon*	§ *paragraph*	* *asterisk*	

Exercise 8. Прочитайте следующие примеры.

59+37=96	3×76=228	+.01	>85	36º	13^{19}
47-19=28	72÷16=4,5	≈.783	<16	25%	$\sqrt[4]{89}$

НАРЕЧИЯ НА -ly С ДРУГИМ ЗНАЧЕНИЕМ

hard (трудный) - hardly (едва ли, едва, вряд ли)
late (поздний) - lately (за последнее время, недавно)
close (близкий) - closely (внимательно, пристально)
high (высокий) - highly (очень, весьма)
short (короткий) - shortly (вскоре, незадолго)
great (большой) - greatly (очень, сильно, значительно)
ready (готовый) - readily (быстро и легко)
near (ближний)- nearly (почти)
like (похожий) - likely (вероятно), unlikely (маловероятно)

Exercise 9. Переведите предложения.

1. It's a highly interesting book. 2. He has published three articles lately. 3. I have nearly finished doing my homework. 4. We closely considered all the necessary conditions. 5. He came into the lecture hall shortly after you. 6. The problem was likely to be interesting. 7. The operation of that program was highly efficient. 8. Microelectronics has greatly influenced the progress of computers. 9. The instructions must readily be prepared by a human operator. 10. The printer is unlikely to work properly.

ГЛАСНЫЕ БУКВОСОЧЕТАНИЯ

[əu] - oa, ow, oll, old, olk, olt	[ɔi] - oi, oy	[ɛ̃ə] - ere, air, are
[au] - ou, ow	[ei] - ai, ay, ey, eigh	[uə] - oor, our
[ai] - igh, ign, ild, ind	[iə] - ear, eer	[auə] - our, ower
		[aiə] - io, ie, ia

b**oa**t, l**ow**, scr**oll**, f**old**, f**olk**, m**olt**; r**ou**nd, h**ow**, b**ou**ndary; v**oi**ce, empl**oy**; h**igh**ly, res**ign**, w**ild**, bl**ind**; f**ear**, p**eer**; wh**ere**, rep**air**, prep**are**; m**oor**, sp**oor**, t**our**ist; sh**ower**, h**our**; m**ai**n, m**ay**, spr**ay**, w**eigh**t; r**io**t, tr**ia**l, h**ie**roglyph

ВОПРОСИТЕЛЬНЫЕ СЛОВА

what - что, какой	why - почему	who - кто
where - где, куда	which - который	whom - кому, кем, и т.д.
when - когда	how - как	whose - чей
	whether, if - ли	

Exercise 10. Переведите предложения с вопросительными словами.

1. He asks whether you can read English. 2. They ask if he is expecting any visitors. 3. The mother asks the teacher if her child studied properly. 4. Nobody knows how this accident occurred. 5. He asks if the plan is changed. 6. The teacher cannot understand how the boys have solved that complicated problem in such a short time. 7. He asked me if I knew who was performing at the theatre on Sunday. 8. We asked him if such materials could be found in the journal. 9. When I was leaving the town my friend asked me whether I would have an opportunity to go on with my work. 10. We asked him whether it was possible to master a foreign language in such a short time. 11. The professor asked him why he had chosen, of all professions, the one in microelectronics. 12. The professor asked me whether I had had any experience in electronics research.

UNIT 7. LESSON 2

Exercise 1. Запомните чтение гласных буквосочетаний:

r**oa**d, kn**ow**, gr**ow**, r**oll**, c**old**, f**olk**, c**olt**ish; h**igh**, s**ig**n, k**ind**, l**igh**t, m**ild**, des**ig**n; f**ou**nd, t**ow**n, n**ow**, gr**ou**nd, c**ou**nt; b**oy**, c**oi**n, expl**oi**t; h**ear**, engin**eer**, engin**eer**ing, n**ear**; th**ere**, ch**air**, b**ear**, h**air**; p**oor**, t**our**, s**ure**, ins**ure**; **our**, t**ower**, h**our**, p**ower**ful; gr**ey**, cont**ai**n, d**ay**, **eigh**t, l**ei**sure, br**ea**k; l**io**n, sc**ie**nce.

Exercise 2. Поставьте глаголы в нужном времени.

1. A lot of important problems (to be solved) by the scientists.

1) yesterday; 2) the whole evening yesterday; 3) at the present moment; 4) every day; 5) next month; 6) by the next month; 7) just.

2. Automatic control (to be introduced) in this plant.

1) already; 2) next year; 3) now; 4) last month; 5) before he started working; 6) for a year; 7) by the end of this year.

Exercise 3. Переведите предложения, обращая внимание на времена.

1. The invention of the computer was followed by other inventions. 2. Most of us have heard about this new electronic device. 3. Great changes have taken place in microelectronics since recent years. 4. Yesterday from 5 till 7 engineers were discussing that problem. 5. Since you have done all the work for today you may go home. 6. In a number of plants automatic machines are replacing the work of men. 7. Rapid growth of science is one of the main features of our time. 8. Many people work at computer design. 9. Man has learned to control forces of nature. 10. They have saved a lot of time by using computers in their research.

Exercise 4. Переведите предложения с согласованием времен.

1. We thought that the experiment would begin the next day. 2. The design engineer said that the new machine would be used in the future. 3. The operator said that he was feeding new data into the machine. 4. Yesterday I read in a newspaper that those machines had been used by our engineers. 5. We knew that Professor N. had published the results of his research. 6. He asked me why I was working at that problem. 7. I did not know who had invented the computer. 8. We heard that he wanted to know everything about this experiment. 9. We know he will be a good programmer if he studies this subject thoroughly. 10. They believed that computers would be a very effective tool if the people used the machines correctly.

Запомните следующие слова.

ACTIVE VOCABULARY

natural	['nxtʃrql]	естественный
set	[set]	набор, комплект
bear	[bFq]	иметь (отношение и т.п.)
resemblance	[rI'zemblqns]	сходство, подобие
algebraic	[,xldʒi'breiIk]	алгебраический
expression	[Iks'preʃn]	выражение
normally	['nLmqlI]	обычно
possible	['pOsIbl]	возможный
binary	['bainqrI]	двоичный, бинарный
originally	[q'ridʒnqlI]	первоначально
handle	['hxndl]	обращаться, работать
letter	['letq]	буква
correspond	[,kOrIs'pOnd]	соответствовать, сообщаться
depend (on)	[dI'pend qn]	зависеть от
chart	[tʃRt]	схема, диаграмма
practical	['prxktIkl]	практический
ordinary	['Ldnqrl]	обычный
numerical	[njH'merIkl]	цифровой
decimal	['desiml]	десятичный
express	[Iks'pres]	выражать
suit	[sjHt]	подходить
lightening	['laitnIN]	молния
list	[list]	список
supply	[sq'plai]	поставлять
significant	[sig'nifIkqnt]	значительный, важный
part	[pRt]	роль, часть
bit	[bit]	бит
specific	[spI'sifIk]	особый, специфичный
byte	[bait]	байт
unit	['jHnIt]	единица

Exercise 5. Прочитайте и переведите интернациональные слова:

natural, algebraic, normally, binary, originally, position, practical, ordinary, operate, electronics, registration, legal, official, formal, formalize, active, correction, real, reality, realization, association, organ, organize, organism, organizer.

Прочитайте текст и переведите его со словарем.

7A. MACHINE LANGUAGE OF A COMPUTER

A machine language is the natural instruction set of a computer which bears little resemblance to the algebraic form in which mathematical expressions are normally written. This language makes the operation of the computer possible. It is known as the binary number system and was originally used to represent and handle numbers only. Nowadays it is used to handle letters and symbols as well.

Binary system uses only two symbols, 1 and 0, rather than the ten decimal numbers (0-9), and the twenty-six letters of the alphabet we normally use.

The decimal numbers are compared with the corresponding binary symbols. The symbol 1 in the binary system can be used to represent one, two, four, eight, or sixteen depending on its position or place in a special chart.

The binary system is not so practical for ordinary numerical problems as the decimal system because more digits are required to express numbers. But this system suits modern computers because some of them can store millions decimal digits and operate with a lightening speed.

The basic unit of information with which digital computers operate is the bit. For many purposes, however it is better not to be specific about how the information is coded into bits. A byte is between 6 and 10 bits and corresponds to a storage unit necessary to contain the binary code.

The store also contains a numerical quantities and data which are to be processed. It also has a program or list of instructions or commands which are to be performed.

It is the machine language that greatly helps the arithmetic unit normally perform the operation of addition, subtraction, multiplication and division and certain other special operations.

The input and output devices are to supply information and to obtain it from the computer. These devices play a significant part in making the capacity of a computer effective. In converting information from one form to another these units employ the machine language.

Exercise 6. Прочтите следующие слова:

language, natural, resemblance, quantity, machine, lightening, expression, chart, significant, correspond, handle, originally.

Exercise 7. Найдите в тексте английский эквивалент.

Обычный набор инструкций, иметь небольшое сходство с, делает возможным, первоначально использовалась, также, скорее чем (а не), соответствующие символы, в зависимости от, специальная таблица, подходит для компьютеров, молниеносная скорость, играют важную роль, по многим причинам, список инструкций.

Exercise 8. Вставьте пропущенные слова:

symbols, machine, handle, unit, set, position, suits, form, numbers, express.

1. A machine language is the instruction ... of a computer. 2. Mathematical expressions are usually written in algebraic ... . 3. This ... language is known as the binary number system. 4. The binary system was at first used to represent ... only. 5. Now it is used to ... letters, symbols and numbers. 6. Binary system uses only two ... . 7. One symbol can be used depending on its ... in a special chart. 8. Digits are required to ... numbers. 9. The binary system ... modern computers. 10. The basic ... of information is the bit.

Exercise 9. Закончите предложения.

1. A machine language is ... 2. The machine language makes ... 3. The machine language is called ... 4. The machine language is used ... 5. The binary system uses ... 6. The decimal numbers are compared ... 7. The decimal system is used ... 8. The bit is ... 9. A byte is ... 10. The store contains ...

Exercise 10. Найдите синонимы:

to resemble, to place, certain, sort, structure, to connect, kind, hard, design, to put, to be like, definite, to link, solid.

Exercise 11. Ответьте на вопросы.

1. What is a machine language? 2. Does this language resemble a mathematical expression? 3. What is the function of the language in the computer? 4. How do they call this language? 5. What is the language used for nowadays? 6. How many symbols does the binary system use? 7. How do the decimal numbers look like in the machine language? 8. Why can the symbol 1 be used to represent different numbers? 9. Why is the binary system not used for usual numerical problems? 10. What is the basic unit of

computer information?

Exercise 12. Прочитайте и переведите следующие наречия:

widely, fully, easily, completely, necessarily, greatly, highly, normally.

Exercise 13. Прочитайте следующие символы.

+132	-109	÷3	≈24.7	>15	79º
=202	×137	±0.5	√356	<79	2%

Exercise 14. Переведите предложения, обращая внимание на время.

1. The operations performed by a computer are called data processing. 2. An electronic computer can perform mathematical work. 3. Digital machines have many applications. 4. Analog computers were designed to accept physical forces. 5. The earliest computers were referred to as 'giant brains'. 6. A problem must be fed into the machine. 7. There are some computers that are able to perform many different jobs. 8. Electronic computers have become very useful in industry. 9. Computers will save research workers years of hard work. 10. The problem this computer is dealing with is very complicated. 11. Scientists believed they would create a powerful device for making calculations. 12. If you use a computer in your work, you'll solve the problem easily. 13. We thought that the electronic devices had been designed some decades ago. 14. The specialists knew the work was requiring expertise and ingenuity. 15. We were said that there would be no possibility to solve the problem if we continued making such bad mistakes.

Exercise 15. Прочитайте и переведите предложения с наречиями.

1. They worked hard and their hard work resulted in new discoveries. 2. She will hardly come as she is very busy. 3. It is highly important that high speed should be applied to calculations. 4. Nearly all the devices were near the TV set. 5. It was already late when we left the laboratory. 6. A very interesting book by this scientist has appeared lately. 7. As everything was ready they could begin the work. 8. It is known that a computer takes the coded instructions readily. 9. It was a close investigation and the scientists closely tested the results. 10. It looks like a computer. 11. It is likely to be a robot. 12. The calculations took a short time but shortly we came across some difficulties. 13. He made much work and it was a great success. 14. A computer is a great achievement of science. 15. Computers have greatly influenced the age of scientific and technological revolution.

UNIT 7. LESSON 3

Read the text without a dictionary.

7B. MICROELECTRONICS AND THE PERSONAL COMPUTER

The future increase in capacity and decrease in cost of microelectronic devices will not only give rise to compact and powerful hardware but also bring changes in the way human beings and computers interact. Both adults and children will be able to have as a personal possession a computer about the size of a large notebook with the power to handle all their information-related needs.

The personal computers can be regarded as the newest example of human medium of communication. The evolution of the personal computer has followed the path similar to that of the printed book, but in 60 years rather than 600. Like the handmade book of the Middle Ages the massive computers built in two decades before 1960 were coarse, expensive, available to only a few.

Just as the Industrial Revolution made the personal book by providing inexpensive paper and mechanized printing and binding, the microelectronic revolution brings about the personal computer. Ideally the personal computer will be designed in such a way that people of all ages and walks of life can model and channel its power to their own needs.

Architects should be able to simulate three-dimensional space in order to modify their current designs. Physicians should be able to store and organize a large quantity of information about their patients. Composers should be able to hear a composition as they are composing it, especially if it is too complex for them to play.

As the use of pocket computers and other advanced machines becomes more widespread, their impact on society will become more and more significant. In schools, not only they are useful in solving problems in maths or physics, but they will store spelling clues for English courses, translations for language studies. In almost any subject they can serve as a teaching aid.

Children should have an active learning tool that gives them ready access to large stores of knowledge in ways that are not possible with books.

The coming pocket computer will have even more everyday applications. Businessmen now are able to better plan their schedules; mini-computers with built-in electronic clocks automatically remind them of previously scheduled appointments and meetings. Investors can analyse market trends and compare projected inflation rates with existing interest figures. And homemakers have an electronic budget planner with

a built-in over-spending reminder.

To top it all, an inexpensive device is now available which permits you to program inputs to your mini-computer's memory bank. It gives you phone numbers on demand, tells you how to spell tough words, performs dozens of complex operations on call.

A great deal of progress has been made in the past decade by design engineers chanelling the raw power of the computer into an effective design tool. Through the combined efforts of a multitude of industrial engineers the power of the computer has been transformed into an effective, efficient extension of the engineer's own skill, talent and capacity.

COMPREHENSION TEST

I. Put the following phrases in the correct sequence to make up a plan of the text. Make corrections if needed.

1. Pocket computer possibilities.
2. The future use of computers by builders, musicians and doctors.
3. Human sphere of communication.
4. Computers in design engineering.
5. Pocket computer applications in business.
6. Computers as a teaching aid.
7. The so-called Second Industrial Revolution.
8. The use of the earliest types of computers.
9. The problem of man-computer interaction.
10. Books and computers.

II. Find the answers to the following questions.

1. What changes will be brought about in the way human beings and computers interact?
2. How old is the computer?
3. What were the first computers like?
4. Who can use computers ideally?
5. Can you name some future computer applications?
6. What role can computers play at school?
7. Will children use books if they have computers? Why?
8. What operations can businessmen, investors and homemakers perform with the help of computers?
9. What functions would you like the computer to have?

10. Why should engineers use computers in the design work?

Translate the text into English. Entitle the text.

TEXT 7C

Машинный язык - это набор инструкций для компьютера. Он немного похож на алгебраическую форму математических выражений. Этот язык дает возможность компьютеру действовать. Машинным языком называют двоичную цифровую систему. Она используется для операций с цифрами, буквами и символами.

В бинарной системе всего два символа. Десятичные цифры можно сравнить с соответствующими двоичными символами. Один символ может использоваться для обозначения разных чисел в зависимости от положения в специальной таблице.

Двоичная система не используется для обычных числовых задач, так как требуется больше цифр для выражения чисел. Эта система подходит для современных компьютеров из-за их большой памяти и высокой скорости.

7D. LOOK WHAT THOSE KNUCKLE-HEADS ARE DOING

If you think of a world free of human error, a society that is regulated by the quiet clicking of a computer which makes no mistakes you will get disappointed.

Like us, the mechanical brains are showing signs of nervousness, indecisiveness. In taking human skills, the machines also have taken our human weaknesses.

An American engineer designed a computer with ears. It responded to carefully spoken numbers with a regulated "clack-click", but one day it became excited by a movie-camera spring that was being wound within its hearing, and went into hysteria producing its clickety-clacks. It returned to normal state, but repeated the performance as soon as it again heard the spring being wound.

Several large computers have suffered nervous breakdowns that were not planned. It was a very human kind of breakdown suffered by a machine which worked too hard at an impossible job. All night long it clicked and clacked wildly, and in the morning it was whirring angrily and gnashing its gear teeth in despair. Finally it stopped in a state of shock. It had been trying to divide by zero. Didn't know any better!

So far the translation machines are not quite perfect as they have limited vocabularies and one word must often do the work of several words.

The title of a Russian technical article "New Uses for Hydraulic Rams" was

translated "New Uses for Water Goats"! Another machine was asked to translate into Russian the expression "The spirit is willing, but the flesh is weak". The translation appeared to be more than strange: "Vodka is strong, meat is weak".

The advocates of computers stand firm in their conviction that all computer mistakes are likely to be caused by wrong information people often feed the machines with. But manufacturers admit that the machines are not perfect; that a big computer can be expected to make a mistake about once a month. Mistakes are caused by worn-out microcircuits in the machines or overloading and so on.

In the theory, computer mistakes can be prevented by using two machines, one to check on the work of the other.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 7E

Listen to the text and put the sentences in order to make the plan of the text.

1. The corresponding mathematical formulas cover several pages of an ordinary book.
2. The electronic brain could easily solve equation with 50, 100, or 200 unknowns.
3. We have to solve problems for which the reactions of the human brain prove too slow.
4. The solution of only a partial problem is completed by the electronic brain in seven minutes.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 8. LESSON 1

ATTRIBUTIVE CONSTRUCTIONS (ОПРЕДЕЛИТЕЛЬНЫЕ КОНСТРУКЦИИ)

Беспредложное существительное-определение стоит перед определяемым словом и переводится справа налево:

machine work	какая?	какая?
работа *машины*	*light* velocity	скорость *света*

Левое существительное-определение можно переводить:

1) прилагательным: *a newspaper article - газетная статья*
2) существительным в косвенном падеже: *wave length - длина волны*
   the translation machine - машина для перевода
3) группой слов, раскрывающей смысл: *world peace - мир во всем мире*
4) существительным в именительном падеже: *conference-hall - конференц-зал*

ЦЕПОЧКА ОПРЕДЕЛЕНИЙ

Если в предложении перед опредеяемым существительным стоят два или более определений подряд, то перевод может быть:

1) последовательным слева направо:
   pure distilled fresh water
   чистая дистиллированная свежая вода
2) последовательным справа налево:
   car speed calculation problem
   проблема вычисления скорости автомобиля
3) перекрестным:
   new foreign policy principles
   новые принципы внешней политики

Цепочка существительных - главное слово всегда последнее, с него начинается перевод:

the land transport
наземный транспорт
the land transport system
система наземного транспорта
the land transport system improvement
улучшение системы наземного транспорта
the land transport system improvement problem
проблема улучшения системы наземного транспорта

Exercise 1.Переведите определение прилагательным или существительным:

a government delegation, a factory building, machine language, the laboratory instrument, production technology, the university laboratory, the student conference, an electron tube, metal part, the temperature scale.

Exercise 2. Переведите определение существительным:

an experiment program, the machine elements, communication service, air pressure, gas temperature, the education system, the crystal structure, the operation principle, the computer design, the test results.

Exercise 3. Сравните пары словосочетаний:

the bus stop - the city bus, the memory system - the system memory, the door glass - the glass door, the steel sheet - the sheet steel, the metal export - the export metal, the control process - the process control, the design system - the system design, an operation program - the program operation, a research institute - institute research, the calculation speed - the speed calculation.

Exercise 4. Переведите определения существительным в нужном падеже:

measurement units, voltage changes, health threat, liberation movement, a return visit, a friendship society, cost advantage, a garden window, television system, water level.

Exercise 5. Переведите словосочетания:

the traffic speed; the traffic speed increase; the railway bridge; the railway bridge reconstruction; the car speed calculation; the car speed calculation process; the high quality program; the high quality program design; the deep sea current measuring device; the temperature limit.

Exercise 6. Укажите, чем выражено определение:

cylinder wall; the English Channel coast; supersonic vertical take-off bomber; fourteen bird and animal stories and plays; wooden house advantages; automatic flight control equipment; essential research programmes; beginning college student; improved information flow; free school bus service; two-bed hotel room; life-long hobby; Electronic Research and Engineering Laboratory; the new orientation device; connecting line; advanced group; reading students; destroyed data; tested method; navigation instrument; current events; general plan; information theory; George Washington bus terminal station; travelling passenger; Manchester United versus Liverpool football match; National Oil Research Institute; federal highway office; class words and expressions; two-page story; the North Pole expedition; the New York City; greatest mineral resources; an interesting book to read.

SUBJUNCTIVE MOOD (СОСЛАГАТЕЛЬНОЕ НАКЛОНЕНИЕ)

Показывает, что говорящий рассматривает действие не как реальный факт, а как предполагаемое, желательное или нереальное. Употребляется:

1. В простых предложениях.

I *should like* to take this book. *Я бы хотел взять эту книгу.*

He *would like* to join us. Он бы хотел присоединиться к нам.

She *could do* it tomorrow. Она смогла бы сделать это завтра.

They *would have helped* you. Они бы помогли вам.

2. После безличных оборотов (см. с.201).

It is desirable that he (*should*) *be* there. Желательно, чтобы он был здесь.

3. После глаголов волеизъявления (см. с.201).

I *wanted* that the test (*should*) *be* done. *Я хотел, чтобы тест был выполнен.*

4. После глагола *wish.*

I *wish* he *were* with us. Мне жаль, что его нет с нами.

I *wish* you *had brought* your book. Мне жаль, что ты не принес свою книгу.

I *wish* he *would tell* us everything. *Я бы хотел, чтобы он нам все рассказал.*

5. После союзов цели *that, so that, in order that* - так, чтобы; *lest* - чтобы не.

He'll go by car *so that* he *(should) be* in time. Он поедет, чтобы успеть.

She went away *lest* they (*should) see* her. Она ушла, чтобы ее не увидели.

6. После союзов сравнения *as if, as though* (как будто, словно).

He felt *as though* he *were insulted*. Он чувствовал так, словно его обидели.

She looked *as though* she *might cry*. Казалось, что она расплачется.

7. После союзных слов *whoever* (кто бы ни), *whatever* (что бы ни), *however* (как бы ни), *wherever* (где бы ни, куда бы ни), *whenever* (когда бы ни).

However tired he *may be*, he'll help us. Как бы он ни устал, он поможет нам.

Exercise 7. Переведите предложения.

1. I should like to thank you for your help. 2. He would like to meet you. 3. You could have done it in a different way. 4. They might have forgotten about it. 5. It is important that everybody do the task. 6. It is necessary that he should attend the conference. 7. The engineer demanded that the test should be repeated. 8. The professor suggested that the students join the lecture. 9. I wish I had followed your advice. 10. I wish it were Sunday today. 11. I wish he would come tomorrow. 12. He talks as if he knew everything about the subject. 13. A sleeping dog behaves as though it were dreaming. 14. Speak louder so that everyone may hear you. 15. In order that they complete the task, we came to help them. 16. We'll continue our work whatever may happen.

СУФФИКСЫ

суффиксы существительных: *-er/-or, -ist, -ian, -tion/-ion/-sion, -ment, -age, -ure, -ance/-ence, -(i)ty, -ics, -ness, -ism*

суффиксы прилагательных: *-able/-ible, -ful, -less, -y, -al, -ic, -ive, -ous,-ant*

суффиксы глаголов: *-ize, -ate, -(i)fy, -en*

суффикс наречий: *-ly*

Exercise 8. Определите часть речи и переведите:

computer, concentrate, concentration, corrosion, atmospheric, logically, collection, meter, metric, international, cubic, anodic, special, specialize, residence, primitive, heroic, heroism, distant, distantly, distance, systematic, systematize, figure, figuratively, decentralize, uncomfortable, protector, indicator, indicate, magnetic, electrification, electrify, electric, electrician, electricity, demonstrate, demonstration, demonstrator, demonstrative, demonstratively, electronics.

МНОГОЗНАЧНОСТЬ *to be, to have*

to be

1) ‘быть, находиться’: He *is* at home now. Он находится...
2) глагол-связка: My friend *is* an engineer. Мой друг - инженер.
3) вспомогательный глагол в Continuous: He *is working*. Он работает.
   вспомогательный глагол в Passive: The letter *is written*. Письмо написано.
4) be+to - модальный глагол 'должен': He *is to* come. Он должен прийти.

to have

1) ‘иметь, обладать’: We *have* a TV set. *У* нас есть телевизор.
2) вспомогательный глагол в Perfect: He *has* passed the test. Он уже сдал тест.
3) have to - модальный глагол 'должен': He *has to* come. Он должен прийти.

Exercise 9. Переведите предложения.

1. The students were in the laboratory. 2. They have a good motor-car. 3. The plant was far away from the city. 4. The students were left in the laboratory. 5. They have bought a good car. 6. The process was speedened. 7. The students were making experiments in the lab. 8. He had to buy a car as he worked far from his house. 9. He was travelling in the north. 10. The students were to come to the lab at 3 o'clock. 11. They have a good plan. 12. They had to test the engine twice. 13. He was to meet me after work. 14. They have already passed their exams.

