



**Некоммерческое  
акционерное  
общество**

**АЛМАТИНСКИЙ  
УНИВЕРСИТЕТ  
ЭНЕРГЕТИКИ И  
СВЯЗИ**

Кафедра  
иностранных языков

**ПРОФЕССИОНАЛЬНО-ОРИЕНТИРОВАННЫЙ  
АНГЛИЙСКИЙ ЯЗЫК**

Методические указания  
Practical English for special purposes for students in informatics  
для специальности 5В060200

Алматы 2014

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Данные методические указания предназначены для улучшения умений, навыков чтения и перевода профессионально ориентированных текстов у студентов 2 курса по специальности 5B060200. Цель методических указаний - ознакомить студентов с терминологией на английском языке по специальности, а также облегчить понимание технических текстов с помощью различных видов тренировочных заданий.

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Печатается по плану издания некоммерческого акционерного общества «Алматинский университет энергетики и связи» на 2014 г.

НАО «Алматинский университет энергетики и связи», 2014 г.

## **1 Computer systems**

What is a computer? The electronic system of a computer is very complex.

Computers can be divided into three types, depending on their size and power: mainframe computers, minicomputers and microcomputers.

Mainframe computers are the largest and most powerful. They can handle large amounts of information. They usually fill a whole room and are sometimes referred to as computer installation. They are found in large installations and government departments.

Minicomputers are the smaller and less powerful than mainframes. They are about the size of an office desk and usually found in offices and banks.

Microcomputers are the smallest and the least powerful. They are about the size of a typewriter. For example, the NC – 300 is very small in size and weighs 25 kg, is resistant to temperature fluctuations, does not require special ventilation, is reliable and easy to operate.

The field of application of the microcomputer is vast. It can be used in many fields of science and engineering. They are ideal for use as home computers and are used in education and business. They can handle smaller amounts of information at a time and are slower than the other two types.

There are many hardware pieces in a computer system. Some are: the system board, power supply, keyboard, mouse, hard disc, monitor. The pieces of equipment making up the computer system are known as hardware.

Information in the form of programs and data is called software. Software means the program needed to operate computer equipment.

The most important item of hardware is the central processing unit (CPU). The processor is the brain and heart of the computer. It does all the processing and controls all the other devices in the computer system.

The main memory is the part of the computer of the computer where programs and data being used by the processor can be stored.

Input and output devices capable of putting into a computer and getting it out of it are types of peripheral equipment. The simplest and the most common type of input device is a keyboard.

You communicate with your computer with the keyboard. With it, you type instructions and commands for the computer and information to be processed and stored. Many of the keys on the keyboard are like those on a typewriter; letter keys, punctuation keys, shift keys, tab, and the spacebar. Your keyboard also has many specialized keys.

The instruction manuals for most software applications contain a section describing the functions of each key or combination of keys.

The mouse works by sliding it around on a flat surface. The mouse does not work if you hold it in the air like a remote control! The desktop is fine, but a ready-made mouse pad is the best surface to roll the mouse on. Its surface is flat and usually somewhat textured. If a surface is too smooth or rough, the ball inside can slip. As you glide the mouse, the ball inside moves in the direction of