ЧТЕНИЕ СОГЛАСНЫХ *c, s, g, j, x* И УДВОЕННЫХ СОГЛАСНЫХ

c	+ e,i,y	[s]
	+ a,o,u,согласных, в конце слова	[k]
	+ перед i в суффиксах	[ʃ]
s	- в окончаниях после глухих согласных	[s]
	- в окончаниях после звонких согласных, гласных, между гласными	[z]
	- перед i в суффиксах	[ʃ]
g	+ e,i,y	[dʒ]
	+ a,o,u,согласных	[g]
x	- перед согласными (ударение на 1-м слоге)	[ks]
	- между гласными (ударение на 2-м слоге)	[gz]
j	- всегда	[dʒ]
ll	- как один звук	[l]

fa**c**e, **c**ity, **c**entral, **c**ycle, **c**ertain, **c**urri**c**ulum, **c**ontain, **c**all, **c**anteen; ches**s**t, **s**orry, **s**ight, folk**s**, note**s**, eye**s**, lie**s**, card**s**, computer**s**, de**s**ign**s**; **g**esture, **g**iant, **g**ym, **g**enerally, **g**oal, **g**uide, **g**rill, **g**ame, **g**ate; e**x**cite, e**x**treme, e**x**ile, e**x**actness, e**x**amine; **J**uly, **j**ustice; sma**ll**, pre**ss**, co**nn**ect, co**rr**ect; spe**ci**al, ten**si**on

ПРЕДЛОГИ ВРЕМЕНИ И ОТНОШЕНИЯ

in (в,через)	in March, in a week	*on* (в)	on Sunday, on May 7
during (во время)	during the lecture	*since* (с)	since 5 o'clock
before (до,перед)	before the lecture	*for* (в течение)	for a day
after (после)	after the lecture	*until* (до)	until June
between (между)	between 3 and 4 o'clock	*at* (в)	at 3 o'clock
from...till (от..до)	from 3 till 5	*by* (к)	by 7 o'clock

of - род.пад. (кого, чей):	The book *of* the teacher.
to, for - дат.пад. (кому, чему):	Give it *to* me. This is *for* him.
by, with - твор.пад. (кем, чем):	It's done *by* them *with* a computer.

Exercise 10. Вставьте нужный предлог.

1. The ground is covered ... snow ... January. 2. I haven't seen you ... July. 3. We'll be engineers ... five years. 4. We repeated grammar ... the lesson, wrote a test ... the lesson and had dinner ... it. 5. He'll come ... one and two o'clock ... Saturday. 6. I usually get up ... 7 o'clock and have breakfast ... 7.30 ... 8.00. 7. This book was written ... a well-known writer. 8. I had done everything ... 5 o'clock yesterday. 9. She had been doing her homework ... an hour or so. 10. This is an old friend ... mine. 11. I'll come ... your place ... 8 o'clock and bring a good book ... you.

UNIT 8. LESSON 2

Exercise 1. Запомните правила чтения согласных букв:

centre, **c**ylinder, spa**c**e, ne**c**essity, pla**c**e, **c**all, **c**ut, **c**contra**c**t, a**c**quire, be**c**ome, physi**c**s; **s**ee, **s**everal, **s**cope, de**s**k, te**st**s, plan**s**, activitie**s**, field**s**; **g**ave, **g**o, **g**ood, **g**uidance, **g**reat, **g**eneral, chan**g**e, ran**g**e; e**x**hibition, e**x**press, e**x**tremely, e**x**tra, e**x**act, e**x**am, e**x**ample, e**x**otic; **j**ust, **j**ob, **j**oke, **j**uice; te**ll**, pre**ss**, co**nn**ect, co**mm**ent.

Exercise 2. Переведите определительные словосочетания:

research laboratory; laboratory research; temperature limit; limit temperature; metal surface; surface metal; transformation energy; energy transformation; speed flight; flight speed; world industry; world trade; world trade system; power sources; power sources development; power sources development system; power sources development problem; invention project; computer design; computer calculation power; automation and telemechanics faculty; electronic devices and apparatus department; pulse form; machine operation; computer unit; numbers and instructions store; circuit connections; measurement unit system; computer science; engineering branch; power station design; air transport system development; space body; space station.

Exercise 3. Переведите, обращая внимание на сослагательное наклонение.

1. I would like to ask for your help. 2. You are the only person she would listen to. 3. One laser beam could carry radio, TV and telephone signals simultaneously. 4. I wish I had studied French instead of English. 5. I wish you had translated the article yesterday. 6. It is necessary that you should follow the instructions. 7. It is requested that students attend lectures and seminars. 8. The scientist insisted that the experiments should be repeated. 9. He suggested that the meeting be held as soon as possible. 10. They felt as if they had done something wrong. 11. The teacher looked at us as though she had never seen us before. 12. In order that hardware may be used effectively software is needed. 13. Students will carry out experiments so that they may be ready for research work in future. 14. Students must work hard lest they should fail at the examination. 15. Whoever may support this plan, I will object. 16. We’ll be glad to see you whenever you come.

Запомните следующие слова.

ACTIVE VOCABULARY

mechanization	[ˌmekənaɪˈzeɪʃn]	механизация
go on	[ˈgəʊ ˈɔn]	продолжать
steadily	[ˈstedɪlɪ]	неизменно
lathe	[leɪð]	токарный станок
loom	[luːm]	ткацкий станок
set	[set]	устанавливать
maintain	[mən'teɪn]	обслуживать**,** поддерживать
load	[ləʊd]	нагружать
burden	[ˈbɜːdn]	груз, бремя, работа
gradually	[ˈgrædjuəlɪ]	постепенно
handle	[ˈhændl]	обращаться,транспортировать
install	[ɪnˈstɔːl]	устанавливать
lighten	[ˈlaɪtn]	облегчать
remove	[rɪˈmuːv]	замещать, устранять
transfer	[ˈtrænsfɜː]	передавать, перемещать
series	[ˈsɪəriːz]	ряд, серия
rapidly	[ˈræpɪdlɪ]	быстро
ordinarily	[ˈɔːdnrɪlɪ]	обычно
define	[dɪˈfaɪn]	определять
entire	[ɪnˈtaɪə]	весь, целый
step	[step]	шаг
finished	[ˈfɪnɪʃt]	конечный, отделанный
goods	[gʊdz]	товары, изделия
assembly	[əˈsemblɪ]	сборка
go wrong	[ˈgəʊ ˈrɔŋ]	испортиться
for instance	[fəˈrɪnstəns]	например
wear out	[weəraʊt]	изнашиваться
vast	[vɑːst]	обширный
quality	[ˈkwɔlɪtɪ]	качество
product	[ˈprɔdəkt]	продукт, продукция

Exercise 4. Прочитайте и переведите интернациональные слова:

textile, product, production, giant, special, vary, variant, variety, mechanization, mechanize, automation, automatic, automatically, revolution, industrial, operation, operator, machine, series, process, correct, control, temperature.

Прочитайте текст и переведите его со словарем.

8A. ADVANCED MECHANIZATION AND AUTOMATION

Mechanization has been going on steadily since long before the Industrial Revolution, and a few of the early lathes and looms were so highly automatic that their operators were left with only the skilled work of setting and maintaining them and the unskilled work of loading and unloading them.

What has happened since then is that more and improved machinery of this kind has gradually been installed, while the burden of loading, unloading and handling between operations has been lightened and in some factories almost completely removed.

There are many good examples of highly automatic machinery today - the textile machines used in many processes, and the automatic lathes and transfer-machines used in engineering. The transfer-machine is perhaps the best example; it is really a series of machine-tools, each doing one operation automatically. The handling of goods in factories has already been mechanized.

"Automation" is a special word for special purpose. Ordinarily automation is any improvement in the control of some activity or process by non-human, i.e. automatic means, but sometimes the term is defined more narrowly.

Recent steps in automation have followed each other with unusual speed. Many people are surprised to learn that in industries like chemical and oil-refining entire processes have become completely automatic.

Automation has many sides. It includes, for example, developments that are no more than advanced mechanization - transfer-machines in engineering, machinery for making finished goods, and mechanical equipment for handling and assembly.

Machines of this kind are automatic in that they do actual work on their own; the operators only watch them and correct them whenever they go wrong - when, for instance, tools wear out.

But automation can also mean automatic control of processes and machinery, and this is a very different thing from mechanization, though the two go together. Control is necessary in a vast number of processes in order to maintain the quality of a product when the operating conditions, such as temperature and pressure, change from time to time.

Exercise 5. Прочтите следующие слова:

means, lathe, loom, machinery, machine, transfer-machine, machine-tool, device, unit, apparatus, equipment, instrument, mechanism, appliance.

Exercise 6. Найдите в тексте английский эквивалент.

Происходила стабильно, задолго до, немногие из первых станков, квалифицированная работа, еще больше, возможно, серия станков, автоматическое средство, более узко, не более чем, сами по себе, когда бы ни, например, время от времени.

Exercise 7. Закончите предложения.

1. Mechanization has been going on steadily since ... . 2. The operators of the early lathes and looms were left with ... . 3. The burden of loading, unloading and handling ... . 4. The transfer-machine is a series of ... . 5. Ordinarily automation is any improvement in the control ... . 6. Recent steps in automation have followed ... 7. Automation includes ... . 8. Machines of this kind are automatic in ... . 9. The operators only watch ... . 10. Control is necessary in a vast number of ... .

Exercise 8. Переведите на английский язык.

1. Токарные и ткацкие станки были значительно автоматизированы. 2. Операторы выполняли только квалифицированную работу. 3. Погрузка, разгрузка и транспортировка между операциями были облегчены. 4. Автоматизация - это специальный термин, используемый для специальной цели. 5. В химической промышленности все процессы полностью автоматизированы. 6. Автоматические токарные станки используются в промышленности. 7. Автоматическое оборудование изготавливает конечный продукт. 8. Механическое оборудование применяется для транспортировки и сборки. 9. Загрузка и разгрузка - это неквалифицированная работа. 10. Установка и обслуживание станков - это квалифицированная работа.

Exercise 9. Ответьте на вопросы.

1. When did the process of mechanization begin? 2. What skilled work did operators perform? 3. What unskilled work had workers to do? 4. What operations have been lightened due to mechanization? 5. What are the examples of highly automated machinery? 6. What is a transfer-machine? 7. What is automation? 8. What sides does automation have? 9. How do automatic machines do their work? 10. Why is control necessary?

Exercise 10. Определите часть речи по суффиксу и переведите слова:

adaptation, appearance, approximately, availability, basically, capability, certainly, classification, communicative, comparable, computational, connection, container, correspondence, consistence, continuation, continually, connective, changeable, independent.

Exercise 11. Переведите предложения с цепочками определений.

1. The space age demands are to solve nonlinear control system problems. 2. The control engineers have to know digital computer capabilities and analog machine limitations. 3. The new equipment ratio is growing in the control equipment development. 4. Automatic control system operates the modern jet airplane engine. 5. One of the control system applications is the high precision control devices design. 6. These are inertial guidance instruments. 7. Another control system use is the manufacture-controlling equipment design. 8. You must study modern complex control functions. 9. The new instruction list directs the machine system. 10. The spaceship contains the instrument compartment. 11. Speed calculations were done yesterday. 12. Control appliances, orientation systems and radio antennas will be installed on the outer surface of a spacecraft. 13. What is the spaceship position in relation to the Earth? 14. The program installation would take too much time. 15. There are numerous buttons and switches on the control panel.

Exercise 12. Переведите предложения с глаголами *to be* и *to have*.

1. The data are in the memory. 2. This computer is hybrid, and that machine is, too. 3. A hybrid computer is a combination of digital and analog ones. 4. These data are to be carefully processed before comparing the results. 5. This experiment is to be carried out again, as well as that one is. 6. What is automation? 7. It is a process in which work is done with minimum human intervention. 8. It is important that the design of automatic system should be a principal concern of an engineer. 9. In recent years control systems have been rapidly advancing. 10. The control engineer has to master the necessary technique. 11. Man has more free time using the automatic equipment than people had before. 12. An engineer has to have deeper knowledge of computers. 13. We have used this instrument in the research several times. 14. Have automatic controls been introduced into production? 15. Sensitive devices had been used before he began working at them.

UNIT 8. LESSON 3

Read the text without a dictionary.

8B. THE AGE OF AUTOMATION

'Automation' has been, and still is, a greatly misused word, but its proper meaning, and therefore its implications, is gradually becoming better understood. Well, automation is a concept through which a machine system is operating with maximum efficiency by means of adequate measurements, observation, and control of its behaviour. It involves a detailed and continuous knowledge of the functioning of the system, so that the best corrective actions can be applied immediately when they become necessary.

Automation in this true sense is brought about only through exploitation of its three main elements, communication, computation, and control - the three 'Cs'.

Provided with the assistance of a computer the managers are free to concentrate on making policy decisions and on changing the decision of the computer if they feel the operation does not really make the best sense. Without automation, the manager would have to spend his time making a series of decisions on the basis of very limited information and a great deal of experience. The computer-aided manager is in a completely different position. Before he gets it, and even before he needs it, the information is processed, all actions which can be decided by the machine already taken, giving him the important facts in a clear-cut form, so that he may sometimes be faced with one, two, or three basic choices. He still has to make his selection of these choices, but he knows what the choices are, and he knows the consequences of his choices in advance, because the computer allows him to test them. Before he makes his final decision, he will probably ask the computer a question: 'If I decide to do this instead of that, what will consequences be?' And he may then find, from the answer the computer gives him, that he has to refer the problem to his superior for a final decision.

Mention should be made that automation does not in the least replace human decisions on important problems. It makes sure that the people who have to make these decisions have adequate pre-digested information to work on. It is not a question of machines replacing men: it is largely a question of extending men's abilities by machines so that in fact they become better, more competent men. If you want to see across the ocean, you must use radar. You cannot see across the ocean with a telescope: you have to use the most adequate tools for your purpose; the further you want to see, the more complex your tools have to be. In the same way, if you want someone thousands miles away to hear you, you do not use a megaphone: you have to use

telecommunications.

Automation which is one of the main factors of technical progress today is impossible without electricity.

Our life can't be imagined without telephone, telegraph and radio communications. But it is also electricity that gives them life. In recent years electricity has made a great contribution to radio communication between the spaceships and also between the astronauts and the earth. Nearly all of the measuring devices used in developing the newest branches of science are electrically operated.

COMPREHENSION TEST

I. Put in the missed word.

1. Automation is a greatly ... word. (misused, misunderstood)
2. An automatic machine system ... with maximum efficiency. (controls, operates)
3. The three main 'Cs' are - communication, ... and control. (computation, correction)
4. Without automation, the manager would have to ... his time making decisions. (spend, save)
5. The computer-aided manager may be ... with a few main choices. (faced, headed)
6. The computers ... the manager to test choices. (allow, give)
7. The computer-aided manager can ... the machine questions. (answer, ask)
8. Automation does not ... in human decision on important problems. (take place, take part)
9. If you want to see across the ocean you must use ... . (telescope, radar)
10. If you want to be heard in a thousand miles away you have to use ... . (megaphone, telephone)
11. It is electricity that gives life to ... . (spaceship, radio)

II. Find the answers to the following questions:

1. What word is still 'automation'?
2. What does automation involve?
3. What would the manager have to do without automation?
4. What are the three main elements of automation?
5. Through what is automation brought about?
6. May the computer-aided manager sometimes be faced with several choices?
7. Will automation replace men or not?
8. In what position is the computer-aided manager?
9. What question will he probably ask the computer before he makes his final decision?
10. What is the result of using automation?

Translate the text into English. Entitle the text.

TEXT 8C

Некоторые первые станки были настолько автоматизированы, что их операторам оставалась лишь квалифицированная работа по установке и обслуживанию этих станков. Позднее бремя погрузки, разгрузки и транспортировки между станками было полностью снято.

Наилучший пример высокоавтоматизированного оборудования - это транспортировочная линия, состоящая из серии станков, выполняющих одну операцию автоматически.

Первоначально автоматизация обозначала любое улучшение в управлении какой-либо деятельностью или процессом автоматическими средствами.

Автоматизация имеет множество сторон. Она включает в себя механизацию процессов, а также автоматическое управление процессами и оборудованием.

8D. ELECTRONICS AND TECHNICAL PROGRESS

Large-scale application of electronic technique is a trend of technical progress capable of revolutionizing many branches of industry.

Electronics is a science that studies the properties of electrons, the laws of their motion, the laws of the transformation of various kinds of energy through the media of electrons.

At present it is difficult to enumerate all branches of science and technology which are based on electronic technique. Without radio electronics we would not have cybernetics, cosmonautics and nuclear physics. It is no mistake, therefore, to compare the birth of electronics to such great achievements of mankind as the discovery of fire, the use of the wheel, and the penetration into the secrets of the atom.

Electronics makes it possible to raise industrial automation to a higher level, to prepare conditions for the future technical equipping of the national economy. It is expected to revolutionize the system of control over mechanisms and production processes. The use of electronic and cybernetic machines led to radical changes in the management of big economic organizations, large plants, and so on. Electronics greatly helps to conduct fundamental research in nuclear physics, in the study of the nature of matter, and in the realization of controlled thermonuclear reactions. Electronic telescopes are used by astronomers to penetrate far into the unknown regions of the universe. An even greater role is being played by electronics in the development of the chemical industry.

Electronics includes many independent branches. The main among them are vacuum, semiconductor, molecular and quantum electronics.

It is hard to overestimate the role of radio electronics in technical progress and in the life of modern society in general. In our time achievements in this branch are associated with the utilization of crystals, among them semiconductor crystals. More attention was given to the study of thin film properties. The use of film elements promised a new and even greater progress in radio electronics, computer engineering and automation.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 8E

Listen to the text and choose the right word.

1. The invention of electronic devices has enlarged the application of energy for various/serious industrial purposes.
2. Electronics has become a new important stage in the development /dependence of electrical engineering as a whole.
3. Electronic devices made it possible/positive to solve the problem of obtaining high frequency currents.
4. In the beginning of the computer era, electron tubes were the dominant/prominent devices in the electronic field.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 9. LESSON 1

PARTICIPLE (ПРИЧАСТИЕ)

Причастие - неличная форма глагола, сочетающая признаки прилагательного или наречия с признаками глагола. В предложении может быть частью сказуемого, определением и обстоятельством.

	Active	Passive	
Participle I	*asking*	*being asked*	одновременное действие
Participle II	-	*asked*	предшествующее
Perfect Participle	*having asked*	*having been asked*	действие

ПРИЧАСТИЕ - ЧАСТЬ СКАЗУЕМОГО

Participle I - при образовании времен Continuous (to be + Part.I)

Participle II - при образовании времен Perfect (to have + Part.II) и всех форм Passive (to be + Part.II)

ПРИЧАСТИЕ - ОПРЕДЕЛЕНИЕ

Participle I отвечает на вопрос ‘какой?’, стоит до или после определяемого слова, переводится: 1) причастием 'что делающий(ся)?что делавший(ся)? что делаемый?'; 2) придаточным предложением с союзным словом 'который'.

the *boiling* water - *кипящая* вода *(которая кипит)*

the problem *being discussed* - *обсуждающаяся (обсуждаемая)* проблема

Participle II отвечает на вопрос ‘какой?’, стоит до или после определяемого слова, переводится: 1) причастием 'что сделанный?'; 2) придаточным предложением с союзным словом 'который'.

the *achieved* results - *достигнутые* результаты

the information *obtained* recently - информация, *полученная* недавно

Одиночное Participle II, стоящее после определяемого слова, переводится до него. Если в предложении стоят две глагольные формы подряд, то первая из них - Participle II-определение.

The device *used* helped us. *Использованное* устройство помогло нам.

ПРИЧАСТИЕ - ОБСТОЯТЕЛЬСТВО

Participle I отвечает на вопросы ‘как?’, ‘когда?’, чаще стоит в начале предложения, переводится: 1) деепричастием 'что делая?'; 2) существительным с предлогом 'при', 'во время'; 3) придаточным предложением с союзами 'когда, в то время как'. Перед причастием могут стоять союзы *when, while*.

Designing a new device he worked hard. 1) *Работая над новым прибором*, он... 2)

При работе над новым прибором он... 3) *Когда он работал над новым прибором*, он...

Being used for computations the device helped us. 1) *При использовании для вычислений* прибор... 2) *Когда прибор использовали для вычислений*, он... 3) *Будучи используем* для вычислений, прибор ...

Participle II отвечает на вопросы ‘когда?’, ‘при каких условиях?’, чаще стоит в начале предложения, всегда употребляется с союзами *if, unless* (если не), *when, although* (хотя), переводится: 1) придаточным предложением; 2) сочетанием союз 'если'+ неопределеннач форма глагола; 3) существительным с предлогом 'при'; 4) деепричастным пассивным оборотом (будучи сделанным).

If heated all substances expand. 1) *Когда вещества нагреваются*, все они... 2) *Если вещества нагреть*, все они... 3) *При нагревании* все вещества... 4) *Будучи нагретыми*, все вещества...

Perfect Participle отвечает на вопросы ‘когда?’, ‘почему?’, стоит в начале предложения, переводится: 1) деепричастием 'что сделав?'; 2) придаточным предложением с союзами 'когда, после того как, так как, поскольку'; 3) существительным с предлогом 'после, по'.

Having finished the work I went home. 1) *Закончив работу*, я... 2) *После того как я закончил работу*, я... 3) *По окончании работы* я…

Having been asked he helped us. *Когда его попросили*, он помог нам.

Exercise 1. Обратите внимание на одновременность действия Participle I.

1. The engineer delivering a report works at our factory. 2. The engineer delivering a report yesterday gave many interesting examples. 3. The students studying chemistry work much in the lab. 4. The students studying chemistry often worked in this lab. 5. People visiting Russia come from many countries of the world. 6. People visiting Russia came from different countries. 7. The young people living in this hostel are our students. 8. The young people living in this house were students of the technical college. 9. The house being built in this street will be our new hostel. 10. The device being tested now was designed by our professor.

Exercise 2. Переведите предложения с Participle II - определением.

1. The recommended book can help you in your work. 2. You must use the published data in your work. 3. We used the obtained results in practice. 4. The designed machine will increase the speed. 5. We do some exercises in written form. 6. The house built in this street is nine storeys high. 7. The book given by the teacher will help me to write my project. 8. We'll use the instruments designed in our lab. 9. The problem discussed at the last lecture was very important. 10. The results achieved in the lab must increase the speed.

Exercise 3. Переведите предложения с одиночным Participle II.

1. The method used helped to design a robot. 2. The methods applied opened new resources. 3. The machine designed operated well. 4. The officer invited visited our factory. 5. The case described attracted much attention. 6. The substance obtained showed the results of his research. 7. The materials needed came in time. 8. He has read all the books recommended. 9. The path found led us to the river. 10. The experiment described took much time.

Exercise 4. Переведите предложения с Participle I - обстоятельством.

1. Reading the text he often used the dictionary. 2. While crossing the street you should be very careful. 3. Making the experiment the engineer used this apparatus. 4. When working in the lab we observed a very interesting phenomenon. 5. Being explained at the lesson the law should be applied in practice. 6. When being prepared at home the text should be translated at first. 7. While translating the text the students came across many new words. 8. Designing the new device they used new methods. 9. When discussing the plan we talked about this problem. 10. While being discussed last time the plan was completely remade.

Exercise 5. Переведите предложения с Participle II - обстоятельством.

1. When cooled water becomes ice. 2. When made this experiment took much time. 3. If heated water becomes steam. 4. If used this material will help us to save time. 5. Unless properly processed these data cannot be applied. 6. Unless discussed these results must not be published. 7. Unless tested this method cannot be used. 8. Although discussed the book is not published yet. 9. Although used much the machine worked well. 10. Although repaired the device works badly.

Exericse 6. Переведите предложения с Perfect Participle - обстоятельством.

1. Having been translated into Russian the book was widely used. 2. Having increased the speed of calculations the programmer increased the efficiency. 3. Having been tested this device was given to the new lab. 4. Having obtained new information researchers decided to discuss it. 5. Having done his homework the student began listening to music. 6. Having been designed this apparatus was applied at the lessons. 7. Having studied English he decided to study Chinese and French. 8. Having solved this practical problem the scientists used the results in industry. 9. Having been published the book of this young writer became very popular. 10. Having been met at the station they went to the hotel.

ПРИСТАВКИ С ОТРИЦАТЕЛЬНЫМ ЗНАЧЕНИЕМ

un- real (реальный)	*un*real (нереальный)
in- dependent (зависимый)	*in*dependent (независимый)
il- legal (легальный)	*il*legal (нелегальный)
im- movable (передвижной)	*im*movable (неподвижный)
ir- regular (регулярный)	*ir*regular (нерегулярный)
dis- appear (появляться)	*dis*appear (исчезать)
mis- fortune (удача)	*mis*fortune (неудача)
non- interference (вмешательство)	*non*-interference (невмешательство)
de- formation (формирование)	*de*formation (расформирование)
anti- social (социальный)	*anti*social (антисоциальный)
counter- action (действие)	*counter*action (противодействие)

Exercise 7. Переведите слова:

insoluble (solve-растворять), unattainable (attain-достигать), incomparable (compare-сравнивать), unbelievable (believe-верить), unsuitable (suit-подходить), inexhaustible (exhaust-истощаться), indestructible (destruct-разрушать), uncreatable (create-создавать), non-understandable.

МНОГОЗНАЧНОСТЬ should, would

should (I, We)

1) сослагательное наклонение: If I..., I *should*... Если бы я..., я бы...

2) Future-in-the-Past (1-е лицо): We said that we *should* use.
Мы сказали, что будем использовать.

3) модальный глагол "должен, следует": You *should* do. Вы должны сделать.

would

1) сослагательное наклонение: If he..., he *would*... Если бы он..., он бы...

2) Future-in-the-Past (2-е, 3-е лицо): He said that he *would* use.
Он сказал, что будет использовать.

3) модальный глагол, выражающий упорное сопротивление (в отрицаниях):
The motor *would* not start. Мотор никак не заводился.

4) повторные действия в прошлом (со всеми лицами):
Last winter I *would* work... Прошлой зимой я обычно работал...

Exercise 8. Переведите предложения.

1. You should be more careful when working with a computer. 2. I was sure that I should become an engineer. 3. If I had been there yesterday I should have met him. 4. It is desirable that you should study this process. 5. We should like to take part in this expedition. 6. The professor suggested that they should investigate the new structure. 7. She said that she would study electronics. 8. The door would not open. 9. The doctor told her not to go out but she would not listen to him. 10. He would work on this project for hours. 11. He said that he would be working in the laboratory. 12. Had he remembered this law, he would not have made this mistake.

СОГЛАСНЫЕ БУКВОСОЧЕТАНИЯ

ss	- [s]	**ch**	- [tʃ]	**tch**	- [tʃ]	**nk**	- [ŋk]	**st**	- [s]	**mn**	- [m]
	\ [ʃ]		\ [k]	**gh**	- [f]	**stl**	- [sl]	**bt**	- [t]	**tz**	- [ts]
sh	- [ʃ]		\ [ʃ]	**ng**	- [ŋ],[ŋg]	**scl**	- [sl]	**mb**	- [m]	**que**	- [k]

bra**ss**, fu**ss**, pre**ss**, me**ss**, pre**ss**ure, a**ss**ure; **ch**osen, **ch**ild, **ch**ill, **ch**art, s**ch**eme, ar**ch**itect, s**ch**olar; scra**tch**, fe**tch**, sco**tch**; rau**gh**, dau**gh**; ri**ng**, E**ng**lish, a**ng**ry; sa**nk**, si**nk**, ba**nk**i**ng**; ru**stl**e, whi**stl**e, mu**scl**e; Chri**st**mas; dou**bt**, de**bt**; to**mb**, cru**mb**; sole**mn**, li**mn**; pictures**que**, che**que**; **sh**ell, **sh**ame, **sh**own; wal**tz**

ПРЕДЛОГИ МЕСТА И НАПРАВЛЕНИЯ

on (на)
in (в)
at (у, в, на)
under (below, beneath) (под)
over (над)
near (около)
to (к, на, в)
towards (в направлении)
from (от, из)
into (в, внутрь)
out of (из, изнутри)
off (с, от)

Exercise 9. Вставьте подходящие предлоги, где нужно.

1. We study … a faculty … computing machines. 2. ... the morning we go ... the University. 3. Our lectures begin ... 9 o'clock. 4. We have no lectures ... Sunday. 5. We take examinations ... January and June. 6. We do not study ... summer. 7. We come ... the classroom and sit down ... the tables. 8. We take our books and note-books … … the bags. 9. Our bags are usually ... the tables. 10. Sometimes they are ... the table ... the floor. 11. During the lesson we go ... the blackboard and write sentences ... it. 12. When the lessons are over we go ... ... the classroom and go … home. 13. We usually come back ... the University ... 3 o'clock ... the afternoon.

UNIT 9. LESSON 2

Exercise 1. Запомните чтение согласных буквосочетаний:

cla**ss**, ma**ss**, expre**ss**, expre**ss**ion, pre**ss**ure; **ch**eck, **ch**ange, **ch**oose, te**ch**nical, **ch**aracter, s**ch**ool; ma**tch**, wa**tch**; enou**gh**, tou**gh**, lau**gh**; thi**ng**, maki**ng**, si**ng**le, a**ng**le; tha**nk**, ra**nk**, ba**nk**; ca**stl**e, hu**stl**e; li**st**en, fa**st**en; dou**bt**ful, de**bt**or; bo**mb**, du**mb**, co**mb**, la**mb**; colu**mn**, autu**mn**; uni**que**, techni**que**; **sh**ine, **sh**ow; quar**tz.**

Exercise 2. Переведите предложения с причастием-определением.

1. The computer is used when we want to receive processed data. 2. The engineer applying a new method achieved very good results. 3. The computer being fed with data starts to make calculations. 4. The experiment being carried out at the moment is very complex. 5. The students being delivered a lecture on computer design showed great interest. 6. The calculating machine performs all the necessary operations. 7. The results published in the scientific journal became known all over the world. 8. The information received helped to design an improved computing machine. 9. The data obtained formed the basis for future research. 10. The designers creating new machines will carry out the experiment.

Exercise 3. Переведите предложения с причастием-обстоятельством.

1. Having made the calculations the digital computer gave out the results. 2. Designing a new machine he thought about its application. 3. He obtained good results using this method. 4. Calculating at high speed a computer is able to perform various operations. 5. When saving information a computer sends it to the memory unit. 6. Having calculated the data the machine showed the results on display. 7. Being applied in designing the new method was a success. 8. When asked a computer performs all the operations. 9. If controlled computers don't make mistakes. 10. Being a complicated device, a computer helps in the research.

Exercise 4. Выберите нужную форму причастия.

1. The scientists (discussing, discussed) this problem will take part in the conference. 2. The problems (discussing, discussed) at the conference are of great significance for future research. 3. (Designing, having designed) a new computer the engineers used new materials. 4. (Designing, having designed) an electronic device he began creating a new robot.

Запомните следующие слова.

ACTIVE VOCABULARY

age	[eidʒ]	век
demand	[di'mɑ:nd]	требовать, требование
master	['mɑ:stə]	изучать, совершенствовать
technique	[tek'ni:k]	техника, технические приемы
gain	[gein]	достигать, добиваться
sophistication	[sə,fistɪ'keiʃn]	искушенность
acquire	[ə'kwaiə]	приобретать
acquaint (with)	[ə'kweint]	знакомить с
capability	[,keipə'biliti]	способность
limitation	[,limɪ'teiʃn]	ограничение
effort	['efət]	усилие, попытка
intervention	[,intə'venʃn]	вмешательство
regulate	['regjuleit]	регулировать
introduce	[,intrə'dju:s]	вводить, внедрять
function	['fʌŋkʃn]	функция, назначение
fulfil	[ful'fil]	выполнять
growth	[grouθ]	рост, увеличение
equipment	[ɪ'kwipmənt]	оборудование
relieve	[rɪ'li:v]	облегчать, освобождать
activity	[æk'tivɪtɪ]	деятельность
devote	[di'vout]	посвящать
ability	[ə'biliti]	способность
occupation	[,ɔkju'peiʃn]	занятие, род занятий
elaborate	[ɪ'læbərɪt]	детально разработанный
amount	[ə'maunt]	количество
concern	[kən'sə:n]	интерес, дело, забота
advance	[əd'vɑ:ns]	продвигаться, развивать
cover	['kʌvə]	охватывать
precision	[prɪ'siʒn]	точность
discover	[dɪs'kʌvə]	открывать

Exercise 5. Прочитайте и переведите интернациональные слова:

technique, nonlinear, limitation, hybrid, automation, manufacture, minimum, regulate, reason, activity, airplane, pilot, inertial, configuration, distribute, distributor, distribution, scheme, theme, effect, effective, individual, specialize, specialization.

Прочитайте текст и переведите его со словарем.

9A. AUTOMATION

The space age demands that the control engineer should master the necessary techniques and obtain the needed knowledge for solving nonlinear control system problems. This means that he must gain sophistication in several almost unrelated fields.

In the first place he must acquire deeper knowledge of modern mathematics and then systems and components in their nonlinear range of operation. At last he must become well acquainted with the capabilities or limitations of modern digital, analog and hybrid computers.

What is automation? It is a process in which work is done with a minimum human effort and intervention and which is largely self-regulating. When introduced, modern complex controls can perform functions man would not be able to fulfil.

The design of newer equipment with greater usefulness and capabilities is bringing about an ever increasing growth in the development of control equipment. The reason is twofold.

Firstly, automatic controls relieve man of many monotonous activities, so that he can devote his abilities to another occupation, either physical or mental.

Secondly, modern complex controls can perform functions which are beyond the physical abilities of man. For example, an elaborate automatic control system operates the engine of a modern jet airplane with only a minimum amount of the pilot's attention, so that he is free to fly his airplane.

It is important that the design and development of automatic control systems should be a principal concern of an engineer. In recent years such systems should have been rapidly advancing in significance in all fields of engineering.

The applications of control systems cover a very wide scope, ranging from the design of precision control devices, such as sensitive instruments used for inertial guidance, to the design of the equipment used for controlling manufacture or some industrial processes.

New applications for automatic controls are continually being discovered in all areas of human life.

Exercise 6. Прочтите следующие слова:

age, demand, master, technique, knowledge, sophistication, hybrid, acquainted, minimum, increase, beyond, advance, significance.

Exercise 7. Найдите в тексте английский эквивалент.

Это значит, достичь искушенности, приобретать более глубокие знания, сначала, затем, наконец, во-первых, во-вторых, вне физических способностей человека, за последние годы, охватывать широкий спектр, основная забота, с минимальными усилиями, или … или.

Exercise 8. Найдите пары синонимов из двух списков:

A: age, demand, technique, problem, field, operation, human, complex, perform, monotonous, occupation, amount, important, principal, rapidly, use, precision, device;

B: dull, main, quickly, instrument, branch, men's, application, carry out, complicated, work, quantity, accuracy, significant, job, era, engineering, task, require.

Exercise 9. Закончите предложения.

1. The control engineer should master ... . 2. He should obtain ... . 3. The engineer must gain ... . 4. First of all he must acquire ... . 5. Then he must get ... . 6. He must become acquainted ... . 7. It is important that the design ... . 8. The engineers had to use control systems in the design of precision ... . 9. He has to apply systems in the design of the equipment ... . 10. He also must discover ... .

Exercise 10. Ответьте на вопросы.

1. What is the main requirement of the space age? 2. In what branches must engineer gain sophistication? 3. What does the control engineer have to know? 4. What is automation? 5. Man cannot perform functions of modern complex controls, can he? 6. What is the first reason of the increasing growth in the development of control equipment? 7. What is the second reason of growing importance of control equipment? 8. What is important about an engineer and automatic control systems? 9. What scope of application do control systems find? 10. What is being done in the field of automatic control now?

Exercise 11. Переведите слова с отрицательными приставками:

unchangeable, unusable, incomplete, inseparable, immovable, imperfect, illiberal, irregularity, nonlinear, non-conductor, non-stop, disable, disconnect, disappear, decentralize, decode, deform, anti-scientific, anti-noise, misapply, misinformation, counter-question, countermeasure.

Exercise 12. Переведите предложения с причастиями.

1. Installations fulfilling the process automatically are used in industry. 2. When introduced, modern complex controls can perform different functions. 3. The design of newer equipment brings about an ever increasing growth in the development of control equipment. 4. Having been used in the experiment the installation was returned to the laboratory. 5. The results achieved in the research were described in the article. 6. The machines being produced at this plant are of high quality. 7. When studying the problem the professor found that it could be divided into several logical parts. 8. When given necessary instructions, a computer starts operating. 9. Being a pocket size the general-purpose computer will be a very useful device. 10. Having calculated the problem we could examine the results. 11. Introducing automatic control man can devote his abilities to another occupation. 12. Having been introduced in various branches of industry, this automatic control system will increase the efficiency. 13. When controlled, the automatic system works properly. 14. We can save much time applying powerful analog computers. 15. Modern complex control systems cover a very wide area ranging from precision control devices to equipment used for manufacture control.

Exercise 13. Переведите предложения с глаголами *should* и *would*.

1. You should be careful when working with computers. 2. I was sure this device would make it possible to regulate the processes. 3. I should like to complete the task as soon as possible. 4. He said that the number of automatic plants would continue to grow. 5. If you started the process, you would find the explanation to the problem. 6. This would be important for labour saving. 7. Skilled people should be required to operate 'thinking' machines. 8. It's necessary you should carry out the computations tomorrow. 9. He supposed that they would be working in the laboratory for two hours. 10. Provided the computer had better software, you would finish your experiment much earlier. 11. Unless the problems were fed into the machine, we should get no results. 12. Last month I would work at the program every day. 13. It would be difficult to do this work without a computer. 14. You should know English better. 15. You should have known English better.

UNIT 9. LESSON 3

Read the text without a dictionary.

9B. THE COMING REVOLUTION IN TRANSPORTATION

You ride toward the city at 90 miles an hour, glancing through the morning newspaper while your electrically powered car follows its programmed route on an automated "guideway". You leave your car at the city's edge - a park-like city without streets - and enter a small plastic "people capsule". Inside, you dial your destination on a sequence of numbered buttons and settle back. Smoothly, silently, your capsule accelerates to 80 miles an hour. Guided by a distant master computer, it slips down into the network of tunnels under the city and takes precisely the fastest route to your destination.

Far-fetched? Not at all. Every element of this fantastic system is already within range of our scientists' skills. Indeed, the system utilizes only a few of the exciting new people-moving machines that have reached or passed the experimental stage.

Many companies are experimenting with guideways. In some systems, the car's power comes from an electric transmission line built into the road. In others, vehicles would be carried on a high speed conveyer, or perhaps in a container.

Computer-controlled highways are useful, for when the human element is removed, vehicles can travel with greater safety at faster speeds, closer together. In fact, most experts believe that each lane of automated highways could move the traffic of three or four of today's uncontrolled lanes.

Automated Autos. At the General Motors Technical Centre the Unicontrol car is being developed which is one step along the way to the automated family sedan. In the car, a small knob next to the seat replaced steering wheel, gear-shift lever, accelerator and brake pedal. Moving that knob sends electronic impulses to a "baby computer" in the car's trunk. From these signals the computer activates the proper servomechanism - steering motor, power brakes or accelerator.

Although this strange control method is easy to handle the car does have to be driven. There are several research laboratories which work at the automated highways that would relieve the driver of all responsibilities except that of choosing a destination.

Automated highways - engineers call them guideways - are technically feasible today. General Motors successfully demonstrated an electronically controlled guidance system. A wire was embedded in the road, and two pick-up coils were installed at the front of a car to sense its position in relation of that wire. The coils sent electrical signals to the steering system, to keep the vehicle automatically on course. They tested a

system that also controlled spacing and detected obstacles. It could slow down or stop an overtaking vehicle until the road was clear.

Most transportation experts don't consider underground highways extravagant at all. Why not put all roads underground and, in that case, why not dig the tunnels to accomodate computer-controlled capsules instead for people to travel farther than their neighbourhood?

For example, a bus line picks up passengers practically at their doors (for a monthly charge) and carries them directly to their destination. In future, such personalized commuter services may be provided by mini-buses. One proposal calls for special metal plates connected to a central computer, installed throughout a neighbourhood. When someone pushes a plate, it signals the computer which orders the nearest mini-bus to pick him up.

COMPREHENSION TEST

I. Put the following sentences in order to make up a plan of a text. Make corrections if needed.

1. Usefulness of computer-controlled guideways.
2. Scientists are able to create automated guideway.
3. Research on automated vehicles.
4. Computer-controlled mini-buses.
5. Programmed routes on an automated guideway.
6. Automated highway concept.
7. Experimenting with guideways.
8. Underground highways.
9. Unicontrol car design.
10. Transportation within a city of the future.

II. Find the answers to the following questions.

1. What are the daring dreams of the motorcar experts?
2. What will the city of the future look like?
3. Can you explain what an automated "guideway" means?
4. What is a "people capsule"?
5. What are people-moving machines like?
6. When will they become commonplace?
7. What is a small computer used in the automated autos intended for and where is it placed?
8. How was the guidance system demonstrated by General Motors work?
9. What are the advantages of automated highway lines as compared to uncontrolled

lanes?

10. What are the advantages of the underground highways as compared to the surface highways?
11. What services may be provided by mini-buses in the future city?

Translate the text into English. Entitle the text.

TEXT 9C

В наш век от инженера требуется изучение необходимых технических приемов. Он должен получить необходимые знания для решения сложных задач. Это значит, что ему следует достичь высоких результатов в нескольких почти не связанных областях.

Прежде всего он должен иметь глубокие знания в современной математике. Затем ему необходимо знать работу систем и их компонентов. И наконец, ему надо быть знакомым с возможностями и ограничениями всех типов современных компьютеров.

Автоматика - это процесс, происходящий с минимальным вмешательством человека. Он является саморегулирующимся процессом. Автоматическое управление освобождает человека от однообразной деятельности. Оно также способно выполнить функции, находящиеся за пределами способностей человека. Автоматическое управление находит применение в промышленном процессе.

9D. ROAD TO THE UNMANNED ENGINEERING PLANT

Japan's engineers designed a prototype of a small unmanned factory. The plant contained machine tools, assembly machines, one or more laser beaming rays to several laser-cutting stations, testing modules that comprised TV cameras which viewed finished products, and a forge that made lumps of metal of standard shapes that were later machined or cut to make the completed goods. The plant's components were built from standard modules so that workers could take machines apart on the shop floor, reassembling them to make different equipment. In this way, the labour force was able to alter parts of its plant - for instance by fitting a new spindle head to a milling machine - so it could make a range of goods of different sizes and shapes.

The "minifactory" was controlled by computers. But the Japanese took an unorthodox approach by deciding on the software - the instructions that run the computers - only after they had designed the physical outline of the factory. Most Western production engineers usually approached the task the other way around, tackling the software issue first. Details about the software in the Japanese system were

worked out a year ago. The plant was able to turn out about 45 different kinds of products, for instance cogs and shafts for gearboxes.

The "minifactory" programme represented a shift in emphasis from a more grandiose government project, called Methods for Unmanned Manufacturing, that started in the early 1970s. Under this, engineers were to build a complete, fully-automated factory by the early 1980s. But government officials realized, first, that the technology involved was very difficult, and secondly that unmanned plants could lead to social problems if they came too quickly. Further, the government committed more resources to energy research, leaving less money for factories. So the project was slimmed down. "The idea of the next plant is not so much to establish a model plant, but demonstrate the technologies that will be required in the future," said one member of the development team. "It's a smaller project, but we are convinced that small is beautiful."

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 9E

Listen to the text and correct the sentences.

1. Electronics is the branch of science and technology which is concerned with the study of phenomena of nature of electricity.

2. Rapidly advancing technology has made critical the need for larger nuclear components.

3. The advantages gained in using transistors were: no heater of filament required, very high operating voltages, low power consumption, short life, resistance to damage from shock or vibration, and extreme flexibility in circuit design.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 10. LESSON 1

SUBJECTIVE PARTICIPIAL CONSTRUCTION (СУБЪЕКТНЫЙ ПРИЧАСТНЫЙ ОБОРОТ)

Состоит из именной части (существительного или местоимения в общем падеже) и причастия. Между ними стоит сказуемое, выраженное глаголом в страдательном залоге (см. с.200). Перед причастием может стоять союз *as*. Перевод начинается со сказуемого, а причастный оборот переводится придаточным предложением с союзами ‘*что’, ‘как*’.

He was found *making* the experiment. Обнаружили, *что он проводит* опыт.

Matter is regarded *as built up* of atoms.

Считается, *что материя состоит* из атомов.

OBJECTIVE PARTICIPIAL CONSTRUCTION (ОБЪЕКТНЫЙ ПРИЧАСТНЫЙ ОБОРОТ)

Состоит из именной части (существительного или местоимения в объектном падеже) и причастия. Стоит после глаголов ментального или чувственного восприятия (см. с.200). Перед причастием иногда может стоять союз *as*. Переводится придаточным предложением с союзами ‘*что’, ‘как*’.

They saw *the device brought in*. Они видели, *как прибор внесли*.

We thought *him writing* a report. Мы думали, *что он пишет доклад.*

We consider *matter as being built* of atoms.

Мы считаем, *что материя состоит* из атомов.

Объектный причастный оборот после глаголов *to have, to get* подразумевает, что действие было выполнено для субъекта (подлежащего) третьим лицом.

They *had* new equipment *installed*. *Им установили* новое оборудование.

The director *got* this plan *cancelled*. *Директор добился отмены* этого плана.

Exercise 1. Переведите предложения.

1. We saw the planes landing and taking off. 2. The engineer heard his colleagues discussing the conference. 3. He wanted his paper published as soon as possible. 4. I saw my friend crossing the street. 5. The teacher found his students solving the equation. 6. We consider a computer as consisting of five main parts. 7. They had all his speeches recorded. 8. We must have all the equipment packed by tomorrow. 9. She got her article typed. 10. The students were seen attending the lecture. 11. Einstein is regarded as having discovered the principle of relativity. 12. The experiment was known as having stopped.

Exercise 2. Сравните словосочетания с причастием.

Participle I Active - Passive: the students discussing this method - the method being discussed now; the engineer studying the problem - the problem being studied by the engineer.

Participle I Active - Participle II: the workers building a new house - the new house built by the workers; the engineer using a new method - the new method used by this engineer.

Participle I - Perfect Participle: asking a student - having asked a student; studying a difficult problem - having studied a difficult problem.

ABSOLUTE PARTICIPIAL CONSTRUCTION (НЕЗАВИСИМЫЙ ПРИЧАСТНЫЙ ОБОРОТ)

Состоит из именной части (местоимения или существительного) и причастия, всегда отделяется запятой. Иногда может начинаться с предлога *with*.

Если стоит в начале предложения - отвечает на вопросы *'почему? когда? при каком условии?'*; переводится придаточным предложением с союзами *'так как, поскольку; когда, после того как; если*'.

Независимый причастный оборот	**,**	главное предложение
(Именная часть + причастие)		подлежащее + сказуемое
The scientist making an experiment	*,*	*his assistant helped him.*
***Когда** ученый делал эксперимент*	*,*	*его ассистент ему помогал.*

Если стоит в конце предложения, переводится сложносочиненным предложением с союзами *'а, и, но, причем'*.

Главное предложение	**,**	независимый причастный оборот
Подлежащее + сказуемое		(именная часть + причастие)
The scientist is making an experiment	*,*	*his assistant helping him.*
Ученый проводит эксперимент	*,*	***и** его ассистент ему помогает.*

Если начинается с *there* - переводится безличным предложением.

There being no voltmeter, we could not measure the voltage.

Так как не было вольтметра, мы не смогли измерить напряжение.

Exercise 3. Переведите. Причастный оборот стоит в начале предложения.

1. The film being interesting, all the students went to see it. 2. Everything being done yesterday, we could have a rest. 3. The work having been finished, we went home. 4. The text having been translated, the students began doing exercises. 5. The engineer

testing the new device, we came to see its operation. 6. The new device being tested, we came to see its operation. 7. The experiment having been finished, the students wrote down the results. 8. The necessary information having been found, I could prepare my report. 9. The train being late, they will not be able to come in time. 10. The film being interesting, we'll go to see it. 11. With planes flying at a high speed, we can get to any place in several hours. 12. With the current switched on, the machine automatically starts operating.

Exercise 4. Переведите. Причастный оборот стоит в конце предложения.

1. We had practical work at the research institute, many students working with the latest apparatus. 2. The students went away, the laboratory assistant remaining in the laboratory. 3. He had made many experiments, the results being good. 4. There are many libraries in our town, the Herzen library being the biggest. 5. All substances consist of atoms, each substance having its own special atom. 6. The engineer designed a new device, new materials being widely used. 7. There are two types of electrically charged particles, the positive particles being called the protons and the negative ones - the electrons. 8. All the students are studying grammar, Pete translating the text. 9. The students translated the text, the teacher helping them. 10. The text has been translated, the teacher analysing the translation in class. 11. The articles discussed microwaves, with particular attention being paid to radio location. 12. The inventor was demonstrating his new device, with the workers watching its operation attentively.

Exercise 5. Переведите. Независимый причастный оборот начинается с *there*.

1. There being no possibility to get this book in the library, I went to the reading hall. 2. There being no help, we could not do this work. 3. There being no tram, he did not come in time. 4. There being two ways to get there, we took the shorter one. 5. There being no bus for a long time, we decided to take a taxi. 6. There being no dictionaries, we could not translate this text in time. 7. There being observed the growth of population, it was decided to pay much attention to the housing problem. 8. There being an exam that day, the students came to the University. 9. There existing the problem of information exchange, the scientists are trying to find new communication channels. 10. There being no necessary program in the computer's memory, I couldn't calculate the project in time.

Exercise 6. Переведите предложения независимым причастным оборотом.

1. Так как работа закончена, мы можем отдохнуть. 2. Поскольку эксперимент закончен, вы должны записать результаты. 3. После того как вся информация была найдена, мы смогли приготовить доклад. 4. Когда этот ученый читает лекцию, все студенты слушают его внимательно. 5. Когда этот текст был переведен, они могли проанализировать перевод.

ПРИСТАВКИ СО ЗНАЧЕНИЕМ ПРЕВОСХОДСТВА, НАХОЖДЕНИЯ ЗА ПРЕДЕЛАМИ, ИЗБЫТКА, ПРЕВЫШЕНИЯ

out- grow (расти)	*out*grow (перерасти)
extra- ordinary (обычный)	*extra*ordinary (необычный)
ultra- violet (фиолетовый)	*ultra*violet (ультрафиолетовый)
trans- continental (континентальный)	*trans*continental (транс-континентальный)

НАХОЖДЕНИЯ НАД ЧЕМ-ЛИБО, ЧРЕЗМЕРНОСТИ

over- fly (летать)	*over*fly (перелетать)
super- cool (охлаждать)	*super*cool (переохлаждать)

НАХОЖДЕНИЯ ПОД ЧЕМ-ЛИБО, НЕДОСТАТОЧНОСТИ

under- value (ценить)	*under*value (недооценивать)
sub- tropical (тропический)	*sub*tropical (субтропический)

Exercise 7. Переведите слова, обращая внимание на приставки:

outdoor, outlaw, extraregular, extra-polar, ultramodern, ultra-complex, transamerican, transatlantic, overwork, overpress, superhigh, supernatural, underestimate, underplay, submarine, subclassify.

МНОГОЗНАЧНОСТЬ *-s* И *-ed*

-s: 1) Множественное число существительных: table*s*

2) 3-е лицо единственное число Present Indefinite: He work*s*.

3) Притяжательный падеж 's - единственное число: the boy'*s* books,

s'- множественное число: the boy*s*' books

-ed: 1) Past Indefinite у стандартных глаголов: He produc*ed*.- Он производил.

2) Participle II: produc*ed* - произведенный

3) Смысловой глагол для Passive: was produc*ed* - был произведен

Perfect: has produc*ed* - произвел

Exercise 8. Переведите предложения, обращая внимание на *-ed* и *-s*.

1. The device of this type install<u>ed</u> in our lab has been thoroughly test<u>ed</u>. 2. The computer is us<u>ed</u> when we want to process the data fed into it. 3. There exist<u>ed</u> huge and slow computer<u>s</u>. 4. The computer is a very complicat<u>ed</u> device employ<u>ed</u> in calculation<u>s</u>. 5. This process describ<u>ed</u> is call<u>ed</u> automation. 6. Being thoroughly done the computation<u>s</u> were us<u>ed</u> in the research. 7. A problem being examin<u>ed</u> with the digital computer consist<u>ed</u> of several logical part<u>s</u>. 8. He use<u>s</u> those transistor<u>s</u> in his experiment<u>s</u>. 9. She graduate<u>s</u> from the University this year. 10. This problem need<u>s</u> a special investigation. 11. What is your friend<u>s</u>' hobby? 12. Speedometer measure<u>s</u> the speed of a car. 13. They took measure<u>s</u> to improve their work. 14. Our professor'<u>s</u>

assistant is a capable young man. 15. Computers are divided into several types.

СОГЛАСНЫЕ БУКВОСОЧЕТАНИЯ

wh	+ a,e,i,u,y	- [w]	**ph**	- [f]	**kn**	- [n]	**pn**	- [n]
	+ o	- [h]	**gu**	- [g]	**gn**	- [n]	**ps**	- [s]
sc	+ e,i,y	- [s]	**qu**	- [kw]	**wr**	- [r]	**pt**	- [t]
	+ a,o,u	- [sk]	**ck**	- [k]	**rh**	- [r]	**th**	- [Ð]
								\ [Þ]

s**ph**ere, **ph**otogra**ph**; dialo**gu**e, analo**gu**e, **gu**ard; blo**ck**, sti**ck**, bla**ck**en; **kn**ight, **kn**own, **wr**ack, **wr**ight; **qu**ick, **qu**arter, s**qu**irrel; **sc**ene, **sc**ent, **sc**roll, tele**sc**ope; **rh**yme, **rh**etoric; **pn**eumatic; **ps**ychologist, **ps**ychic; recei**pt**; **gn**aw, **gn**ash; **wh**ether, **wh**ile, **wh**ite; **wh**o, **wh**ose, **wh**om; **th**ought, **th**ree, ten**th**, heal**th**; **th**at, **th**an, o**th**er, bro**th**er

СОЮЗНЫЕ СЛОВА

Связывают придаточное предложение с главным, выполняя функцию члена предложения.

местоимения		*наречия*
who - кто, который	what - что, который	where - где, куда
whom - которому...	which, that - который	when - когда
whose - чей, которого		how - как
		why - почему

Exercise 9. Переведите предложения.

1. Who can do it is unknown. 2. He didn't tell us when he had done it. 3. I wonder why he has come here. 4. The thought what to do next is unbearable. 5. I asked her which computer was faster. 6. This is the man whom I told you about yesterday. 7. The way how it could be done was shown to us in the lab. 8. He took the book that was lying on the table. 9. This is the place where I was born. 10. That was the man whose book I had taken the previous day.

UNIT 10. LESSON 2

Exercise 1. Запомните чтение согласных буквосочетаний:

physics, **ph**oto; **gu**ide, **gu**idance; bri**ck**, bla**ck**; **kn**ow, **kn**owledge; **wr**ite, **wr**ong; **qu**ality, **qu**antity; **sc**ience, **sc**ientific, **sc**ope, **sc**ale; **rh**ythm, **rh**ombus; **pn**eumatics, **ps**eudo, **ps**ychology, recei**pt**; **gn**ome, **gn**at; **wh**at, **wh**ere, **wh**y, **wh**isper, **wh**o, **wh**ose, **wh**ole; **th**ank, **th**ing, pa**th**, **th**ese, **th**ere, ba**th**e, smoo**th**e.

Exercise 2. Переведите предложения с независимым причастным оборотом.

1. All the work being done, the students went home. 2. All the problems having been solved, they stopped the discussion. 3. The experiment having been made, everybody was interested in the results. 4. Some personal computers having been installed in the new laboratory, many experiments were improved. 5. The engineer having come, the experiment began. 6. The professor spoke on the development of computers, the lecture being illustrated by diagrams. 7. A series of attempts having been made, he came to a successful solution of the problem. 8. The computer is a complex device, some of its circuits being extremely small. 9. The professor came into the lecture hall, the students following him. 10. All the data having been fed, the computer started processing.

Exercise 3. Сравните причастные обороты.

A. 1. The automatic systems being used, the process was performed without human intervention. 2. Using the automatic systems we can perform the process without any intervention. 3. Special-purpose computers having been applied in the research, scientists developed a new branch of technology. 4. Having applied special-purpose computers scientists developed a new branch of technology. 5. The automatic controls being employed, man was relieved of many monotonous activities. 6. Employing the automatic controls man could devote his abilities to another occupation. 7. Control systems having rapidly advanced in significance, new applications for them are continually being discovered. 8. Having been rapidly advanced in significance control systems are constantly finding new applications. 9. An elaborate automatic controls operating the engine of a modern jet airplane, the pilot is free to fly the plane. 10. Operating the engine of a modern plane the control system helps the pilot to fly the plane freely.

B. 1. We saw him studying in the library. 2. He was seen studying in the library. 3. They think us preparing the experiment. 4. We are thought as preparing the experiment.

Запомните следующие слова.

ACTIVE VOCABULARY

attract	[q'trxkt]	привлекать
attention	[q'tenʃn]	внимание
imagine	[ɪ'mxdʒɪn]	представлять
stage	[steidʒ]	стадия
exist	[ɪg'zist]	существовать
enterprise	['entqpraiz]	предприятие
remote	[rɪ'mout]	удаленный, дистанционный
watch	[wɔtʃ]	наблюдение
constant	['kɔnstqnt]	постоянный
presence	['prezqns]	присутствие
instrument	['instrumqnt]	прибор, средство
mechanism	['mekqnɪzm]	аппарат, устройство
production	[prq'dʌkʃn]	производство
machinery	[mq'ʃɪnqri]	машинное оборудование
reliable	[rɪ'laiqbl]	надежный
regulator	['regjuleitq]	регулятор
skilled	['skild]	квалифицированный
technology	[tek'nɔlqdʒɪ]	техника, технология
industrial	[in'dʌstriql]	промышленный
development	[dɪ'veləpmqnt]	развитие, разработка
manufacture	[ˌmxnju'fxktʃq]	производство, производить
especially	[ɪs'peʃqlɪ]	особенно
all-round	['ɔl'raund]	всесторонний, полный
improvement	[ɪm'pruvmqnt]	улучшение
condition	[kqn'diʃn]	условие
grow	[grou]	расти, увеличиваться
trend	[trend]	тенденция
construction	[kqn'strʌkʃn]	строительство
vital	['vaitql]	жизненный
necessity	[nɪ'sesɪtɪ]	необходимость

Exercise 4. Прочитайте и переведите интернациональные слова:

stage, mechanization, hydroelectric, constant, turbine, start, stop, mechanism, regulator, cultured, metallurgy, metallurgical, construction, class, classification, planet, react, reaction, reactive, million, milliard, module, local, locate, location.

Прочитайте текст и переведите его со словарем.

10A. AUTOMATION IN THE MODERN WORLD

The growing importance of automatic equipment and processing in industry attracts world-wide attention. In our days one cannot imagine technical progress without automation, which is the highest stage of mechanization.

There exist many almost fully automatic enterprises: power stations with remote control, chemical plants where men have only to keep watch over automatic units. Take, for example, hydroelectric stations which are controlled by only a few men.

Some hydroelectric power plants have such mechanization that they do not require the constant presence of man at all. Instruments automatically start and stop the turbines, send the power to the consumer, regulate the water input.

There are several automatic systems at present which use different techniques. But in each case mechanisms perform the process of production and the human operator has only to control the operation of processes. In some kinds of work automatic machinery is more accurate and reliable than human workers.

The worker in the plant with modern automatic equipment is to regulate the production process and to control the machines. But the operation of "thinking" machines, the latest modern equipment and automatic regulators requires highly skilled, cultured people with good knowledge of technology.

Automation of all industrial processes is of great importance at today's stage of the development of engineering. It has already been introduced in various branches of industry for automatic manufacture of different goods.

In metallurgy automation finds an especially wide field of application. In metallurgy all-round automation makes it possible not only to regulate processes automatically, but also to introduce remote control. This is especially important for the improvement of labour conditions of workers in the metallurgical industry.

The number of automatic plants grows and will continue to grow. Such is the general trend of modern engineering. The construction of more and more automatic enterprises is a vital necessity today.

Exercise 5. Прочтите следующие слова:

instrument, enterprise, mechanism, machinery, manufacture, improvement, vital, reliable, especially, production, cultured.

Exercise 6. Найдите в тексте английский эквивалент.

Растущее значение, привлекать внимание во всем мире, нельзя представить, наивысшая стадия, полностью автоматизированный, следить за приборами, совсем не требуется, в каждом случае, приходится только контролировать, в некоторых видах работы, образованные люди, высококвалифицированные работники, основная тенденция, жизненная необходимость.

Exercise 7. Закончите предложения.

1. One cannot imagine ... . 2. There exist many almost ... . 3. Some power plants do not require ... . 4. Instruments automatically ... . 5. Mechanisms perform the process ... . 6. Automatic machinery is more ... . 7. The worker is to ... . 8. Automation of all industrial processes is of ... . 9. All-round automation makes it possible to introduce ... . 10. The general trend of modern engineering is ... .

Exercise 8. Найдите пары синонимов:

opportunity, to deal with, requirement, great, since, possibility, energy, demand, to guide, for, immense, power, to consider, to lead.

Exercise 9. Ответьте на вопросы.

1. What attracts world-wide attention nowadays? 2. What is automation? 3. What kinds of enterprises are being almost fully automated? 4. How do automatic instruments work in a hydroelectric power plant? 5. What is the worker's function in the plant with automatic equipment? 6. What does the operation of 'thinking' machines require? 7. Where has automation of industrial processes already been applied? 8. What is the role of automation in metallurgy? 9. Why is remote control so important in the metallurgical industry? 10. What is the general trend of modern engineering?

Exercise 10. Переведите следующие слова:

subdivide, subsection; extraplanetary, extrascientific; ultra-short, ultra-formal; transform, transoceanic; supersensitive, supersonic; underground, understudy; overstudy, overload; outnumber, outplay.

Exercise 11. Переведите предложения с независимым причастным оборотом.

1. Working with this digital machine he made many calculations, the results giving correct answers. 2. There are two tables in this paper, one of them holding the initial data. 3. The memory is divided into some registers, each of them holding one number. 4. This amplifier being a good device, we used it for our research work. 5. The analog machine consisted of five main parts, one of them being the input. 6. These digital computers are electronic machines, each of them consisting of millions of circuits. 7. The engineer applying a new method of computing, good results were achieved. 8. The computer performs complicated calculations, the output unit producing final answers. 9. A device printing information on paper, the form of an output is readily understood. 10. The importance of processing growing, it attracts world-wide attention. 11. Mechanisms perform the process of production, the operator having only to control the operation of processes. 12. Power plants having been automated, the presence of man is not required. 13. All-round automation making it possible to introduce remote control, the labour conditions are improved. 14. The number of automatic plants will continue to grow, this being the trend of modern engineering. 15. Our age demanding rapid advance in engineering, new uses for automatic control are being discovered.

Exercise 12. Переведите предложения, обращая внимание на *-s* и *-ed*.

1. McCarthy's invention is LISP. 2. He lectures on programming. 3. Professor Brown's lectures are always listened to with interest. 4. His studies were very important. 5. Great advances have taken place in information science since the invention of a computer. 6. The transistor's form depends on its use. 7. Among the University graduates you will find computer operators, programmers, experts on automation and informatics, control engineers and other specialists. 8. The machine-tool used was equipped with the numerical control. 9. Automation coordinated with other phases of technology has greatly contributed to production. 10. There are things without which a computer wouldn't have existed at all. 11. Advanced automation exceeded the limits of technology. 12. With computerized numerical control being widely used, the production becomes more effective. 13. Software was introduced by this programmer. 14. The manufacture operated by a computer is becoming more conventional in the modern world. 15. Computer designers created new hardware.

UNIT 10. LESSON 3

Read the text without a dictionary.

10B. CYBERNETICS AND AUTOMATIC CONTROL

Man has always been striving to make physical work easier by using more efficient tools and mechanical means. The greatest technological progress has been made in the past 150-200 years. However, this progress has been accomplished by growing intellectual and nervous strain on man connected with the control of new machinery.

To see for yourself how true this is, just look into the driver's cab of a modern locomotive, into the wheel-house of an ocean-going ship or into the cockpit of a modern airliner, with their multitudinous controls and indicator dials.

This has presented today's world with new problems. At present, there is only one way of solving these problems, namely through extensive use of highly efficient means and methods of cybernetics.

The immense possibilities of cybernetics as a science dealing with the most general laws of control have opened up boundless prospects for the automation of complex and labour-saving process in all spheres of human activities.

Cybernetics is gaining a growing importance. Nowadays, many processes of man's activities can be mathematically described and, therefore technical facilities may be provided to simulate these processes automatically. Automation makes it possible not only to free man from doing various operations but also to perform the operations with a greater speed and accuracy. The progress of computing engineering and the theory of programming process are vital to successful employment of cybernetic techniques.

History provides very early examples of automatic control, but they were little used in industry. Progress was slow until the 20th century, but it received an important stimulus from the military needs of the last war and the pace has accelerated. Automatic control is most advanced in industries like chemical, oil-refining and food-processing, where materials are easy to handle. Because of it these industries have become highly automatic without any of the well-known inventions, such as transfer-machines and electronic computers. Control is also largely automatic in the manufacture of goods so different as iron and steel, cement and paper.

A system of control usually consists of three basic units - one that measures, one that controls, and one that corrects. If, for example, the condition to be controlled is the temperature of a boiler, the measuring unit records what is happening to the temperature and tells the controlling unit, which compares the actual temperature with what it should be, and then tells the correcting unit to adjust a steam valve and so correct the temperature.

Controlling instruments are pneumatic, mechanical or hydraulic, and electric. Electric or electronic units are fast and able to send signals over long distances so giving remote control.

Automatic control is perhaps best known in plants where production is continuous, such as oil-refineries, but it is also found in factories that produce in batches. There are instances when the search for definite material requires a great deal of effort and time. A machine does the job in minutes.

Automatic information return systems operate in a number of institutions, in particular, in electrical engineering, instrument making and light industry.

COMPREHENSION TEST

I. Say whether these sentences are true or false.

1. People tried to lighten physical work using animals.
2. The greatest technological progress was made in the beginning of 17th century.
3. The cockpit of an airliner, the driver's cab of a locomotive, the wheel-house of a ship are the examples of new machinery.
4. The today's problem is the control technology.
5. Cybernetics deals with computers.
6. Automation cannot free man from doing various operations.
7. Technical progress was slow up to the end of the 19th century.
8. We cannot properly automate oil-refining and food-processing industries.
9. Controlling instruments are pneumatic and mechanical.
10. Electronic units are rather slow and able to send signals over long distances.
11. A machine does the job in a minute.
12. Electrical engineering, instrument making and light industires demand automatic systems.

II. Find the answers to the following questions.

1. What period of time has been taken by the technological progress?
2. What did this progress cause?
3. What is cybernetics?
4. Is cybernetics important nowadays?
5. Can automation perform operations instead of men?
6. What is vital to successful use of cybernetics techniques?
7. What accelerated the technical progress in the 20th century?
8. In what industries is automatic control most advanced?
9. What are the basic units of a control system?
10. What kind can controlling instruments be of?

Translate the text into English. Entitle the text.

TEXT 10C

В наши дни нельзя представить технический прогресс без автоматизации. Автоматизация - это самая высокая степень механизации.

Существуют полностью автоматизированные предприятия. Это электростанции с дистанционным управлением, химические заводы. Оператор должен только лишь следить за работой автоматических приборов. На некоторых предприятиях даже не требуется постоянного присутствия человека. Приборы автоматически начинают и заканчивают операции.

Работа автоматического оборудования более точна и надежна, чем работа человека. Но работа такого оборудования требует высоко-квалифицированных образованных специалистов.

10D. AUTOMATION IN USE

A variety of modern tools, including copying machines, microphotography and mechanical office equipment, helps in the handling of the growing volume of information. Electronic computers are being more and more widely used to process this information.

Nowadays almost every sphere of human life is automated to some degree. Automation is being developed in business, in science, in engineering, and in manufacturing. Powerful, special-purpose electronic machines make people more efficient in their everyday jobs.

In the past 200 years people have improved their ability to manufacture goods by a factor of 100 but in the last 20 years there has been an increase of 10,000,000 in the rate at which we process and retrieve information.

Early electronic processing machines were best at arithmetics. But now they do things that aren't mathematical. They handle all kinds of information, and they are especially good in searching out and sorting out data.

Transport is only a service of industry, and must be coordinated with development in communications and with planning. Automation, telemechanics and computing techniques are being widely introduced in traffic control.

The examples of such are the use of buses in a demand-activated mode, made possible by better communication computers and organization; the use of electronics for presentation of information to car drivers and the automatic control of cars on motorways; and the design of improved vehicles, such as monorail or automatically

controlled trams.

Any automatic vehicle that operates at much above walking speed needs a reserved track, and to avoid creating a barrier to the movements of pedestrians and vehicles this must be above or below ground. Automobile computers are now used in some cars to locate engine problems. This device substantially reduces time for servicing. Another electronically controlled system is fuel injection. Automatic control of automobiles and trucks on highways is already a possibility. Computers are widely used for automatic control of traffic on highways.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 10E

Listen to the text and decide which word appears in the text.

1. Cybernetics is the science dealing with the problems of control and управления of processes.
2. The main aim of this science is увеличить efficiency of human labour by controlling and governing processes in nature.
3. The American mathematician Norbert Wiener was the основатель of cybernetics.
4. Cybernetics arose as a result of the junction of different sciences связанных with control processes.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 11. LESSON 1

GERUND (ГЕРУНДИЙ)

Герундий - неличная форма глагола, оканчивающаяся на ***-ing*** и объединяющая свойства существительного и глагола. В русском языке соответствующая форма отсутствует. Герундий имеет временные и залоговые формы.

	Active	Passive	
Indefinite Gerund	*writing*	*being written*	одновременное действие
Perfect Gerund	*having written*	*having been written*	предшествующее действие

ГЕРУНДИЙ - ПОДЛЕЖАЩЕЕ

Стоит в начале предложения, перед ним нет других частей речи. Переводится существительным в именительном падеже или неопределенной формой глагола.

Reading is my best rest. *Чтение* (*читать*) - мой лучший отдых.

ГЕРУНДИЙ - ЧАСТЬ СКАЗУЕМОГО

Стоит после глаголов *to be, to begin, to continue, to finish*.

Their task is *studying.* Их задача - *учиться/учеба*.

He finished *speaking*. Он закончил *говорить*.

ГЕРУНДИЙ - ДОПОЛНЕНИЕ

Стоит после глагола-сказуемого и переводится существительным в винительном падеже или неопределенной формой глагола. Сложные формы переводятся придаточным предложением.

He likes *reading* books. Ему нравится *читать* (*чтение*) книги.

He mentioned *having read* it. Он упомянул, *что читал* это.

ГЕРУНДИЙ - ОПРЕДЕЛЕНИЕ

Употребляется с существительным и может стоять до или после определяемого слова. Если стоит справа, то употребляется с предлогом *of, for* или другим предлогом и переводится существительным или инфинитивом:

the method *of producing* - метод *производства*

an instrument *for measuring* - прибор *для измерения*

Если стоит слева, то употребляется без предлога и по форме совпадает с причастием. Различие в том, что причастие указывает на действие, выполняемое существительным, а герундий на назначение предмета, обозначенного существительным:

the *working* man - *работающий* человек (причастие)

the *working* place - *рабочее* место (герундий)

ГЕРУНДИЙ - ОБСТОЯТЕЛЬСТВО

Употребляется с предлогом и стоит в начале или в конце предложения. Переводится существительным с предлогом, деепричастием или придаточным предложением.

Upon landing on a planet the spacemen... 1) *После высадки* на планету космонавты... 2) *Высадившись* на планету, космонавты... 3) *После того, как космонавты высадятся* на планету,...

Для выражения времени используются предлоги *on (upon)* (по, после, при), *after* (после), *before* (перед), *in* (в то время как, при); причины - *for* (за), *owing to* (благодаря, из-за); образа действия - *by* (путем, при помощи); других обстоятельств - *besides* (кроме), *instead of* (вместо), *without* (без), *apart from* (помимо), *in spite of* (несмотря на).

Exercise 1. Назовите предложения, содержащие герундий-подлежащее.

1. Reading this new English article he used dictionaries. 2. After reading the magazine he gave it to me. 3. Reading aloud is useful for you. 4. While reading my report he asked me some questions. 5. When playing the piano she was singing some melodies. 6. Playing the piano is pleasant. 7. After playing chess they went to the cinema. 8. Speaking foreign languages is very important for every cultured man. 9. Travelling by train you see much. 10. Seeing is believing. 11. Flying is better for long journeys but travelling by car is more interesting. 12. Smoking is not allowed in this building.

Exercise 2. Переведите предложения с герундием-дополнением.

1. The girl likes dancing. 2. My grandmother likes being read newspapers. 3. The student is proud of having passed his exams well. 4. The scientists were interested in using this device in their research. 5. His friend remembers having been visited by you. 6. I thank you for visiting me. 7. I am afraid of coming late. 8. I remember having put that book on the shelf. 9. I remember having shown her the letter. 10. Science requires experimenting.

Exercise 3. Назовите сочетания, содержащие герундий-определение:

1. a sleeping child; 2. a sleeping car; 3. the melting point; 4. the melting metal; 5. an operating instruction; 6. an operating device; 7. a reading hall; 8. a reading student; 9. a driving force; 10. a driving car; 11. the landing speed; 12. the landing airplane; 13. writing paper; 14. a writing student.

Exercise 4. Переведите предложения с герундием-определением.

1. Is there any possibility of finding a suitable program so soon? 2. I like the idea of spending my vacation in the Crimea. 3. We have an opportunity of visiting this museum. 4. Flying costs are high now. 5. The melting point of silver is 960.5ºC. 6. She found the materials needed in the reading hall. 7. The working area of this robot is rather small. 8. The rate of producing this material is low. 9. The calculating speed is very high. 10. You can read the information in the operating manual.

Exercise 5. Назовите номера предложений, где герундий - обстоятельство.

1. By conducting the experiment we obtained interesting results. 2. When testing the new device he used this equipment. 3. Before leaving the laboratory he switched the light off. 4. Making a complex experiment the student solved many problems. 5. On applying pressure we changed the volume of the gas. 6. Upon receiving my letter he left for Moscow. 7. In discussing the problem we used some new data. 8. You will never speak good English without learning grammar. 9. Using this program you speed up the process. 10. He improved his report by changing the end.

Exercise 6. Переведите предложения и определите функцию герундия.

1. After being addressed by many people he answered their questions through TV. 2. The boiling temperature of steel is high. 3. Reducing the use of fuel is one of the most important problems. 4. She remembered having been given the reference book. 5. He insisted on being sent to Moscow. 6. All metals expand upon heating. 7. Without investigating this phenomenon the specialists cannot get good results. 8. We discussed different methods of teaching foreign languages. 9. When do you think of going there? 10. Living is fighting.

Exercise 7. Переведите предложения, обращая внимание на *ing*-формы.

1. The monument needs restoring. 2. The monument of what century are you restoring? 3. The monument of what century is being restored? 4. The experts restoring the monument were provided with all modern techniques. 5. With the help of a magnet we can hold two huge metal plates together without tying them up. 6. He pointed out that the assembling time of apparatus was very short. 7. The policemen were informed of having been awarded for the brilliant operation. 8. The committee studied the problem of improving the bus service in the town without increasing the number of buses operating on the routes. 9. Increasing population of the world changes the face of the earth. 10. Heating the substance at high temperatures may change its properties. 11. Being heated to high temperatures the substance expanded considerably. 12. The substance was being heated for three hours.

ПРИСТАВКИ СО ЗНАЧЕНИЕМ ПРЕДШЕСТВОВАНИЯ, ПОСЛЕДОВАТЕЛЬНОСТИ

pre- war (военный) — *pre*war (довоенный)

post- war (военный) — *post*war (послевоенный)

НАХОЖДЕНИЯ МЕЖДУ ЧЕМ-ЛИБО, ВЗАИМНОЙ СВЯЗИ

inter- act (действовать) — *inter*act (взаимодействовать)

ПОВТОРЯЕМОСТИ ДЕЙСТВИЯ, ВЫПОЛНЕНИЯ ЕЩЕ РАЗ

re- write (писать) — *re*write (переписать)

ОБЩНОСТИ, СОВМЕСТНОСТИ, ВЗАИМНОСТИ

co- operation (операция) — *co*operation (кооперация)

ПРЕДЫДУЩЕГО СОСТОЯНИЯ

ex- champion (чемпион) — *ex*-champion (экс-чемпион)

Exercise 8. Переведите слова, обращая внимание на приставки:

preschool, precondition, post-school, postdate, interdependent, international, rebuilt, reassemble, co-produce, coauthor, ex-boxer, ex-minister.

МНОГОЗНАЧНОСТЬ *-ing*

1) Participle I: read*ing* - читающий, читая
2) Герундий: read*ing* - чтение, читать
3) Отглагольное существительное (показатели: артикль, -s, предлог of после):
   the read*ing* of the text - чтение текста
4) Смысловая часть сказуемого в Continuous: I am read*ing* - Я читаю.
5) местоимение: everyth*ing*, someth*ing*
6) прилагательное: interest*ing*
7) уменьшительный суффикс существительных: duckl*ing*

Exercise 9. Переведите предложения.

1. Our University has 8 buildings. 2. I have done everything you asked. 3. That's not a very interesting film. 4. We were discussing the plan all the meeting. 5. What are you doing here? 6. While visiting our city you can go sightseeing. 7. He stood at the table looking at me. 8. The car going at a high speed was stopped by a policeman. 9. He went out of the room without looking at me. 10. Measuring temperature is necessary in many experiments. 11. The duckling broke its leg. 12. On coming to the lab he began testing the devices. 13. The readings on the scale were done automatically. 14. The task will be the reading of the text.

ПРАВИЛА ЧТЕНИЯ

Повторите правила чтения:

чтение гласных в	открытом типе слога,
	закрытом типе слога,
	III и IV типах слога,
	безударном слоге,
	буквосочетаниях;
чтение согласных	букв,
	буквосочетаний.

Exercise 10. Прочитайте слова:

lengthen, investigate, convenient, considerable, reference, equation, strictly, informal, embrittlement, continuous, entrance, Australian, reversible, strengthen, efficient, graduate, separate, separation, density, densely, combustion, aqueous, electromotive, glorify, number, facilitate, facility, adviser, calculate, utilize, excellent, typist, encouragement, justify, suitable, opportunity, conventional, resemblance, conductivity, numerous, essential, expensive, extremely, Chinese, satisfy, creature, courage, moisten, softly.

СОЧИНИТЕЛЬНЫЕ СОЮЗЫ

and; *but*; *or*; *whereas*

и, а; но; *или*; *тогда как*

Соединяют однородные члены предложения или сложносочиненные предложения.

Exercise 11. Переведите предложения.

1. There were some books and a paper on the table. 2. He finished his work and the data were published. 3. My father is strict but fair. 4. I came early but nobody met me. 5. What do you prefer: cheese or ham? 6. You should do the task today or tomorrow or we'll not be able to continue solving the problem. 7. We know everything about computer's memory whereas human memory has been largely unknown. 8. Brains use many slow and imprecise channels whereas computers use few and speedy ones. 9. You and I are good friends. 10. You don't know me, but I know you.

UNIT 11. LESSON 2

Exercise 1. Прочитайте следующие слова:

society, educational, establishment, creative, inseparable, occur, invention, requirement, achievement, opportunity, exhibition, law, environment, arrange, majority, common, relation, probably, provide, prove, experience, sufficient, considerably, expand, success, exploration, estimation, durable, reliability, supply.

Exercise 2. Переведите предложения с герундием.

1. There are many ways of solving this problem. 2. Reading English technical magazines is important for an engineer. 3. The idea of creating a multi-stage rocket belongs to Tsiolkovsky. 4. He remembers having given the computer some instructions. 5. My friend succeeded in creating a new instrument for measuring purposes. 6. We used this method of studying new scientific data. 7. The scientists devote much attention to experimenting with this device. 8. The computer is busy with calculating the data. 9. He thought of using these data for constructing that device. 10. Processing various information is the main task of any computer.

Exercise 3. Переведите предложения с герундием-обстоятельством.

1. On coming into the lab he began making his experiment. 2. On returning home he began translating this text. 3. There could be no progress in science without experimenting. 4. By using these scientific principles we are able to develop this science. 5. After studying the theory we can begin experimenting. 6. Before reading this text you must get a good dictionary. 7. After feeding the data into the machine, he began processing them. 8. He finished solving the problem without saving the results. 9. In regulating the production process and controlling it the worker in the modern plant is to be skilled and cultured. 10. Upon being introduced in various branches of industry automatic control is especially important for the improvement of labour conditions.

Exercise 4. Переведите словосочетания с герундием.

In solving the problem; on solving the problem; by solving the problem; for solving the problem; without solving the problem; before solving the problem; in spite of solving the problem; the problem of solving the task; the task of getting good results; solving the problem is; getting good results gave us.

Запомните следующие слова.

ACTIVE VOCABULARY

properly	[ˈprɔpəli]	надлежаще
substantially	[səbˈstænʃəli]	значительно
contribute	[kənˈtribjuːt]	вносить вклад
productive	[prəˈdʌktɪv]	производительный
sphere	[sfɪə]	сфера деятельности
exceed	[ɪkˈsiːd]	превосходить
excite	[ɪkˈsaɪt]	вызывать интерес
discipline	[ˈdɪsəplɪn]	предмет, дисциплина
hardware	[ˈhɑːdweə]	аппаратное обеспечение
software	[ˈsɔftweə]	программное обеспечение
theory	[ˈθɪərɪ]	теория
analysis	[əˈnælɪsɪs]	анализ
connection	[kəˈnekʃn]	соединение
term	[tɜːm]	термин
program	[ˈprəʊgræm]	программа
instruction	[ɪnsˈtrʌkʃn]	команда, инструкция
procedure	[prəˈsiːdʒə]	процедура
essence	[ˈesəns]	сущность
piece	[piːs]	кусок
influence	[ˈɪnflʊəns]	влиять, влияние
actuate	[ˈæktjueɪt]	активировать, побуждать
up-to-date	[ˈʌptuˈdeɪt]	современный
equip	[ɪˈkwɪp]	оборудовать, оснащать
conventional	[kənˈvenʃənl]	традиционный, обычный
computerize	[kəmˈpjuːtəraɪz]	работать с помощью ЭВМ
penetrate	[ˈpenɪtreɪt]	проникать
whole	[həʊl]	весь, целый
computerization	[kəmˌpjuːtərɪˈzeɪʃn]	компьютеризация
produce	[prəˈdjuːs]	производить
consequence	[ˈkɔnsɪkwəns]	последствие; значение

Exercise 5. Прочитайте и переведите интернациональные слова:

phase, contribute, productive, sphere, discipline, theory, metal, term, crystal, plastic, apparatus, computerize, computerization, actuate, generator, modify, modification, reflect, reflective, reflection, structure, architecture, solid, laser, radar, vacuum.

Прочитайте текст и переведите его со словарем.

11A. THE ROLE OF COMPUTERS IN AUTOMATION

Automation plays an important part in the great advances in technology. Automation properly coordinated with other phases of technology can substantially contribute to high productive efficiency.

Mechanization of production operations and their automation are one of the most important problems and what is being done in this sphere at present greatly exceeds what was done in the past.

Advanced automation is impossible without computers. Computer science is an exciting field of study and research. It is a broad discipline, covering logic design, hardware, software, the theory of computation, numerical analysis, programming and computer application.

The two main components that each computer is to have are hardware and software. These are the things without which a computer wouldn't have existed at all. Hardware is the units, devices, connections that build up a computer. We can use this term not only about computers but speaking of other different equipment and machinery.

Software is the programs, instructions and procedures that make the crystal-metal-plastic-and-what-not apparatus function as it does now. Software is computer's brains as it is. It's the computer essence, so to say. It would be dead without software, just a piece of metal and plastic.

Modern production has greatly been influenced by modern computers. Software programs are used to actuate different machine-tools and automatic equipment. The up-to-date machine-tool is normally equipped with conventional numerical control (NC) or computerized numerical control (CNC).

So, we may say that machine-tools are now not just a piece of metal. They begin 'thinking' as the computer technology penetrates deeper and deeper into the process of mechanization.

This whole process, by which machines can be used to work for us, is called automation. First, simple mechanization, then automation and now computerization have produced and are still producing important social consequences.

Exercise 6. Прочитайте следующие слова:

substantially, mechanization, computerization, hardware, software, theory, analysis, coordinate, contribute, penetrate, discipline, actuate, consequence.

Exercise 7. Найдите в тексте английский эквивалент.

Внести вклад, значительно расширить, то что делается сейчас, то что было сделано в прошлом, вызывающая интерес область знаний, не существовало бы вовсе, которые составляют компьютер, использовать не только о, но и говоря о, и-из-чего-там-только-не-сделанную, как он есть, так сказать, всего лишь кусок металла, весь этот процесс.

Exercise 8. Закончите предложения.

1. Automation plays ... . 2. Automation contributes ... . 3. Advanced automation is impossible ... . 4. Computer science is a broad discipline, ... 5. The two main components of a computer are ... . 6. Hardware is ... . 7. Software is ... . 8. Modern production has greatly been influenced ... . 9. The whole process ... . 10. ... have important social consequences.

Exercise 9. Переведите слова в скобках.

1. Automation is (соотнесена) with other phases of technology. 2. Computer science (охватывает) hardware, software, etc. 3. A computer consists of (аппаратуры) and software. 4. Hardware is the units and (соединения). 5. Software makes the hardware (функционировать). 6. Software is the computer's (сущность). 7. Software is used to actuate different (станки). 8. (Современные) machine-tools are equipped with CNC. 9. The computer technology (проникает) into the process of automation. 10. Machines are used to work (для нас).

Exercise 10. Ответьте на вопросы.

1. What is the role of automation in technology? 2. What is one of the most important problems nowadays? 3. What does advanced automation need? 4. What are the fields of computer science? 5. What are the main components of any computer? 6. What is hardware? 7. What is software? 8. What are modern machine-tools equipped with? 9. What process is called automation? 10. What processes contribute to the development of the modern world?

Exercise 11. Переведите следующие слова:

pre-historic, pre-revolutionary, post-revolutionary,post-graduate, interaction, interconnection, interchange, reconstruct, reappear, co-existence, coordination, ex-president, ex-student.

Exercise 12. Переведите предложения с герундием.

1. On being coordinated with other phases of technology, automation contributes to high productive efficiency. 2. Using the term "hardware" is possible to any other equipment. 3. The process of introducing computers into production is becoming faster. 4. After equipping some machine-tools with computerized numerical control the engineers increased the productivity. 5. They invented a new method of actuating this machine-tool. 6. After studying the theory of computation he began experimenting with the software. 7. The programmer thought of inventing more complicated software. 8. On processing the data he began thinking of using the results in the further research. 9. The equipment for controlling the operation was designed last month. 10. There would be no progress in future without computerizing the production. 11. Early in the 20th century the process of mechanizing manufacture was the great advance in technology. 12. We heard of examining these physical forces without using computers. 13. He succeeded in developing a new apparatus. 14. He left the laboratory without attracting any attention. 15. Studying the logic design, numerical analysis and programming is very important for the control engineer.

Exercise 13. Переведите предложения, обращая внимание на *-ing*.

1. It was an interesting article. 2. Everything is ready. 3. The building was very high. 4. I was translating this article the whole evening yesterday. 5. The computer is not just a thinking machine. 6. When being fed into the computer the information was automatically stored. 7. The mistake having been found, he made some corrections. 8. The automatic controls can perform the job without requiring humans. 9. Creating new microelectronic devices is necessary for the technical progress. 10. They were informed of having made a mistake. 11. He began correcting the instructions. 12. The method of processing the data was invented half a century ago. 13. I thought of experimenting with these devices. 14. The readings on the scale were very important. 15. Mechanization was also called labour saving.

UNIT 11. LESSON 3

Read the text without a dictionary.

11B. HORIZONS OF AUTOMATIOM

Transport, a vast sphere of material production, has become one of the biggest spheres in which cybernetics methods are being applied. Large scale research and experimental work are now being carried on with a view to automating transportation process by cybernetics methods in such spheres as locomotive driving, ship handling, air and marine navigation, current control over the functioning of big transport divisions, planning and technical work, such as the drawing up of cargo and passenger transportation plans, time-tables and schedules, the solution of engineering and scientific problems connected with designing, servicing and maintaining the basic units, accounting and stock-taking.

Let us dwell in greater detail on each of the above spheres. To drive a train, to steer a ship or plane strictly to schedule and at high speed, an engine driver, a helmsman or a flier should always look ahead, size up the situation quickly, set the necessary engine operation mode, use braking devices and manoeuvre.

At the same time, an operator has to ensure the normal operation of all units, using the appropriate instruments. It goes without saying that the discharge of all these functions is beyond one man's physical and physiological powers. Previously, attempts were made to solve this problem by employing more men to serve as the engine driver's mates, ship mechanics and co-pilots. But this has had an adverse effect on labour productivity and has also violated the vital principle of one-man control. Specialists see a radical solution of the problem in the automation of transport control using the latest technical means and methods of cybernetics.

The first steps in designing a robot driver for heavy high-speed trains were made at the beginning of the fifties. The robot incorporated a small-size electronic computer with assorted transducers. All the necessary data - overall distance, time of covering each stretch of the route, speed limits, etc. were programmed and fed into the computer's storage. As the train rolled along, the electronic computer set the optimum speed on the basis of information coming in from the transducers.

A system with one central electronic computer controlling all the trains proved more rational for a closed railway network of the underground type. In this case, all the trains are fitted with actuating devices. Such systems operate on the lines of underground railways. Robot drivers run each train strictly to schedule (to 3 seconds) and align it with platforms to within 0.3 meters of the set point.

There has been substantial progress in the field of automatic ship control systems,

above all in the main propulsion plant. World experience shows that the system of comprehensive process automation is the best; it cuts down the crews by 50 per cent, makes work easier, increases the reliability of machines and prolongs their service life. New automation systems ensure the most rational cargo distribution on board large ships.

New automatic equipment guaranteeing a high degree of ships' navigational and running safety is developed. This system issues timely warning of obstacles in the ship's way and prevents collisions with other ships in conditions of poor visibility caused by fog, downpours or snowfall.

COMPREHENSION TEST

Match the beginnings and the endings of the sentences.

A: 1. Transport is ... .
2. Cybernetics methods are being ... .
3. Locomotive driving, ship handling, air and marine navigation ... .
4. A helmsman ... .
5. A driver ... .
6. A flier ... .
7. A vehicle operator must ... .
8. The radical solution of the transport automation problem is ... .
9. In a robot-driver all the necessary data ... .
10. All the trains are ... .
11. The system of comprehensive process automation ... .

B: 1) handles a ship;
2) look ahead, size up the situation, set the necessary engine operation mode;
3) widely applied in transport;
4) a vast sphere of material production;
5) the use of the latest technical means and methods of cybernetics;
6) are automated transportation processes;
7) drives a train;
8) fitted with actuating devices;
9) makes work easier, employs less people and increases the reliability of machines;
10) flies a plane;
11) were programmed and fed into the computer's storage.

Translate the text into English. Entitle the text.

TEXT 11C

Автоматика играет важную роль в развитии техники. Механизация промышленных процессов сильно повлияла на технический прогресс.

Автоматизация невозможна без компьютеров. Компьютерная наука - это дисциплина, включающая логическое проектирование, программное обеспечение, аппаратуру, цифровой анализ, программирование, теорию вычислений и т.д.

Аппаратное и программное обеспечение вместе составляют компьютер. Аппаратное обеспечение - это приборы, устройства, соединения. Программное обеспечение - это программы, команды, процедуры. ЭВМ значительно влияют на современное производство. Современные станки оснащены числовым управлением и числовым программным управлением.

Процесс использования машин в работе для нас называется автоматизацией.

11D. ELECTRONICS AND THE CITY

Many different kinds of urban difficulties could be lessened by transporting men in new ways.

An explorer of our society from another planet may well wonder at our inability to use city streets in view of our ability to use strands of wire.

Morse could only send one message at a time through a wire in 1845, we now send dozens simultaneously. The wire is no larger, but we use it better. Mathematical resolution of communication phenomena has enabled us to do this. Similar analysis of transportation systems has shown that our use of city streets is about as primitive as Mr. Morse's use of wire. Their carrying capacities, too, could be increased.

The electronic engineers have numerous techniques for increasing channel's capacity. One is to digitize information by counting bits of it.

Although it is not feasible to transport man from one place to another the way we transmit his voice, it is quite easy to count the human heads rather than vehicles flowing through city streets. This suggests several different ways of getting waves of people through streets faster.

In cities, of course, streets intersections are numerous and troublesome. We control the traffic flow through many busy intersections with crude signal lights. They cannot distinguish between a bus, carrying 50 persons and a lone boy on the motorcycle. It would be quite easy to enable them to do this by putting special signals in the buses

(that wouldn't disturb even a dog's sleep) and receivers in the signal light boxes. The control mechanism then could delay one person a few seconds to give 50 people that many seconds. Such electronic devices are becoming cheaper and would soon be tried if we seriously set out to maximize the flow of people rather than the flow of vehicles.

A new electronic device has been developed at the Highway Engineering Institute. It is capable of controlling a motor vehicle in dangerous situations many times quicker than the most experienced driver can.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 11E

Listen to the text and decide which division appears here.

1. The ... refers to the technical means used in the control mechanisms.
2. The ... is connected with the application of the theoretical findings and technical features of cybernetics to the solution of control problems in various fields of science and human activity.
3. The ... division deals with the philosophical problems of this science, its mathematical and logical foundations.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 12. LESSON 1

COMPLEX GERUNDIAL CONSTRUCTION
(СЛОЖНЫЙ ГЕРУНДИАЛЬНЫЙ ОБОРОТ)

Сложный герундиальный оборот состоит из именной части (притяжательного местоимения или существительного в притяжательном или общем падеже) и герундия. Переводится придаточным предложением с союзами "что; чтобы; то...что; о том, что; для того, чтобы" и др. В придаточном предложении подлежащее - именная часть, а сказуемое - герундий.

имен.часть + герундий

His knowing English well helps him in his work.

То, что он знает английский хорошо, помогает ему в работе.

Функции герундиального оборота:

Сложное подлежащее: *His being tired* was noticed by everybody.
То, что он устал, заметили все.

Сложное дополнение: They knew *of his having published the results.*
Они знали о том, *что он опубликовал результаты.*

Сложное определение: There is a possibility of *our making this experiment.*
Есть возможность, *что мы выполним этот опыт.*

Сложное обстоятельство:

After his having invented the device the professor became known.
После того, как профессор изобрел прибор, он стал известен.

Exercise 1. Назовите предложения, содержащие сложный герундиальный оборот.

1. In spite of everyone being tired we decided to go on further. 2. Having taken new magazines I went home. 3. The problem couldn't be solved without necessary experiments being carried out. 4. I think of solving this problem in another way than you did. 5. This phenomenon results from a new element being formed. 6. His having visited my home was unpleasant. 7. After saying this he went away. 8. They were informed of the criminals having appeared in the city.

Exercise 2. Переведите предложения со сложным герундиальным оборотом - подлежащим.

1. Your making many mistakes is unpardonable. 2. His being sent to London was unexpected. 3. Her sister's being taught by a famous scientist at the University will give good results. 4. Landau's being an outstanding scientist is known to all our students. 5. Their having passed physics well did not surprise us. 6. His having been interested in

languages since his childhood helps him greatly. 7. The new results being obtained in our lab is of great importance. 8. Her refusing to help us was unusual.

Exercise 3. Переведите предложения со сложным герундиальным оборотом - дополнением.

1. They were proud of his having taken part in cosmic flights. 2. We are interested in her using this method of calculations. 3. The teacher insisted on the student's going on with this exercise. 4. I was sure of my sister's having received my letter. 5. I remember your having objected to this schedule. 6. I know of his having been sent to Kiev. 7. What is the reason of his having left our city so suddenly? 8. We heard of the experiment having started last week.

Exercise 4. Переведите предложения сложным герундиальным оборотом - определением.

1. There is little hope of my coming home in time. 2. I like the idea of our group's going there in summer. 3. We discussed different methods of our students' studying English. 4. He had good hopes of my coming to his native town. 5. I was surprised at the news of his coming here. 6. The thought of my failing at the exam was terrible. 7. The way of their coming here was unknown. 8. He has a dream of his family's going to the seacoast in summer.

Exercise 5. Переведите предложения со сложным герундиальным оборотом - обстоятельством.

1. After his having finished school his family moved to another town. 2. On my friend's coming home he began doing this work. 3. Before my leaving for Moscow I'll visit you. 4. In spite of their having worked hard the results of their test were poor. 5. Instead of his being sent to London they left him at home. 6. Owing to the results of the test being obtained in time, he could continue his research. 7. Besides his being a well-known scientist he often wrote science fiction stories. 8. On my making the homework my sister tried to cook dinner.

Exercise 6. Переведите предложения и определите функцию оборота.

1. The possibility of chemical energy being transformed into electric energy is evident. 2. His being able to write good programs was taken into consideration. 3. There is no hope of our getting a letter from him soon. 4. On the lecturer's appearing in the hall the students greeted him. 5. I heard of her having been helped by the friends. 6. We are surprised of his work being criticized. 7. There is a possibility of your being asked at every English lesson. 8. His demonstrating this phenomenon made his name well known in the world. 9. We know of many experiments being carried out in this field.

10. Have you heard of the new laboratory having been built in our University?

ПРИЧАСТИЕ и ГЕРУНДИЙ

Exercise 7. Переведите предложения и определите функцию причастия.

1. Studying these materials he found some interesting facts. 2. Having studied these materials we decided to use them in our work. 3. When studied these materials showed good electrical properties. 4. While studying these materials he came to a new idea. 5. The studied materials were given to our engineer. 6. The materials being studied now are of great importance. 7. We know that the scientist studying these materials is a good chemist. 8. The materials studied helped us in carrying out this work. 9. He was studying these materials all the evening yesterday. 10. The professor has been studying this problem for two years.

Exercise 8. Переведите предложения и определите функцию герундия.

1. Understanding English technical terms is important for an engineer. 2. It is no use speaking to her. 3. I remember attending his lecture on history. 4. He remembers having added some instructions to the program. 5. They finished installing the apparatus only on Saturday. 6. He began determining the properties of the new material. 7. After failing at the exam in January he had to take it again in February. 8. After graduating from the University he worked in the Far North. 9. At the meeting they discussed different ways of improving their work. 10. There are different ways of obtaining the substance.

Exercise 9. Определите часть речи: герундий или причастие.

1. Instead of restoring the old theatre they decided to build a new one in the centre of the town. 2. Using new possibilities they applied atomic energy. 3. It is possible to set up power stations based on utilizing the heat of the sun. 4. Creating a new software program my friend made some mistakes. 5. Before being sent up the balloon was filled with a special gas. 6. What apparatus do we use when measuring air pressure? 7. Science requires exploring new fields of knowledge. 8. Speaking English well a student can be very successful. 9. The problem of obtaining power was solved. 10. He left the room having said goodbye.

СЛОВОСЛОЖЕНИЕ

сущ.+сущ.->сущ.

man (человек) + kind (род) = mankind (человечество)

сущ.+прил.->прил.

world (мир) + wide (широкий) = worldwide (всемирный)

прил.+сущ.->прил.

double (двойной) + pole (полюс) = double-pole (двухполюсный)

сущ.(прил.,нар.)+прич. II->прич. II

heat (тепло) + treated (обработанный) = heat-treated (термически обработанный)

Exercise 10. Переведите следующие слова:

dining-hall, sleeping-room, lecture-hall, bookshelf, schoolboy, notebook, classroom, homework; radio-operator, sunlight, sunburn, railway, businessman, pipeline, ice-breaker, airplane;

fire-resistant, waterproof, soundproof, bright-coloured, low-powered, thermoelectric;

whereas, whenever, wherever, whoever, sometimes, everywhere, anyhow, nobody.

УКАЗАТЕЛИ ПОДТВЕРЖДЕНИЯ ДЕЙСТВИЯ

- I like the film. - I like it, too. I do, too. So do I.	*тоже*
- I like movies. I also like disco.	*также*
- I don't like the film. - I don't either.	*мне тоже (нет)*
- I don't like the film. - Neither do I.	*мне тоже (нет)*
- I like movies as well as disco.	*так же как и*
- I like movies. I like disco as well.	*(а) также*

Exercise 11. Переведите предложения.

1. I have seen this film, too. 2. London as well as other capitals is a very beautiful city. 3. My friend hasn't been to London, neither have I. 4. There are also other types of computers. 5. I passed my exams yesterday as well as my group-mates. 6. I didn't pass the test in English and my group-mates didn't either. 7. I like bacon for breakfast as well as ham. 8. My dog likes both of them, too. 9. I have translated this text. I have also translated the next one. 10. He hates it, so do I. 11. He doesn't like snakes, neither do I.

СОЧЕТАНИЯ СЛОВ

Слова в смысловой группе произносятся слитно. Если слово заканчивается на немой *r*, то перед последующим гласным звуком звук [ɾ] начинает произноситься: there is - [ðɛəɾ'ɪz]

in the car, at the wall, on the shelf, in the street, at the box

over the sea, under the box, about the house, after the bell

ever and ever, doctor and I, her article, we are at the lesson

their aunt, your animal, more and more, farther and farther

red pen, black coat, nice suit, and the door, brief flight

in the middle of the square, in front of the building

out of the room, throughout the world, in spite of the noise

ПОДЧИНИТЕЛЬНЫЕ СОЮЗЫ

Соединяют главное предложение с придаточным. Союзы:

дополнительные: that (что), whether, if (ли)

времени: when (когда), while (в то время как), before (прежде чем), after (после того как), till (до тех пор пока), as (когда, по мере того как), as long as (пока), as soon as (как только), whenever (когда бы ни), since (с тех пор как)

места: where (где), wherever (где бы ни)

причины: because (потому что), since (поскольку), as (так как), for (так как)

цели: in order to (для того чтобы), that (чтобы), so that (так чтобы), lest (чтобы не)

условия: if (если), unless (если не), provided (при условии что), in case (в случае если)

уступки: though, although (хотя)

Exercise 12. Переведите предложения.

1. That he has written the paper is quite certain. 2. The question is if he will come. 3. He said that he had done it. 4. Here is the book that we have spoken about. 5. She will do it when she returns. 6. The plant grows where the others couldn't. 7. As it was raining, we stayed at home. 8. She must hurry lest she would be late. 9. I'll do this work if I have time. 10. Though he was very young, he was a good worker. 11. I stayed there till she came. 12. Provided you find the key you can open this door. 13. I was absent because I was ill. 14. I'll be glad to see you whenever you come to my place.

UNIT 12. LESSON 2

Exercise 1. Прочитайте сочетания слов:

this is, that is, is this, is that, is the; take the book, put the load, a top tone, a big block; look at the book, about the book, about the load; a doctor of, a teacher or a student, the centre of; a black cat, a bad table, on the floor, and the ceiling; in the shelf, against the wall.

Exercise 2. Переведите предложения. ГерундиальныЙ оборот - дополнение.

1. I remember his having given the computer some instructions. 2. He knew about the data being fed into the computer. 3. We heard of the experiment being started last week. 4. Mankind is interested in computer being used in space exploration. 5. We didn't know about McCarthy's having created LISP. 6. The student read about the achievements having been made in microelectronics. 7. They insisted on this invention being used. 8. We know of various experiments being made in this lab. 9. The scientists spoke of the new personal computer having been employed instead of the mainframe. 10. He knew about my having calculated this design.

Exercise 3. Переведите предложения с герундиальным оборотом.

1. Their examining this mathematical problem was very unusual. 2. The computer being a universal machine is known to everybody. 3. Automation being coordinated with computerization contributes to the technological progress. 4. The new method of information being processed was applied last time. 5. The instructions for the machine-tool with computerized numerical control being worked out help engineers to speed up the production process. 6. The way of machine-tools with numerical control being equipped was a success. 7. The computer technology was introduced into production after machine-tools being improved. 8. On my coming to the laboratory they began making the experiment. 9. The data were processed upon software being fed into the new computer. 10. The process of machines being applied to work for us is called automation.

Exercise 4. Сравните сложный герундиальный и независимый причастный обороты.

1. After his making the calculations, we tested the results. 2. He having made the calculations, we tested the results. 3. By our using this new method the efficiency was increased. 4. We using this new method, the efficiency was increased.

Запомните следующие слова.

ACTIVE VOCABULARY

signify	[ˈsignɪfai]	означать
formerly	[ˈfɔ:mɔ:lɪ]	раньше
tool	[tu:l]	инструмент
guidance	[ˈgaidəns]	руководство
formation	[fɔ:ˈmeiʃn]	образование, формация
punch	[pʌntʃ]	пробивать отверстия
card	[kɑ:d]	карточка
speed	[spi:d]	скорость
ingenuity	[ˌindʒɪˈnju:ɪtɪ]	изобретательность
expertise	[ˌekspɜ:ˈti:z]	компетентность
desirable	[dɪˈzaiərəbl]	желательный
change	[tʃeindʒ]	изменение
decision	[dɪˈsiʒn]	решение
latter	[ˈlætə]	последний (из названных)
instantly	[ˈinstəntlɪ]	немедленно
transmit	[trænzˈmit]	передавать
stack	[stæk]	складывать в кипы
pile	[pail]	стопка, груда
reach	[ri:tʃ]	достигать
space	[speis]	космос
capsule	[ˈkæpsjul]	капсула
state	[steit]	констатировать
switchboard	[ˈswitʃbɔ:d]	коммутатор
describe	[dɪsˈkraib]	описывать, изображать
reason	[ˈri:zn]	причина
satellite	[ˈsætəlait]	спутник
launch	[lɔ:ntʃ]	запускать
coordinate	[kəuˈɔ:dɪneit]	координировать
accomplish	[əˈkʌmplɪʃ]	совершать, выполнять
mind	[maind]	ум, мысль, разум

Exercise 5. Прочитайте и переведите интернациональные слова:

card, capsule, telephone, phrase, formation, sort, qualify, micro, phenomenon, associate, realize, plate, miniaturization, maximum, generation, manner, engage, illuminate, illumination, original, design, period, periodic, distant, distance, film, microfilm.

Прочитайте текст и переведите его со словарем.

12A. AUTOMATION AND AUTOMATIC CONTROL

"Automation" is a modern term signifying the use of machines to do work that formerly had to be done by people. What used to be called labour saving or mechanization has now been called automation.

Any tool may be a form of automation provided it helps people to work more easily, better, or more quickly. Provided the tool can do its work without requiring human guidance it may be called a higher form of labour saving.

A machine language of some sort is the formation of every higher form of automation. In its early stages punched cards represented a machine language as it did punched paper tapes.

The computer is a very high speed adding and subtracting machine. However, it is not a thinking machine as it is sometimes called. Everything it does other than adding and subtracting is the result of man's ingenuity and expertise.

During the past years significant gains have been made in the fields of science, industry and engineering. What is new today becomes history tomorrow. Desirable changes and growth require some decisions and the latter require reliable data that are instantly available and that can be transmitted easily.

For example, it has been said that if the paper used for making calculations for the Apollo space program were stacked in one pile the stack of papers would reach the Moon before the space capsule itself would get there. Moreover, it is often stated that if the telephones of the USA were still under the old operator system, all women in America over 21 years of age would be needed as switchboard operators.

The future of the world may be described in this short phrase: "computers and change". The reason is simple. Computers can handle large amounts of information rapidly and accurately. Without computers the space age would not be possible.

When a satellite is launched the thousands of computations that should be made and coordinated could not be accomplished by human minds in the shortest time available. However, the computer can handle the job.

Exercise 6. Прочитайте следующие слова:

signify, require, language, ingenuity, expertise, desirable, decision, instantly, capsule, switchboard, satellite, launch, accomplish.

Exercise 7. Найдите в тексте английский эквивалент.

Термин обозначающий, что привыкли называть, руководство человека, на ранних стадиях, перфокарты и перфоленты, однако, как иногда его называют, все что он делает кроме, за последние годы, достигла бы луны, более того, как часто отмечают, большое количество информации, справляться с работой.

Exercise 8. Найдите пары синонимов:

to affect, to possess, to increase, rapid, to produce, century, sort, to replace, to continue, for, the world, technique, to gain, to influence, quick, to rise, to have, to generate, to take place, kind, age, to go on, engineering, to win, the globe, during.

Exercise 9. Закончите предложения, используя список B.

A: 1. Automation is a modern term ... . 2. Mechanization is used to be called ... . 3. A tool can do its work ... . 4. The computer is a very high speed ... . 5. It is not a ... . 6. The result of man's ingenuity is the work of a computer doing everything other than ... . 7. The paper tape was used ... . 8. The thousands of computations are made ... . 9. Computers are widely used ... . 10. Desirable changes and growth require some decisions, ...

B: 1) adding and subtracting machine; 2) signifying the use of machines instead of men; 3) for handling large amount of information; 4) for making calculations; 5) adding and subtracting; 6) labour saving; 7) thinking machine; 8) the latter demanding reliable data; 9) in a satellite being launched; 10) without requiring human guidance.

Exercise 10. Ответьте на вопросы.

1. What does the term automation signify? 2. How was automation formerly called? 3. What tool may be a form of automation? 4. What is a machine language? 5. What is the result of men's ingenuity and expertise? 6. What does growth of technology require? 7. How large could be the stack of papers containing calculations for the Apollo space program? 8. How can you describe the future of the world? 9. Why would the space age be impossible without computers? 10. What kind of job can the computer handle?

Exercise 11. Переведите следующие слова:

machine-tool, special-purpose, general-purpose, robot-making, self-regulating, world-known, all-round, up-to-date, large-scale, switchboard, typewriter, widespread, microcomputer.

Exercise 12.Переведите предложения со сложным герундиальным оборотом.

1. The tool can do its work without human guidance being required. 2. The computer being called a thinking machine is not correct. 3. The thousands of computations should be made in satellite's being launched. 4. There is much hope of the calculations being done in time. 5. Desirable changes and growth require reliable data being instantly available. 6. They heard of his having published the results of his last experiment. 7. I was sure of the computer working accurately. 8. In spite of technological processes being automated the plant won't fulfil its plan in time. 9. The problem could not be solved without necessary experiments being carried out. 10. We discussed methods of the computers' handling large amounts of information on a single chip. 11. Before the experiment being started, we had to perform some computations. 12. In spite of the results being ready, we couldn't begin the experiment. 13. The possibility of a computer processing data in a few seconds is evident. 14. His having solved this problem made him succeed in the experiment. 15. We know of complicated research being carried out in computer science.

Exercise 13. Переведите предложения с указателями подтверждения действия.

1. I am very interested in the results, too. 2. He also wants to compare the results. 3. A digital computer sorts out information, and analog machine does it as well. 4. We cannot solve this problem without a general-purpose computer, and neither can they. 5. Analog computers measure physical quantities as well as simulate some physical processes. 6. He cannot use this computer as it's out of order. He is not allowed to apply that one either. 7. Automatic controls assist men in industry, too. 8. A single microchip has also become a conventional thing. 9. The computer did not process the data and it didn't store them either. 10. You can't calculate the results in a minute, neither can I. 11. The engineer used the hard discs as well as some floppy discs. 12. I like playing computer games and my friend likes it too. 13. This computer doesn't make mistakes, and neither does that one. 14. The computer had processed the data as well as calculated the results. 15. Also, it had stored all the results obtained.

UNIT 12. LESSON 3

Read the text without a dictionary.

12B. NEW AUTOMATION SYSTEMS

A large number of cybernetic problems are being tackled in air transport, too. The growing intensity of air traffic has called for the automation of its control. The world's biggest airports handle up to 1,000 planes a day. The dangerous situations that often arise as a result tell on an aerodrome's capacity.

The automatic air traffic system takes over a large proportion of the work involved in the information exchange between dispatcher and pilot. At the same time, it carries out all sorts of calculations and warns the dispatcher of potential danger, thus taking a lot of nervous strain and effort out of his work.

Fundamental research is being carried out into the automation of automobile driving. The "robot driver" system is called upon to do two things: to keep the vehicle on the road and to prevent it from colliding with the cars ahead or running into obstacles. The first problem was solved experimentally by tracing a luminous line on the road and fitting a car with a photocell which keeps an "eye" on this line, and, through a set of actuating mechanisms, adjusts the steering wheel in case of the slightest deviation from the course.

The second problem is more complex, both technically and economically. Life itself insistently calls for its solution. Two ideas are considered the most practicable in this respect - the use of microwave radar which probes the stretch of the road lying ahead of the moving car and presents the road situation on a dishboard screen. In conditions of poor visibility, it can always take over the steering wheel and brake control. The other idea is to lay "loops" of current-carrying cable under the road surface. When a car passes over such a loop, the latter's magnetic characteristic changes, this being a source of information for the car following immediately behind. The latter's transducers pick the signal and transmit continuous measurements of the distance to the leading car, its speed and the gain rate. In critical situation, the engine is stopped automatically.

Apart from the systems described above there are efficient and timesaving cybernetic devices intended for handling trains, ships and planes. Two systems are of special interest.

The first system is meant for booking train tickets. It consists of an electronic computer, cash registers connected with it via communication channels and an information board displayed prominently at the terminals, at the Central Booking Bureau and at the city station. The computer storages contain information about the

vacancies in each train departing from the city every day and keep the booking agents informed on the availability of any given place. With the increase in storage capacity, the systems will make it possible to book tickets 30 to 60 days in advance.

An electronic system for controlling the speed of trains has been installed on several lines in the underground. More trains per hour can run thanks to this system. Automatic devices keep an eye on how loaded the line is and step up or cut down the speed of the trains or even stop them altogether if necessary.

Medical engineers also design more electronic aids to help people. They are divising replacement parts for the human body - from skin to the spinal cord.

COMPREHENSION TEST

I. Put in the missed words.

1. The growing ... of air traffic has called for the automation.
2. The automatic air traffic system is involved in the information ... between dispatcher and pilot.
3. The robot-driver system is to keep the ... on the road.
4. This problem was solved by ... a luminous line on the road.
5. The robot-driver system has also to prevent the ... from colliding with other cars.
6. This problem is more complex, ... technically and economically.
7. The first idea is the use of ... .
8. The other idea is to lay 'loops' of cable under the road ... .
9. In critical ..., the engine is stopped automatically.
10. The computer storage of an automatic booking train tickets system contains information about the ... in each train.
11. Medical engineers divise ... parts for human body.

II. Find the answers to the following questions.

1. Why is automation needed in air?
2. What kind of job does an automatic system perform?
3. What is being done in the automation of automobile driving?
4. What functions does the 'robot driver' system perform?
5. How was the first problem solved?
6. What difficulties arise out of the second problem?
7. What are the two ways of solving this problem?
8. What is done with the machine in critical situation?
9. What does the system for booking train tickets consist of?
10. What kind of information is stored in its computer?
11. What is the contribution of medical engineers in the process of automation?

Translate the text into English. Entitle the text.

TEXT 12C

Автоматизация - это термин, обозначающий использование машин для выполнения работы, которую раньше делал человек. Автоматизация - это более высокая степень технического прогресса.

За последние годы были сделаны значительные достижения во всех областях науки, промышленности и техники. То, что является новым сегодня, становится историей завтра. Быстрый рост требует надежной информации, которая должна быть всегда доступна и ее легко можно было передать.

Будущее цивилизации можно описать одной фразой: "компьютеры и изменения". Причина проста, так как ЭВМ могут работать с большим количеством информации быстро и точно. Наш космический век был бы невозможен без компьютеров.

За минимально короткий срок компьютеры могут справляться с различными видами сложных работ, которые не может выполнить человек.

12D. PIONEER FOR AGE OF UNMANNED SHIPS

The super-automated tanker Seiko Maru sailed from Japan to the Persian Gulf. An electronic computer which was installed in the ship was fully utilized to ensure safety and save labour.

In the past, several ships with electronic computers had been built in Japan, but the scope of their automation had been confined only to cargo loading and unloading. Therefore, the Seiko Maru was the first ship that had been computerized on such a large scale.

It was said that among the many computerized programs prepared for the vessel was one for the prevention of collisions. In order to enable the ship to automatically avoid any dangerous object the computer was linked with radar and estimated the possibility of collision at all times.

There was also a program for fixing the ship's exact position. This was calculated on the basis of radio signals which were received from an artificial satellite now circling the earth along a polar orbit.

This had completely automated the work of fixing the ship's position, which had so far required much time and skill. Other programs included a cargo handling control program for automatic loading and unloading and an engine trouble emergency repair program which kept a constant watch on the operation of the engine section. If there

was a trouble, it sounded an alarm and typed out instructions for repair.

All of these programs were handled by a single computer. Moreover, the crew did not need to have any expert knowledge of the computer. All they had to do was to press a limited number of buttons.

It was said that such automation enabled the number of crew to be more than halved to about 15 compared with a conventional ship of a smaller size.

Several types of ships had also joined the waterborne revolution. Highly automated supertankers more than a thousand feet long are sailing with crews of fewer than 30 men.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 12E

Listen to the text and decide what synonymous word was used in the text.

1. Electronics has made the processing of information quick and automatic.
2. Electronic devices respond very quickly to signals and take measurements and direct faults very precisely.
3. For instance, human worker can work in safe and congenial surroundings.
4. Digital computers have already shown themselves capable of doing routine office work.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 13. LESSON 1

INFINITIVE (ИНФИНИТИВ)

Инфинитив - неличная форма глагола, в русском языке - неопределенная форма глагола. Формальный признак - частица *to*.

	Active	Passive	
Indefinite	*to translate*	*to be translated*	действие одновременное с
Continuous	*to be translating*	-	действием сказуемого
Perfect	*to have translated*	*to have been translated*	предшествующее действие

ИНФИНИТИВ - ПОДЛЕЖАЩЕЕ

Стоит в начале предложения, переводится неопределенной формой глагола или существительным.

To walk in the forest is pleasant. *Гулять* в лесу приятно.

Если есть зависимые слова, используется формальное подлежащее *it*.

It is pleasant *to walk* in the forest. *Гулять* в лесу приятно.

ИНФИНИТИВ - ЧАСТЬ СКАЗУЕМОГО

Стоит после глагола *to be*. После модальных глаголов употребляется без *to*.

Our task is *to translate* the text. Наша задача - *перевести* текст.

He must *do* the work. Он должен *сделать* работу.

ИНФИНИТИВ - ДОПОЛНЕНИЕ

Стоит после сказуемого, отвечает на косвенный вопрос, переводится неопределенной формой глагола или существительным. Сложные формы переводятся придаточным предложением с союзами 'что', 'чтобы'.

We decided *to fulfill* the plan. Мы решили *выполнить* план.

He wanted *to be examined*. Он хотел, *чтобы у него приняли экзамен*.

ИНФИНИТИВ - ОПРЕДЕЛЕНИЕ

Стоит после определяемого слова, отвечает на вопрос ‘какой?’, переводится придаточным предложением с союзом 'который' или существительным с предлогом 'для'. Формы Passive переводятся со значением долженствования или будущего времени.

A voltmeter is a device *to measure* the voltage.

Вольтметр - прибор *для измерения* напряжения.

The book *to be read* is very interesting.

Книга, которую *нужно прочитать*, очень интересная.

После слов the first, the last инфинитив переводится личной формой глагола в том же времени, в котором стоит глагол "to be".

He was the last *to come*. Он пришел последним.

ИНФИНИТИВ - ОБСТОЯТЕЛЬСТВО ЦЕЛИ

Стоит в начале или в конце предложения, часто употребляется с союзом *in order (to)* – 'для того чтобы', 'чтобы'. Переводится неопределенной формой глагола с союзом 'чтобы' или существительным с предлогом 'для'.

In order to master English you must work hard.

Для того чтобы выучить английский вы должны работать усердно.

ИНФИНИТИВ - ОБСТОЯТЕЛЬСТВО СЛЕДСТВИЯ

Употребляется после наречий *too* – 'слишком', *enough* – 'достаточно', сочетания *such ... as to* – 'такой (настолько) ... что (чтобы)'; переводится неопределенной формой глагола с союзом 'для того чтобы'; 'чтобы', 'что'.

The water was *too* cool *to swim*.

Вода была *слишком* холодной, *чтобы плавать*.

Exercise 1. Переведите предложения с инфинитивом-подлежащим.

1. To know mathematics is necessary. 2. To do exercise in time was important. 3. To solve this problem was very interesting. 4. To know a foreign language is necessary for you. 5. To meet our friends was very pleasant. 6. To explain the rule is necessary. 7. To achieve good results was not so easy. 8. To drive a car in a big city is difficult.

Exercise 2. Переведите предложения с инфинитивом-обстоятельством цели.

1. To know mathematics the students must study hard. 2. To do the exercise he used the dictionary. 3. In order to solve this problem they carried out several experiments. 4. To know a foreign language you must learn much. 5. To meet our friends in time we took a taxi. 6. To explain this process the teacher showed us some diagrams. 7. To achieve good results I began experimenting. 8. To drive a car you should know the traffic rules.

Exercise 3. Сравните инфинитив-подлежащее и обстоятельство цели.

1. To do the work in time is very important. 2. To do the work in time we must use modern methods. 3. To read special literature in a foreign language is necessary for every scientific worker. 4. To read special literature you should know the grammar well. 5. To measure the distance between stars we use a special unit, a light year. 6. To measure the distance between stars requires special knowledge. 7. To find out the state of a mass of a gas is quite possible. 8. To find out the state of a mass of a gas one should know its volume, its pressure and its temperature.

Exercise 4. Переведите словосочетания с инфинитивом-определением:

a) the first to apply - первым применил, the last to come, the first to answer, the second to do, the last to write, the first to solve, the second to jump, the last to know;

b) work to be done - работа, которую нужно сделать, laboratory to be built, experiments to be carried out, articles to be translated, problem to be discussed, rule to be remembered, theory to be explained.

Exercise 5. Переведите предложения с инфинитивом-определением.

1. The plastics to be produced in our lab will be widely used in industry. 2. Marie and Pierre Curie were the first to discover radium. 3. To find an instrument for our experiment was the next problem to be solved. 4. I read the article to be retold tomorrow. 5. The apparatus to be designed by this research group is to be used in the new lab. 6. Galileo was the first to say that the earth moves round the sun. 7. Tsiolkovsky was the first to put forward the theory of space flights. 8. Gagarin was the first to make the cosmic flight. 9. Mendeleyev was the first to discover the Periodic Law of elements. 10. He was the first to complete the exercise to be written.

Exercise 6.Определите функцию инфинитива и переведите предложения.

1. Our country was the first to launch the sputnik into the orbit. 2. The problem to be discussed will be of great interest. 3. To train highly qualified scientific workers is the task of institutions of higher learning. 4. In order to find the distance between the Earth and the Moon Newton made a lot of calculations. 5. To drive machines requires power. 6. To heat a body we place it in contact with another body at higher temperature. 7. This method is not good enough to be used everywhere. 8. He was saving money to travel about the country. 9. I was to make it in time. 10. Coffee was too hot to drink.

Exercise 7. Сравните инфинитив и герундий.

1. To read English is a great pleasure. 2. Reading English is necessary for you. 3. He likes to read English. 4. He enjoys reading English books. 5. His task was to complete the work in time. 6. Our task was completing the experiment in time. 7. The instrument to measure voltage is called voltmeter. 8. The instrument for measuring voltage is on the table. 9. Molecules are too small to be seen with the microscope. 10. Molecules are too small for being seen with this microscope.

КОНВЕРСИЯ

Образование новых слов путем перехода одной части речи в другую. Иногда совпадение форм встречается у нескольких частей речи.

back - спина (сущ.)*;* задний (прил.)*;* поддерживать (гл.)*;* обратно (нар.)

Exercise 8. Переведите выделенные слова правильной частью речи.

1. Do you know Ned's new *address*? 2. The letter was not *addressed* to him. 3. The *telephone* is the invention of the 20th century. 4. Sam didn't *telephone* me yesterday. 5. Nelly's *visit* has come to an end. 6. Why don't you *visit* her? 7. The city was in *ruins*. 8. That fact *ruined* John's career. 9. Have you got many *mistakes* in your test? 10. You have *mistaken* me for somebody else. 11. I don't know this girl's *name*. 12. The boy was *named* after his grandfather. 13. Pete wants to *pilot* modern airplane. 14. He wants to become a *pilot*. 15. I haven't received an *answer* to my letter. 16. She didn't *answer* my last letter.

УКАЗАТЕЛИ КОЛИЧЕСТВА

How *many* films have you seen?		How *much* milk have you drunk?	
all/every		*all*	
most/fewest		*most/least*	
more/fewer		*more/less*	
a lot		*a lot*	
several		-	
a few	of them	*a little*	of it
three		-	
both		-	
some		*some*	
none		*none*	
a (great/large) number		*a (great/good) deal*	
a plenty		*amount*	

Exercise 9. Переведите предложения с указателями количества.

1. None of these books is interesting. 2. A large number of computers are being used in industry. 3. My cat doesn't like milk that's why a little of it was drunk. 4. How many stars are there in the sky? 5. Several mistakes were done in her test. 6. Two or three of the cassettes were sold. 7. Both friends were students. 8. We spent a great deal of time on solving this problem. 9. Fewer parts are needed for this modern device. 10. Less power is required by the new generation of computers.

УДАРЕНИЕ

Может падать на различные слоги.

1. В большинстве двусложных слов ударение падает на первый слог и ударная гласная читается по правилу.

'sofa, 'turner, 'fifty, 'cozy, 'many, 'fancy, 'typist

2. В большинстве трех- и четырехсложных слов ударение падает на третий слог с конца и ударная гласная, как правило, читается кратко.

'family, 'cinema, 'faculty, 'popular

ne'cessity, ge'ology, e'conomy

3. В словах с суффиксом -tion/-sion ударение падает на предшествующий суффиксу слог и ударная гласная читается по правилу, за исключением буквы i - [i].

sen'sation, de'cision, il'lusion, comp'letion, repe'tition, 'vision

4. В словах с этим суффиксом, имеющих 5 и более слогов, основное ударение падает на предшествующий суффиксу слог, а второстепенное - на пятый от конца слог, гласная в этом слоге читается кратко.

ad,minist'ration, in,vesti'gation, e,xami'nation, ,consti'tution, pro,nunci'ation

Exercise 10. Прочтите слова с правильным ударением:

government, delegation, factory, building, machine, language, laboratory, instrument, production, technology, university, conference, electron, electronic, temperature, experiment, element, communication, service, education, operation, principle, accomplishment, advisability, unpredictable, unchangeable.

НАРЕЧИЯ, СОВПАДАЮЩИЕ ПО ФОРМЕ

с прилагательными: fast (быстро), hard (упорно), late (поздно)
с предлогами: after (после, потом), before (раньше), since (с тех пор)
с союзами: but (лишь, кроме)

Exercise 11. Переведите предложения.

1. He is working fast. 2. It is a fast train. 3. We study hard. 4. That was a hard work. 5. He came late yesterday. 6. I had a late dinner yesterday. 7. The English lesson will be after dinner. 8. He went away from the town and never came back after. 9. I've lived here since the year I entered the University. 10. She left the country and nobody has seen her since. 11. I was sure I had seen him before. 12. I'll come home before dinner today. 13. Nobody but you can do it. 14. She was young but vary clever.

UNIT 13. LESSON 2

Exercise 1. Прочитайте слова, делая правильное ударение:

'fifty, 'many, 'timer, 'careful, 'badly, 'energy, 'factory, 'interest, 'faculty, 'memory, ne'cessity, a'bility, ra'pidity, tech'nology, at'traction, at'tention, com'pletion, in'vasion, ad,mini'stration, in,vesti'gation, com,muni'cation, e,xami'nation.

Exercise 2. Переведите предложения с инфинитивом-определением.

1. The problem to be solved is of great importance. 2. Everybody was interested in the problem to be discussed at the conference. 3. The work to be done by the computer is very useful. 4. Silicon is the material to be widely used in industry. 5. The device to be tested has been brought to our lab. 6. The apparatus to be designed will be useful in speeding up the process. 7. Silicon was perhaps the first material to be used by man for making a transistor. 8. The work to be done tomorrow was given by the engineer-in-chief. 9. There are many problems to be solved concerning the programming of a computer. 10. The disadvantages to be overcome were discussed at the scientific conference.

Exercise 3. Сравните инфинитив-подлежащее и инфинитив-обстоятельство.

1. To master the speciality we must study hard. 2. To master this speciality is a complicated task. 3. To solve the problems dealing with speed computations scientists had to conduct a lot of experiments. 4. To collect new information by satellites will help to get better results. 5. To translate a foreign text correctly you must know grammar. 6. To read scientific articles is a useful and interesting way to master the speciality. 7. To create a new electronic device the engineers have to make certain measurements. 8. This method was introduced to achieve better results. 9. The size of modern computers is such important as to be taken into consideration. 10. To study means to work hard.

Exercise 4. Переведите сочетания с инфинитивом:

to create new equipment we make; to create new equipment is; we want to create new equipment; new equipment to be created is; he was the first to create new equipment; new equipment is too important to be created now; new equipment has to be created;

can process, could be processed, might discuss, might be discussed, must perform, must be performed, should obtain, should be obtained; have to do, has to be done, had to be tested, had to program, is able to translate, were able to connect.

Запомните следующие слова.

ACTIVE VOCABULARY

rate	[reit]	темп, скорость
ingenious	[in'dZ:njqs]	изобретательный
means	[mi:nz]	средство
example	[ig'zRmpl]	пример
apparatus	['xpqreitqs]	прибор, аппарат
engine	['endZin]	двигатель, машина
governor	['gAvqnq]	регулятор
mixture	['mikstSq]	смесь
arrangement	[q'reindZmqnt]	схема, расположение
make up	[meik Ap]	составлять
switch	[switS]	переключатель
contact	['kOntqkt]	контакт
correct	[kq'rekt]	точный, правильный
combination	[,kOmbi'neiSn]	соединение, сочетание
mention	['menSn]	упоминать
close	[klous]	тщательный
proper	['propq]	надлежащий, правильный
flow	[flou]	поток
pressure	['preSq]	давление
proportion	[prq'pLSn]	соотношение
watch	[wOtS]	наблюдать
meter	['mi:tq]	счетчик, измерительный прибор
case	[keis]	случай, обстоятельство
move	[mHv]	передвигать
handle	['hxndl]	ручка, рубильник
uniformly	['jHnifLmli]	однообразно
precise	[pri'sais]	точный
machine-tool	[mq'SintHl]	станок
detail	['di:teil]	деталь
appearance	[q'piqrqns]	внешний вид

Exercise 5. Прочитайте и переведите интернациональные слова:

carburettor, mixture, cylinder, motor, contact, gas, proportion, nylon, material, factory, principle, detail, negative, negatively, positive, positively, integral, register, division, dominion, calculate, calculator, focus, uniformly, proportional, diameter.

Прочитайте текст и переведите его со словарем.

13A. AUTOMATIC CONTROLS

In many modern machines and engineering processes certain quantities have to be controlled, such as temperatures, rates of speed and so on. This is often done by automatic devices. The various highly ingenious means for doing this are known in general as control systems.

Simple examples of control apparatus are found in the steam engine where there is a governer to control the speed. In the petrol engine the carburettor and throttle, as is known, control the mixture of air and petrol vapour and its flow to the cylinders.

Electric motors have control arrangements made up of switches or contacts operated in the correct order and rate, often in very complicated combinations. Gas and electric stoves and boilers, electric irons and kettles, and many other pieces of equipment have automatic devices for controlling temperatures.

Some of the most important applications of automatic control mentioned are applied in the chemical industry. Chemical processes such as the manufacture of nylon or certain stages of oil refining require very close control to the proper values of quantities such as temperatures, rates of flow, pressures, acidity, proportions of materials and so on.

Formerly chemical factories had to employ many people to watch various meters and measuring instruments and to move control handles. Now, more and more, such operations are being done by automatic control systems.

These apparatus are costly, but much labour is saved. Besides, in many cases, the automatic controls, as is stated, work faster and more uniformly than even the most skilled operator can.

We know the automatic controls are also used to control the thickness in rolling steel plant, or to obtain the precise amount of stretch of the wet paper in paper-making machines. They are used to control the work of many machine-tools.

All these controls are based on the same principles of operation, the details and appearance of the apparatus being of course different in different applications.

Exercise 6. Прочтите следующие слова:

ingenious, carburettor, throttle, mixture, vapour, cylinder, arrangement, iron, kettle, acidity, detail, appearance.

Exercise 7. Найдите в тексте английский эквивалент.

Известны в основном, простейшие примеры, как известно, сейчас все больше и больше, кроме того, во многих случаях, как установлено, чем даже, точное количество, на тех же самых принципах, состоящие из, смесь воздуха и пара, определенные стадии, внешний вид прибора.

Exercise 8. Закончите предложения.

1. In engineering processes ingenious devices control ... 2. Examples of control devices are found in ... 3. The automatic controls for controlling temperatures find application in ... 4. In chemistry some manufacturing processes or certain stages of oil refining require very close control to ... 5. To watch various meters and measuring instruments and to move control handles a lot of people had to ... 6. Now in chemical plants most of operations are being done by ... 7. Though being costly the automatic controls save ... 8. Automatic controls work faster and ... 9. Automatic controls can control the precise amount of the thickness in ... 10. The details and appearance of all automatic controls are different and depend on different applications, though they are based ...

Exercise 9. Ответьте на вопросы.

1. What quantities have to be controlled in modern production? 2. What does a control device do in a steam engine? 3. How does a control apparatus function in a petrol engine? 4. How do control units operate in electric motors? 5. In what kind of domestic equipment are automatic devices for controlling temperature used? 6. Why are the applications of automatic controls so important in chemical industry? 7. What kind of work did many people have to do in chemical works before? 8. Why is it more efficient to use the automatic control in industry? 9. What examples of efficient application of automatic controls in some other industries are there in the text? 10. Why are the details and appearance of various apparatus so different?

Exercise 10. Переведите следующие слова разными частями речи:

code, control, change, design, force, handle, input, limit, list, model, output, power, pulse, range, register, term, use, result, root, set, sort, switch, process, record, decimal.

Exercise 11. Переведите предложения с инфинитивом.

1. Modern complex controls can perform functions man would not be able to fulfil. 2. The worker in the plant with modern automatic equipment is to regulate the production processes. 3. All-round automation makes it possible to introduce remote control. 4. Software programs are used to actuate different machine-tools. 5. Automation is the use of machines to do work instead of men. 6. Automation helps people to work more easily. 7. In the steam engine there is a governor to control the speed. 8. In the petrol engine there is the carburettor and throttle to control the mixture of air and petrol vapour. 9. Chemical factories had to employ many people to watch meters and to move control handles. 10. To control temperature in electric irons and kettles we use automatic devices. 11. The operations to be done by automatic control systems are very complicated. 12. Electric motors to be operated correctly are made up of switches and contacts. 13. To control certain quantities in modern machines and engineering processes is a vital necessity today. 14. Automatic control is applied in the chemical industry to regulate the proper values of the quantities. 15. To move control handles was one of the main tasks of chemical workers in the past.

Exercise 12. Определите неличную форму глагола.

1. Having investigated the phenomenon he devised a new theory for its explanantion. 2. What apparatus do we use to measure air pressure? 3. We apply computers to process data. 4. Do you find any difficulty in solving this problem? 5. Science requires exploring new fields of knowledge. 6. The article discussed the results currently being tested by our research team.

Exercise 13. Переведите предложения с указателями количества.

1. Many electronic devices can be found in our laboratory. 2. Much information is being processed now. 3. A lot of operations are done by various types of computers. 4. We did a lot of work. 5. A large number of microchips build up the memory unit. 6. The memory unit stores a large amount of different data. 7. Specialists have created a great number of microelectronic units. 8. The microprocessor performed a few instructions. 9. Little information is to be used in our research. 10. New electronic computers need fewer parts than the earlier types. 11. An analog computer can process less information than a digital one. 12. We use more knowledge to design new devices now than we did some years ago. 13. More calculations are being performed by computers from year to year. 14. None of the instructions suited the program. 15. None of work has been done yet.

UNIT 13. LESSON 3

Read the text without a dictionary.

13B. THE SECOND INDUSTRIAL REVOLUTION

Computers have been described as machines that think. This is an oversimplification. Computers are machines that are capable of very rapid and accurate calculations, but they do need instructions from human beings.

However, within the past few years great advances have been made in the techniques of programming computers to act in remarkably intelligent ways. Moreover, having received its instructions and the data which it is to handle, the computer can then analyse it and make the required deductions from it in an astonishingly short time. The results can either be recorded or filed or used to control directly some apparatus or plant. In either case the computation is done much faster than a human could do it. Thus not only a great deal of human mental drudgery is avoided, but more difficult calculations or forms of process control can be undertaken.

The application of computers to industry is causing a second industrial revolution, as significant to the human race in its economic and social implications as was the first industrial revolution. The first industrial revolution involved the replacement of human and animal muscle power by the power of machines. It released mankind from a lot of physical work, and although we failed to avoid some unpleasant initial effects, no one could doubt that the material effects in the long run have been of great benefit to all of us.

Even though this first industrial revolution is still not completed we have now been caught up with a second similar phenomenon as computers spread into industry, commerce and the government service. Just as machines relieved us of the necessity for so much unpleasant physical work, so computers can relieve us of much detailed routine mental effort. Much of the drudgery of bookkeeping and filing, for example, can now be done by computers. Routine design calculations can also be computerized. Machines are thus freeing the human mind, in the same way as the muscle was freed over 100 years ago.

The introduction of computers will enable the control of industry and government records to continue to improve without an impossible situation developing in which most of us would have been employed in filing records.

This, of course, is only the negative side of the computer revolution. The positive side is even more significant. Just as the appearance of mechanical power opened the way to new feats of engineering like the railway and aeroplane, the combine harvester

and the mechanical excavator, so automatic computing opens the way to new and much more effective methods of engineering design, recordkeeping and management.

The computer may even make possible entirely new ways of conducting a business. The major airlines, for example now maintain up-to-the-minute records in a central computer of all seats sold, thus permitting the maximum sale for each flight without risk of overselling.

Computers are the most suitable and reliable machines for making calculations. All the great discoveries in science have been the result of accurate measurements and calculations. Automation, as well as all other sciences, is closely connected to technological progress and computer development.

COMPREHENSION TEST

I. Choose the right word.

1. Computers have been described as machines that (think, calculate).
2. Great advances have been made in the techniques of (operating, programming) computers.
3. Computers (require, analyse) the data to be handled.
4. The application of computers to industry is (causing, obtaining) a second industrial revolution.
5. Computers (avoid, release) men from a lot of mental work.
6. Computers are (spread, handled) into industry, commerce and the government service.
7. Machines are (freeing, filing) the human mind.
8. Automatic computing (opens, leads) the way to new methods of engineering design.
9. Computers (cause, result) exact measurements and calculations.

II. Find the answers to the following questions.

1. Why is it oversimplification to call computers 'thinking machines'?
2. What does a computer do after receiving the instructions?
3. What is done with the result of processing?
4. What is the reason of the second industrial revolution?
5. What replacement does the second industrial revolution involve?
6. What is being done by computers now?
7. What will the introduction of computers cause in the control?
8. What is the negative side of the computer revolution?
9. What is the positive side?
10. What has been the result of accurate measurements and exact calculations?

Translate the text into English. Entitle the text.

TEXT 13C

Во многих современных механизмах и технологических процессах определенные физические величины необходимо контролировать. Это делается автоматическими устройствами. Их называют системами управления.

Простейшие примеры управляющих приборов - это различные типы двигателей. В них используются разнообразные регуляторы, карбюраторы, переключатели и контакты. В бытовых приборах также имеются автоматические устройства для управления температурой.

Важное значение приобрело автоматическое управление в химической промышленности. Автоматические системы работают быстрее и более единообразно, чем даже самый квалифицированный оператор.

Все автоматические системы управления основаны на одних и тех же принципах действия, но конструкция и внешний вид приборов сильно отличаются в зависимости от их применения.

13D. COMPUTER TECHNOLOGY AND COMPUTER SCIENCE

Scientific research, in many fields, is now dependent on computers, either for working out the implications of a theory or for handling the very large amounts of data obtained from certain experiments. Astronomers have been able to test theories about the structure of stars by following their consequences on a computer. Crystallographers have, with the help of computers, deduced the structure of large molecules from the complicated way in which they diffract X-rays, and so have begun to understand the mechanisms by which heredity is transmitted. Physicists have been able to sort out the tracks made by millions of high-energy particles, and so to obtain statistics and to pick out the rare cases that add to our basic knowledge. Thus, in many instances the computer is actually creating new jobs.

Computer technology, from a precocious childhood, is moving into a turbulent adolescence, and we must try to understand its problems. We can still see its adult state but dimly. It seems, for example, that it may not be necessary for each office to have its own computer, but rather merely to enjoy shared access to a central computer by means of land lines. We may perhaps look forward to the day when there is a national network of computers linked to each other by something like the telephone system. Large offices would then keep their records at the local computer exchange. If a computer received a job that is too big for it to handle, it would pass it on to a larger computer via the

national net by calling on the national power grid. This is for the future, but it may come sooner than we think. Whatever physical form it may take, we can be sure that the interchange of information between computers will grow enormously in volume in the years to come. This in turn will raise much deeper problems of compatibility of equipment and codes than any we have encountered so far.

Information return is not the only advantage of computers in processing information. The data fed into the computer's memory may be automatically processed and tabulated to supply consolidated conclusions for the needs of management. Thus, the science and technology information system becomes a part of the management information systems which are being widely applied.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 13E

Listen to the text and answer the questions.

1. What is automation?
2. How many components is automation made up of? What are they?
3. Which components replace human muscles? Which ones replace human brains?
4. Where is the intelligent use of leisure growing?

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

UNIT 14. LESSON 1

OBJECTIVE INFINITIVE CONSTRUCTION
(ОБЪЕКТНЫЙ ИНФИНИТИВНЫЙ ОБОРОТ - сложное дополнение)

Англ.предл.: Подлежащее + сказуемое + именная часть + инфинитив (сложное дополнение)
Рус.предл.: Подлежащее + сказуемое, **что/чтобы/как** придаточное предложение

Состоит из именной части (существительное или местоимение в объектном падеже) и инфинитива. Переводится придаточным предложением.

После глаголов предположения, желания, приказания, разрешения (*to suppose, to assume, to consider, to think, to expect, to believe, to want, to wish, to like*) инфинитив употребляется с частицей *to* (см. с.201).

The teacher wanted *them to translate* this text.

Преподаватель хотел, *чтобы они перевели* этот текст.

После глаголов чувственного восприятия (*to see, to hear, to feel, to watch, to notice*) и глагола *to make* (заставлять) частица *to* не употребляется (см. с.201).

I saw *her play* the guitar. Я видел, *как она играет* на гитаре.

The teacher made *us read*. Учитель заставил *нас читать*.

ИНФИНИТИВНЫЙ ОБОРОТ С ПРЕДЛОГОМ for

Перед именной частью стоит предлог *for*; переводится придаточным предложением с союзом *'чтобы'* или неопределенной формой глагола.

The most important thing is *for the apparatus to function* properly.

Самое важное - *чтобы аппаратура работала* нормально.

SUBJECTIVE INFINITIVE CONSTRUCTION
(СУБЪЕКТНЫЙ ИНФИНИТИВНЫЙ ОБОРОТ - сложное подлежащее)

Англ.предл.: Подлежащее + сказуемое + инфинитив \сложное подлежащее/
Рус.предл. : Сказуемое, **что** + придаточное предложение

Состоит из именной части (существительное или местоимение) и инфинитива. Сказуемое выражено:

1) глаголом в Passive: (*is said, is known, is supposed, is found, is considered, is believed, is reported,* etc.);
2) глаголом в Active: *to seem, to appear, to prove, to turn out, to happen, to chance*;
3) сочетанием: *to be likely* (вероятно), *to be unlikely* (маловероятно), *to be sure*, *to be certain* (несомненно) (см. с.201) .

Перевод: сказуемое (говорят, известно, кажется, вероятно...), союз "что" и

придаточное предложение, или простое предложение с вводным словом.

He is known *to read*. Известно, *что он читает*. = *Он*, как известно, *читает*.

Exercise 1. Найдите сложное дополнение и переведите предложения.

1. He wants the assistant to test a new device. 2. We know gravity to act on every particle of the body. 3. I want you to understand this process. 4. The experiments have shown the apparatus to function properly. 5. He made the students repeat the experiment. 6. We supposed all the details of the plan to have been explained to you. 7. The chemist observed the body expand. 8. We heard the scientist make a report on space flights. 9. The engineer supposed the test to have been carried out. 10. The professor made us prepare the task. 11. She felt somebody look at her. 12. The dean wanted me to come.

Exercise 2. Отметьте номера предложений со сложным дополнением.

1. I want to invite you to the concert. 2. I want you to invite me to the concert. 3. We know the device to have been designed. 4. They attend English classes to have some practice. 5. I expected my friend to write a report in time. 6. The teacher made the students read the text again. 7. The engineer supposed to come early. 8. He supposed the device to operate well. 9. I heard him speak about new research. 10. My father wanted me to become an engineer.

Exercise 3. Переведите предложения с объектным инфинитивным оборотом.

1. We supposed the research to have been completed. 2. I know him to be working at his diploma project now. 3. We saw the taxi stop near the University. 4. I didn't know him to have returned from his business trip. 5. I want him to be told about it. 6. Nobody noticed her leave the room. 7. We believed the student to have finished his experiment successfully. 8. The teacher wanted the rule to be remembered. 9. He heard me speak over the phone. 10. I was told of them to have travelled to various countries.

Exercise 4. Переведите предложения, в которых есть оборот с предлогом *for*.

1. He brought all the materials necessary for the students to go on with the experiment. 2. Everybody waited for the train to come. 3. The first thing for me to do is to start the experiment. 4. It is for you to decide which of the two methods to use. 5. Microscopes make it possible for us to see very small objects. 6. It was late for us to begin discussing this question. 7. For the reaction to start it is necessary to heat the apparatus. 8. Was the question too difficult for her to answer? 9. It's for me to decide to come or not to come. 10. It is time for him to start studying.

Exercise 5. Найдите сложное подлежащее и переведите предложения.

1. They are considered to have written the article. 2. The newspapers are known to be brought in the morning. 3. He is said to have a large collection of books. 4. The experiment is supposed to be a success. 5. He proved to be an excellent worker. 6. She appeared to be surprised at the news. 7. They seem to be working in the lab. 8. He is sure to make a good report. 9. This question is likely to be discussed at the conference. 10. We are unlikely to meet him here.

Exercise 6. Отметьте номера предложений со сложным подлежащим.

1. Everybody knows all matter to be composed of molecules. 2. Some buildings are planned to be built in our city. 3. The engineer was asked to design a new device. 4. The expedition is expected to be organized next year. 5. The application of this device is unlikely to give better results. 6. They hoped to be sent on an expedition. 7. He proved to be an inventive engineer. 8. The student proved the theorem in a few minutes. 9. She is certain to come today. 10. My father seemed to be reading a magazine when I came. 11. They are unlikely to complete the experiment tomorrow.

Exercise 7. Переведите предложения с субъектным инфинитивным оборотом.

1. The engineer was expected to come in time. 2. He proved to be a good sportsman. 3. This event is said to have taken place recently. 4. Vitberg, a Russian architect, is known to have constructed many beautiful buildings. 5. The book seems to have been translated into many languages. 6. The device proved to be of a new type. 7. He seemed to be ill. 8. The professor is supposed to deliver a lecture tomorrow. 9. The conference is sure to have opened. 10. He is certain to study at the University.

Exercise 8. Переведите словосочетания с инфинитивом.

1. To do the work in time is ... 2. To do the work in time it is necessary... 3. The work to be done is ... 4. The work to do is ... 5. He wants to do the work ... 6. He is able to do the work... 7. They want the work to be done ... 8. The work is sure to be done ... 9. He was the first to do the work ... 10. The work is too hard to be done ... 11. He is reported to do the work ... 12. He must do the work ... 13. The work proved to be done ... 14. We saw him do the work ... 15. The work is easy enough to be done ...

ЛАТИНСКИЕ И АНГЛИЙСКИЕ СОКРАЩЕНИЯ

etc. *et cetera* - and so on
i.e. *id est* - that is
viz *videlicet* - namely
vs. - versus
via - through
e.g. *exempli gratia* - for example
vice versa - on the contrary
A.D. - anno domini
B.C. - before Christ
a.m. *ante meridium* - in the morning
p.m. *post meridium* - in the afternoon

C - Centigrade
F - Fahrenheit
no - number
p.(pp.) - page(s)
fig. - figure
in - inch
sq in - square inch
ft - foot (feet)
lb - libra
m - meter
g - gram

Exercise 9. Прочтите и переведите предложения.

1. The standard diskette size is 3.5 in. 2. I'll phone you at 5 p.m. 3. It was Dynamo vs. Spartak football match. 4. The heart of a computer is CPU, i.e. central processing unit. 5. He finished school No 22. 6. You can see the process shown in fig.12 p.96. 7. The temperature tomorrow will be 20ºC. 8. The Olympic Games started in 776 B.C. 9. Ben Nevis is 4,406 ft high. 10. We study mathematics, physics, informatics, etc.

ДВОЙНЫЕ СОЮЗЫ

both ... and	как ... так и (и...и)	*neither ... nor*	ни ... ни
either ... or	или ... или	*not only ... but also*	не только ... но и

НАРЕЧИЯ *too, enough*

Употребляются с прилагательными и наречиями противоположного значения: *too* - слишком, *not enough* - не достаточно.

Exercise 10. Переведите предложения.

1. Franklin is known both as a scientist and as a political leader. 2. They were either in the office or in the lab. 3. Neither he nor I know French. 4. She speaks not only English but also Japanese. 5. Both the calculation and the result processing will be finished in time. 6. I'll leave either tonight or tomorrow. 7. I could find him neither at home nor at work. 8. You can get to that place not only by bus but also by underground. 9. The electrical kettle was too hot to touch. 10. The electrical iron was not cool enough to touch. 11. This work is too dull for me. 12. The task is not interesting enough for me.

ИНТОНАЦИЯ

Основные компоненты интонации - фразовое ударение и тон.

Фразовое ударение в обычной речи не падает на личные, притяжательные и указательные местоимения, глаголы-связки, вспомогательные и модальные глаголы, артикли, предлоги, союзы и частицы.

I have 'come to 'Moscow to 'enter the 'Institute.

Путем членения простого предложения на отдельные смысловые группы выделяют группы: 1) подлежащего с зависимыми словами; 2) сказуемого с дополнением; 3) определения с определяемым словом; 4) обстоятельства в начале предложения. Выделяется два основных тона - восходящий (/) и нисходящий (\ ). Восходящий тон употребляется в общих вопросах и незаконченных в смысловом отношении синтагмах.

'Do you 'speak Russian?
At ten | he is 'always at work.
'Do you 'speak Russian or French?
These are a pen, a book and a box.
This 'old 'friend of mine | is a cook.
'Nick is a boss | and 'Ann's a clerk.
She is a pupil, isn't she?
As a rule, | I am at 'home at five.

Нисходящий тон используется в повествовательных предложениях, специ-альных вопросах, второй части альтернативных вопросов, первой части разделительных вопросов.

He 'goes to school.
'Do you 'study English or French?
'Where do you live?
You're a student, aren't you?

СОСТАВНЫЕ ПРЕДЛОГИ

according to *согласно*	in addition to *кроме*	instead of *вместо*
because of *из-за*	as far as *до*	on account of *вследствие*
by means of *посредством*	in order to *чтобы*	owing to *из-за, благодаря*
due to, thanks to *благодаря*	in spite of *несмотря на*	in front of *перед*

Exercise 11. Переведите предложения.

1. According to the information received by us the exhibition will open tomorrow. 2. We didn't do the task because of the lack of dictionaries. 3. All the calculations were made by means of computer. 4. He achieved good results due to his hard work. 5. He could not go to work in the North on account of his poor health. 6. In addition to the oral examination they are given a written test. 7. The bus stop is just in front of my house. 8. I went to the post office in order to send a telegram. 9. I went to the stadium in spite of the rain. 10. May I go there tomorrow instead of today? 11. He walked down the street as far as the bank.

UNIT 14. LESSON 2

Exercise 1. Прочтите предложения с правильной интонацией.

Com'puters can per'form 'different ope'rations.

Every day | my friend and I | study English | very hard.

Can computers count?

This is a computer and that is a printer.

The computer is digital.

I see a display, a keyboard and a printer.

At five, he is very busy.

As a rule, digital computers count.

It's a computer, isn't it?

Do computers count or measure?

Exercise 2. Переведите предложения со сложным подлежащим.

1. The lecture was said to be interesting. 2. The device is reported to have been tested at the research laboratory. 3. The calculation is known to be completed tomorrow. 4. The computer proved to calculate at a very high speed. 5. They seemed to be carrying on an interesting work. 6. The device appeared to be useful. 7. These data are likely to be stored in the memory. 8. They are unlikely to have been processed. 9. Automation is sure to be applied at different plants. 10. The machine-tool is supposed to be used in metallurgy.

Exercise 3. Переведите предложения со сложным дополнением.

1. I suppose her to become an engineer. 2. The engineer expected the work to be done in time. 3. We thought him to have taken part in the experimental work. 4. Everybody knows him to be writing a new program. 5. We know his discoveries to have produced great changes in this field of science. 6. Did you want the instructions to be changed? 7. They supposed this test to be carried out next week. 8. Every engineer considers electronic devices to play a great part in industrial control. 9. We saw the computer calculate the equation. 10. The professor made us do this complicated assignment.

Exercise 4. Переведите сочетания с инфинитивом.

I want the students to read, we expect him to come, he is expected to come, he wants the article to be translated, we watched the machine-tool work, we consider him to be a good engineer, he is considered to be a brilliant engineer, the speed is likely to change, he is sure to solve the problem, the report was supposed to be interesting, the scientist wanted the assistant to help, the data were reported to be processed, the scientist was reported to discover, the engineer considered the installation to be provided, the new design is expected to be developed, the spaceship is assumed to be a complicated mechanism.

Запомните следующие слова.

ACTIVE VOCABULARY

mark	[ma:k]	отмечать
switch-over	['switʃouvq]	переход, переключение
radical	['rxdʒkql]	коренной
management	['mxnʒdʒmqnt]	управление
principle	['prinsqpl]	принцип
base	[beis]	основывать
discovery	[dʒs'kʌvqri]	открытие
give off	['giv 'lf]	испускать
power	['pauq]	энергия
beam	[bʒm]	луч
source	[sls]	источник
stream	[strʒm]	стремиться
phototube	['foutotjʒb]	фотоэлемент
create	[krʒeit]	создавать
electricity	[ʒlek'trisʒtʒ]	электричество
cut off	['kʌt 'lf]	отрезать
break	[breik]	ломать
current	['kʌrqnt]	электрический ток
release	[rʒ'lʒs]	освобождать
counter	['kauntq]	счетчик
inspect	[ʒn'spekt]	осматривать, проверять
matter	['mxtq]	вещество, материя
conveyor	[kqn'veiq]	конвейер
proceed (from)	[prq'sʒd]	начинать, направляться
continue	[kqn'tinjʒ]	продолжать
check	[tʃek]	проверять
measure	['meʒq]	измерять
standard	['stxndqd]	стандарт, образец
reject	[rʒ'dʒekt]	браковать, отбрасывать
tolerance	['tolqrqns]	допуск

Exercise 5. Прочитайте и переведите интернациональные слова:

phototube, electricity, inspect, conveyor, standard, revolution, mark, radical, method, documentation, lecture, laboratory, assist, assistant, assistance, literature, recommend, central, centralize, identify, identification, manipulate, manipulator, manipulation.

Прочитайте текст и переведите его со словарем.

14A. THE ELECTRONIC EYE

Computers and automated production control systems are being widely used on an ever greater scale in industry. The present stage of development of the modern world is marked by the switch-over from the industrial revolution to radical changes in the methods of management.

A kind of automatic control is the electronic eye, which is often used to open and close doors. The principle of this mechanical control is based on discovery made by Herz in 1887. He found that certain kinds of metal give off electric power when a beam of light strikes them.

The door controlled by an electronic eye works like this. A source of light streams toward and strikes a phototube made of metal and glass. The light striking a phototube creates a constant source of electricity. When you walk through the beam of light, you cut it off from the mechanism and break the current.

By breaking the flow of electricity, you release a tiny switch connected with another electrical source, and another switch is tripped which swings the door open in front of you. All this happens in a fraction of a second.

Industry has many other uses for the electronic eye. The eye is the control for a mechanical counter. In soft-drink factories an electronic eye inspects bottles before they are packed in cases. If there is contaminating matter, like a speck of dirt, in the bottle the electronic eye sees it and a tripped switch dumps the bottle off the conveyer belt into a discard box.

Proceeding from the simple flyball governer to the electronic eye and automatic devices scientists continue to develop more and more complex automatic controls for even more complicated operations.

Automatic controls can operate many processes after the systems have been set up by human beings. An automatic machine for checking the lengths of steel tubes may be said to measure each piece by comparing it with a standard. It may reject all pieces outside given tolerances or it can represent in a code the length of each piece, within the limits of its accuracy.

Exercise 6. Прочтите следующие слова:

power, beam, light, strike, source, stream, cut, break, current, flow, tiny, switch, swing, counter, case, speck, dirt, discard, length.

Exercise 7. Найдите в тексте английский эквивалент.

В постоянно увеличивающемся масштабе, стадия отмечается, принцип основывается, следующим образом, отрезать от, вы освобождаете, все происходит, перед упаковкой в ящики, сбрасывать с конвейера, начиная, установлены человеком, измеряет сравнением, вне пределов допуска, отмечена переходом.

Exercise 8. Расставьте предложения в нужном порядке.

1. You walk through the beam of light. 2. A stream of light strikes a phototube. 3. A tiny switch is connected with another electrical source. 4. The door opens in front of you. 5. A source of light streams toward a phototube made of metal and glass. 6. You cut the stream of light off from the phototube. 7. Another switch is tripped. 8. The current is broken. 9. The light striking a phototube creates a constant source of electricity. 10. A tiny switch is released.

Exercise 9. Закончите предложения.

1. Automated production control systems are being used in ... . 2. The present stage of development is marked by ... . 3. The electronic eye is applied to ... . 4. The principle of this control is based on ... . 5. The door is controlled by ... . 6. A tiny switch is connected with ... . 7. Another switch is tripped to ... . 8. Bottles are packed in ... . 9. The systems have been set up by ... . 10. An automatic machine for checking the length measures each piece by ... .

Exercise 10. Ответьте на вопросы.

1. What is an electronic eye? 2. Where is the electronic eye used? 3. What is the principle of this mechanical control? 4. When was this phenomenon discovered? 5. What are some industrial applications for the electronic eye? 6. What function does the electronic eye perform in soft-drink factories? 7. In what cases can automatic controls operate many processes? 8. What does an automatic machine for checking the length of steel tube do? 9. What does this automatic machine do if pieces are outside given tolerance? 10. How is the present stage of development of the modern world marked?

Exercise 11. Прочитайте и переведите следующие сокращения:

etc.; i.e.; e.g.; vs; viz; via; no.; fig.; vice versa; A.D.; B.C.; a.m.; p.m.; m; mm; cm; km; g; kg; in; sq in; ft; lb; ^{o}C; ^{o}F.

Exercise 12. Переведите предложения с инфинитивными оборотами.

1. The electronic eye is known to be a kind of automatic control. 2. Herz found certain kinds of metal to give off electric power when a beam of light strikes them. 3. We know the electronic eye to be used as the control for mechanical counter. 4. Scientists are supposed to develop more complex automatic controls. 5. The complexity of operation is considered to call for the complexity of automatic controls. 6. An automatic machine may be said to measure by comparing with a standard. 7. The specialists regard computers to be widely used on an ever greater scale in industry. 8. We heard the present stage of development be marked by the switch-over to radical changes in management. 9. They watched the bottles be packed in cases. 10. The tiny switch connected with another electric source is likely to be released. 11. The door is certain to be opened in front of you. 12. The electronic eye is likely to control a machine counter. 13. You make the current break by cutting the beam of light from the phototube. 14. We know a beam of light to strike a phototube. 15. The process seemed to happen in a fraction of a second.

Exercise 13. Переведите предложения с двойными союзами и наречиями.

1. Digital computers are not only rapid but also exact. 2. Both machine-tools and transfer-machines are widely used in industry. 3. You can choose either this method of production or that one. 4. You can feed both data and instructions into the computer's memory. 5. Automatic controls are applied both in industry and in research. 6. Neither modern computers, nor up-to-date machine-tools can completely take place of men. 7. Automatic controls are not only widely used but also opening new prospects of automation. 8. Analog computers are used to either simulate physical processes, or process the necessary data. 9. Either this scientist or any other skilled specialist must do this work. 10. Not only general-purpose but also special-purpose computers can perform useful functions. 11. You can use neither computer, nor any other electronic device to calculate this equation. 12. Electronic computers would substitute neither human brains, nor human feelings. 13. The device was too heavy to lift. 14. The computer was not powerful enough to perform this program. 15. Is it too easy or not simple enough to become a skilled specialist in control engineering?

UNIT 14. LESSON 3

Read the text without a dictionary.

14B. CYBERNETICS

Variously described as the science of automatic control or the science for explanation of the functions of the human brain, cybernetics is more accurately a near-pantology of interdisciplinary character originally dealing with the problems of automatic control. Because of the complexity of such control the originators of the discipline turned to organisms capable of performing analogous functions and through scientific description of the activities of the organism attempted to derive the necessary mathematic formulation for their automata.

The word "cybernetics" originated from the Greek "kybernetike", the Latin "gubernator", the French "gouvernail" and the English "governor", all meaning, in one sense or another, "control". In 1834 French physicist Ampere used the word cybernetique in his Essay on the Philosophy of the Sciences to describe the study of the means of government. In the 50s Norbert Wiener at M.I.T. (the Massachusettes Institute of Technology) used the word to name his volume, which dealt with the activity of a group of scientists enganged in the solution of the wartime problem and some of the mathematical concepts involved.

Since the original work by Wiener's group the word has become associated with the solution of problems dealing with purposive activities for computers, necessitating consideration of providing computers with perception, synthesis, and flexibility of approach. Of such, the discipline must rely on the skills and knowledge of the practitioners of the exact sciences as well as life sciences such as biology, psychology, biochemistry and biophysics, neurophysiology, and anatomy.

The contribution of the life scientists to the progress of cybernetics consists of the evaluation, measurement, and description of the capabilities and of the structural and functional attributes of living organisms. Such studies involve the methods of communication, feedback and control in the living entity. Hence an important aspect of the work in cybernetics in the province of mathematicians deals with the mathematical theory of communication.

In terms of computer development, cybernetics is concerned with the design and construction of electrical or electronic analogs capable of performing processes carried out within living entity (including the selection and evaluation, as well as the storage of information) and resulting in appropriate activity based on the information in accordance with assigned purpose.

In terms of understanding the operation of the human nervous system cybernetics is expected to contribute new insight into a wide range of processes such as learning, discrimination, regulation, physiological and psychological malfunction, and the emotional behavior of individual human beings as well as societies. Specifically the problems of decision making, thinking and synthesis, imagination and creative endeavor of people come under the scrutiny of cyberneticists.

It is anticipated that the future developments of automated industries and societal functions will be based on the theorems developed from cybernetics which thus far has made significant contributions to the technology of guided missiles, business and scientific computer applications, active prosthetics, communications, and automatic control.

COMPREHENSION TEST

I. Complete the sentences.

1. Cybernetics is the science of automatic …
2. Cybernetics is the science for explanation of the functions of …
3. Cybernetics is of interdicsiplinary character originally dealing with …
4. The word 'cybernetics' originated from the …
5. The word is associated with the solution of problems concerning …
6. Life studies involve the methods of …
7. In terms of computer science, cybernetics is concerned with …
8. In terms of human nervous system, cybernetics is expected to contribute …
9. The future developments of automated industries will be based on …

II. Find the answers to the following questions.

1. How was cybernetics described?
2. What did the word 'cybernetics' originate from?
3. What does it literary mean?
4. Who introduced this word in the modern dictionaries?
5. When and where was it done?
6. What is this word associated with? Why?
7. What contribution did the life scientists make into cybernetics?
8. What is cybernetics concerned with in terms of computer development?
9. What does cybernetics do in terms of life sciences?
10. What will the future development of automation be based on?

Translate the text into English. Entitle the text.

TEXT 14C

Компьютеры и системы управления автоматизированным производством широко используются в промышленности. Современная стадия развития отмечена переходом от промышленной революции к радикальным изменениям в методах управления.

Один из видов автоматического управления - это электронный глаз. Он часто используется для открывания и закрывания дверей.

Промышленность имеет множество других использований электронного глаза. Он широко применяется во всех сферах производства.

Ученые продолжают разрабатывать все более сложные системы автоматического управления для выполнения все более сложных операций.

Чем сложнее процесс, тем изобретательнее должно быть устройство управления. Это означает, что сложность операции вызывает сложность автоматического устройства управления.

14D. COMPUTERS IN DESIGN ENGINEERING

Design engineering has been variously described as a science, an art, and a profession. It has been acknowledged to require creativity, knowledge, skill, inspiration, experience, and talent. It has also been acknowledged to require a lot of plain hard work.

Fifty years ago, a new force appeared on the engineer's horizon, the computer. Like any new concept it was at first shunned by some and welcomed openly by others. Over that half a century engineers have taken the lead in pushing back the boundaries of computer knowledge and computer usefulness, and gradually the computer has become an accepted tool in most circles, and in some a precision instrument for the extension of the engineer's own talent. With the speed, accuracy and marvelous capacity for work of the computer some pioneering engineers in various parts of the world have used the computer effectively, even brilliantly, in their design engineering profession.

By extrapolating from the present role of the computer in design engineering, an estimate of the future role can be developed. This extrapolation of use, coupled with new hardware development and the pioneering efforts of various corporations, universities, and individual engineers throughout the world, points towards an increasingly close man-machine relationship between the design engineer and the computer.

The engineering computer of our time is able to communicate automatically with other computers in remote location. Devices are available today that let computers "talk" to one another over telephone lines. Some 50 years ago it was difficult to imagine that in the future the computer in the Californian plant of a large company might recognize that information requested of it was contained in the memory of the computer in the New York plant, automaticaly call up the New York location, request the information, receive it, and relay it to the waiting engineer in a matter of seconds.

This same concept was extended to allow a computer in an engineering firm to call up a computer at the State Library and request a formula, some statistics, an article, a drawing, a picture, or even a complete book.

I. Translate the text using the dictionary.
II. Give the main idea in 2-3 sentences.
III. Make up a short plan of the text.

LISTENING COMPREHENSION. TEXT 14E

Listen to the text and decide what order appears in the text.

1. Recent progress with automation falls into three well-defined streams: 1) the use of electronic computers in automatic control and in the processing of information; 2) the mechanization of manufacturing operations on components, of handling between processes, and of simple assemblies; 3) automatic control of processes.

2. Control may be simply 1) mechanical, 2) computerized or 3) automatical.

I. Give the main idea of the text.
II. Render the text into Russian.
III. Retell the text.

Appendix 1

СПРАВОЧНЫЙ ГРАММАТИЧЕСКИЙ МАТЕРИАЛ

ОСОБЕННОСТИ ПЕРЕВОДА СТРАДАТЕЛЬНОГО ЗАЛОГА (с.34) : БЕССОЮЗНЫЕ ПРИДАТОЧНЫЕ ПРЕДЛОЖЕНИЯ (с.74) :

Глаголы, после которых требуется предлог:

to act on *действовать на*
to deal with *иметь дело с*
to depend on *зависеть от*
to hear of *слышать о*
to look at *смотреть на*
to refer to *ссылаться на*
to rely on *полагаться на*
to send for *посылать за*
to speak about *говорить о*
to work at *работать над*

Глаголы, после которых в русском языке предлог не требуется:

to listen to *слушать* ....
to wait for *ждать* ...

Глаголы, после которых в английском языке предлог не требуется:

to answer *отвечать на*
to influence *влиять на*
to address *обращаться к*
to join *присоединяться к*
to follow *следовать за*

СУБЪЕКТНЫЙ ПРИЧАСТНЫЙ ОБОРОТ (с.130) :

is said *говорят*
is known *известно*
is supposed *предполагается*
is considered *считается*
is found *обнаружено*
is believed *полагают*
is assumed *допускается*
is mentioned *упоминается*
is thought *думают*
is stated *констатируют*
is seen *видят*
is heard *слышат*

ОБЪЕКТНЫЙ ПРИЧАСТНЫЙ ОБОРОТ (с.130) :

Глаголы ментального восприятия:

to want *хотеть, нуждаться*
to wish, to desire *желать*
to suppose *предполагать*
to assume *допускать*
to consider *считать*
to think *думать*
to expect *ожидать*
to believe *считать*
to understand *понимать*
to know *знать*
to find *находить*
to claim *утверждать*
to state *констатировать*
to allow, to permit *позволять*
to order, to command *приказывать*
to enable *давать возможность*

Глаголы чувственного восприятия:

to feel *чувствовать*
to see *видеть*
to hear *слышать*
to watch *наблюдать*
to observe *наблюдать*
to notice *замечать*

ОБЪЕКТНЫЙ ИНФИНИТИВНЫЙ ОБОРОТ (с.186) :

Глаголы предположения, желания, приказания, разрешения:

to want *хотеть, нуждаться*
to wish, to desire *желать*
should like *хотел бы*
to suppose *предполагать*
to assume *допускать*
to consider *считать*
to think *думать*
to expect *ожидать*
to believe *считать*
to prove *доказывать*
to understand *понимать*
to know *знать*
to note *отмечать*
to find *находить*
to claim *утверждать*
to state *констатировать*
to allow, to permit *позволять*
to order, to command *приказывать*
to enable *давать возможность*
to force *вынуждать*

Глаголы чувственного восприятия:

to feel *чувствовать*
to see *видеть*
to hear *слышать*
to watch *наблюдать*
to observe *наблюдать*
to notice *замечать*

Глаголы разрешения, просьбы, побуждения:

to make *заставлять*
to cause *заставлять*
to have *просить*
to let *позволять, разрешать*

СУБЪЕКТНЫЙ ИНФИНИТИВНЫЙ ОБОРОТ (с.186) :

Глаголы в Passive:

is said *говорят*
is known *известно*
is supposed *предполагается*
is considered *считается*
is reported *сообщается*
is expected *ожидается*
is found *обнаружено*
is believed *полагают*
is assumed *допускается*
is mentioned *упоминается*
is thought *думают*
is stated *констатируют*
is noted *отмечается*
is claimed *утверждается*
is seen *видят*
is heard *слышат*

Глаголы в Active:

to seem, to appear *казаться*
to prove, to turn out *оказываться*
to happen, to chance *случайно оказаться*

СОСЛАГАТЕЛЬНОЕ НАКЛОНЕНИЕ (с.104)

Безличные обороты:

It is necessary *необходимо, чтобы*
It is important *важно, чтобы*
It is essential *очень важно, чтобы*
It is desirable *желательно, чтобы*
It is possible *возможно, что*
It is improbable *маловероятно, что*
It is suggested *предполагается, что*
It is proposed *предполагается, чтобы*
It is required *требуется, чтобы*
It is demanded *требуется, чтобы*
It is requested *требуется, чтобы*
It is ordered *необходимо, чтобы*

Глаголы волеизъявления:

suggest *предполагать, предлагать*
propose *предлагать*
desire *желать*
order *приказывать*
insist *настаивать*
require, demand *требовать*

Appendix 2

ADDITIONAL VOCABULARY

achieve	[ə'tʃi:v]	достигать
act on	['ækt 'ɔn]	действовать на
advantage	[əd'vɑ:ntɪdʒ]	преимущество
affect	[ə'fekt]	воздействовать
aid	[eid]	помогать; помощь
associate	[ə'səuʃieit]	соединять, связывать
approach	[ə'prəutʃ]	подход; приближаться
calculus	['kælkjuləs]	исчисление
cause	[kɔ:z]	причина; вызывать
common	['kɔmən]	общий
configuration	[kən,figju'reiʃn]	форма, конфигурация
consider	[kən'sidə]	считать, полагать
considerable	[kən'sidərəbl]	значительный
course	[kɔ:s]	курс, ход, течение
determine	[dɪ'tɜ:mɪn]	определять
devise	[dɪ'vaiz]	придумывать, изобретать
direct	[dɪ'rekt]	прямой, непосредственный
disadvantage	[dɪsəd'vɑ:ntɪdʒ]	недостаток
distinguish	[dɪs'tiŋgwɪʃ]	различать, отличать
distribute	[dɪs'tribjʉt]	распределять
drive	[draiv]	приводить в движение
durable	['djuərəbl]	длительный
education	[,edjʉ'keiʃn]	образование
effect	[ɪ'fekt]	влиять; влияние
electron tube	[ɪ'lektrɔn 'tjʉb]	электронная трубка
environment	[ɪn'vaiərənmənt]	окружающая среда
estimate	['estɪmeit]	оценивать
examine	[ɪg'zæmɪn]	исследовать
exercise	['eksəsaiz]	выполнять
exhibition	[,eksɪ'biʃn]	выставка
expand	[ɪks'pænd]	расширять
experience	[ɪks'piəriəns]	жизненный опыт
experiment	[ɪks'perɪmənt]	опыт, эксперимент
explain	[ɪks'plein]	объяснять
exploration	[,eksplɔ'reiʃn]	исследование
generate	['dʒenəreit]	производить
feature	['fi:tʃə]	характерная черта, особенность
individual	[,indɪ'vidjuəl]	отдельный, особенный
invent	[ɪn'vent]	изобретать

knowledge	[ˈnɔlidʒ]	знание
law	[lɔ:]	закон
locate	[ləuˈkeit]	размещать
manner	[ˈmænə]	образ, способ, манера
miniaturization	[ˌminjətʃəraiˈzeiʃn]	миниатюризация
modify	[ˈmɔdifai]	видоизменять
module	[ˈmɔdju:l]	модуль
observe	[əbˈzə:v]	наблюдать
occur	[əˈkə:]	происходить
opportunity	[ˌɔpəˈtju:niti]	возможность
overcome	[ˌəuvəˈkʌm]	преодолевать
phenomenon(a)	[fiˈnɔminən] ([nə])	явление (я)
place	[pleis]	помещать
plate	[pleit]	плата, пластина
possess	[pəˈzes]	владеть, обладать
prepare	[priˈpɛə]	готовить
property	[ˈprɔpəti]	свойство
provide	[prəˈvaid]	снабжать, обеспечивать
qualify	[ˈkwɔlifai]	квалифицировать
react	[riˈækt]	реагировать
realize	[ˈriəlaiz]	понимать; осуществлять
receive	[riˈsi:v]	получать, принимать
reduce	[riˈdju:s]	уменьшать
reflect	[riˈflekt]	отражать
replace	[riˈpleis]	замещать
research	[riˈsə:tʃ]	исследование
screen	[skri:n]	экран
semiconductor	[ˈsemikənˈdʌktə]	полупроводник
shape	[ʃeip]	форма
slow	[sləu]	медленный
solid	[ˈsɔlid]	твердый
state	[steit]	состояние
structure	[ˈstrʌktʃə]	структура
study	[ˈstʌdi]	изучать; изучение
succeed in	[səkˈsi:diˈin]	достигать цели
success	[səkˈses]	успех
sufficient	[səˈfiʃənt]	достаточный
suggest	[səˈdʒest]	предполагать
support	[səˈpɔ:t]	поддерживать
wave	[weiv]	волна
work out	[ˈwə:kˈaut]	разрабатывать

Appendix 3

IRREGULAR VERBS

Part 1

1	cut	cut	cut	резать
2	let	let	let	позволять, давать
3	put	put	put	класть
4	spread	spread	spread	распространяться
5	bring	brought	brought	приносить
6	buy	bought	bought	покупать
7	fight	fought	fought	бороться
8	think	thought	thought	думать
9	catch	caught	caught	ловить, поймать
10	teach	taught	taught	обучать
11	build	built	built	строить
12	send	sent	sent	отправлять
13	spend	spent	spent	тратить
14	feed	fed	fed	питать
15	hold	held	held	проводить, держать
16	lead	led	led	вести
17	meet	met	met	встречать
18	read	read	read	читать
19	say	said	said	говорить, сказать
20	feel	felt	felt	чувствовать
21	keep	kept	kept	хранить
22	leave	left	left	покидать
23	mean	meant	meant	обозначать
24	sleep	slept	slept	спать
25	find	found	found	находить
26	wind	wound	wound	заводить (механизм)
27	sell	sold	sold	продавать
28	tell	told	told	рассказывать
29	lay	laid	laid	класть
30	pay	paid	paid	платить
31	get	got	got	получать
32	have	had	had	иметь
33	hear	heard	heard	слышать
34	light	lit	lit	зажигать, освещать

IRREGULAR VERBS

Part 2

1	lose	lost	lost	терять
2	make	made	made	делать
3	stand	stood	stood	стоять
4	strike	struck	struck	ударять
5	win	won	won	выигрывать, добиваться
6	break	broke	broken	ломать
7	choose	chose	chosen	выбирать
8	speak	spoke	spoken	говорить
9	drive	drove	driven	приводить в движение
10	write	wrote	written	писать
11	rise	rose	risen	подниматься
12	shake	shook	shaken	трясти
13	take	took	taken	брать, взять
14	forget	forgot	forgotten	забывать
15	eat	ate	eaten	есть
16	fall	fell	fallen	падать
17	become	became	become	становиться
18	come	came	come	приходить
19	begin	began	begun	начинать
20	drink	drank	drunk	пить
21	ring	rang	rung	звонить
22	sing	sang	sung	петь
23	swim	swam	swum	плавать
24	run	ran	run	бегать, работать (о машине)
25	fly	flew	flown	лететь
26	grow	grew	grown	расти
27	throw	threw	thrown	бросать
28	know	knew	known	знать
29	show	showed	shown	показывать
30	be	was, were	been	быть, находиться
31	see	saw	seen	видеть
32	do	did	done	делать
33	go	went	gone	идти, ехать

Appendix 4

АНГЛИЙСКАЯ ТРАНСЛИТЕРАЦИЯ РУССКОГО АЛФАВИТА

А – a	Е – e	Й – i	О – o	У – u	Ш – sh	Э - e
Б – b	Е – yo	К – k	П – p	Ф – f	Щ – shch	Ю - yu
В – v	Ж – zh	Л – l	Р – r	Х – kh	Ъ - "	Я - ya
Г – g	З – z	М – m	С – s	Ц – ts	Ы - y	
Д – d	И – i	Н – n	Т – t	Ч – ch	Ь - '	

ТАБЛИЦА ПРЕФИКСОВ ДЛЯ ОБРАЗОВАНИЯ ДОЛЬНЫХ И КРАТНЫХ ЕДИНИЦ

factor	*prefix*	*symbol*		*factor*	*prefix*	*symbol*	
10^{12}	tera	T	Т	10^{-2}	centi	c	с
10^{9}	giga	G	Г	10^{-3}	milli	m	м
10^{6}	mega	M	М	10^{-6}	micro	µ	мк
10^{3}	kilo	k	к	10^{-9}	nano	n	н
10^{2}	hecto	h	г	10^{-12}	pico	p	п
10^{1}	deca	da	да	10^{-15}	femto	f	ф
10^{-1}	deci	d	д	10^{-18}	atto	a	а
множитель	*префикс*	*обозначение*		*множитель*	*префикс*	*обозначение*	

МЕРЫ ВЕСА

1 ounce (Oz.) = 8.3 gram
1 pound (Lb.) = 454 gram
1 gram = .35 oz.
1 kilogram = .2 lb.
1 tonne = 204.6 lb.

МЕРЫ ДЛИНЫ

inch (In.) = .54 cm
foot (Ft.) = 30.5 cm
yard = 91 cm
mile = 609 m
centimetre = .39 in.
metre = 3.28 ft.
kilometre = .6 mile

CREDIT TEXT TRANSLATION

1st Term

Translate the texts into English using the dictionary.

1

Автоматика, как и вся наука в целом, неразрывно связана с техническим прогрессом. Значительный прогресс был достигнут в развитии математической логики, теории информации и программирования. Все это было очень важно для современной революции в вычислительной технике. Но и без привлечения вычислительной науки развитие новой техники было бы невозможно.

Начавшееся в 50-х бурное развитие физики твердого тела было связано с крупными достижениями полупроводниковой промышленности, т.е. созданием электронных элементов (транзисторов), которые заменили электронные лампы в ЭВМ второго поколения.

Развитие исследований в области физики твердого тела произвело переворот в радиоэлектронной промышленности, где в середине века совершился переход от вакуумных приборов к твердотельным.

Первые ЭВМ на электронных лампах были громоздкими, не очень надежными и потребляли много энергии. Они могли выполнять не больше, чем несколько тысяч операций в секунду и применялись главным образом в качестве быстродействующих арифмометров.

Использование микроэлектронных схем дало возможность повысить быстродействие машин до нескольких миллионов операций в секунду.

2

В начале 60-х годов инженеры-электронщики получили возможность монтировать несколько электронных деталей, т.е. транзисторов или других полупроводниковых элементов на одном блоке из кремния. Так были созданы интегральные схемы. С течением времени электронные схемы становились все более и более "интегральными". Появилась возможность на один блок из кремния устанавливать все возрастающее количество электронных компонентов. Микроэлектроника стала основой создания сверхмощных вычислительных систем.

Первая ЭВМ была тридцатитонным "монстром" на восемнадцати тысячах электронных ламп. Микро-ЭВМ, созданная на одном кристалле кремния, способна выполнять миллионы вычислений в секунду, что в тысячи раз больше, чем мог дать старый "монстр".

Появился микропроцессор, и тут же специалисты стали использовать его для самых различных целей. Легче, пожалуй, перечислить области, где пока еще не пробуют его использовать.

В самом деле, перспектива создать любое устройство, любую машину, оснастить их кристаллом, способным управлять этим устройством или машиной, - это весьма заманчивая перспектива. Причем вполне реальная.

CREDIT TEXT TRANSLATION

2nd Term

Translate the texts into English using the dictionary.

1

Так называемый "электронный глаз" представляет из себя датчик контроля и, соответственно, используется в качестве контролирующего органа различных систем. Например, наиболее часто мы с ним встречаемся при проходе через турникеты метро, заводских проходных и пассажирских шлюзов аэропорта.

Рассмотрим принцип действия "электронного глаза" на примере счетного устройства, применяемого на различных производствах. На транспортерной ленте конвейера двигаются изделия. При движении, вне зависимости от скорости, они пересекают узко сфокусированный на фотоэлементе луч света, при этом элетрический ток, проходящий через фотодиод, перестает поступать на электронную схему самого счетного устройства. Таким образом, электронная схема фиксирует прерывание луча, которое обозначает прохождение изделия. Затем полученная информация передается на компьютер.

Пожалуй, трудно назвать отрасль человеческой деятельности, где бы сейчас не использовался принцип "электронного глаза". Столь широкое применение фотоэлементов обусловлено чрезвычайной надежностью, простотой конструкции и низкой стоимостью при производстве.

2

Датчик контроля, известный как "электронный глаз", широко применяется как контролирующий орган различных систем. Очень часто с ним можно столкнуться в метро, проходных, аэропортах, где он используется при прохождении через пропускные системы.

Рассмотрим принцип действия "электронного глаза" на примере системы безопасности газовой печи. При нормальном горении факел газовой горелки имеет определенную форму и цвет пламени, что фиксируется фотодатчиком системы контроля пламени. При каких-либо изменениях факела горелки фотодатчик не пропускает через себя электрический ток, идущий на электронную схему пульта системы безопасности. В этом случае пульт дает команду электромагнитному клапану, стоящему на газопроводе, закрыться и отсечь газ от горелок.

Несмотря на очень хорошие технологические качества фотоэлементов, они имеют один серьезный недостаток. Чувствительная поверхность фотоэлементов требует высокую чистоту, так как частицы пыли, сажи и дым резко отрицательно действуют на чувствительность элемента, что, в свою очередь приводит к сбоям в системе, где они установлены.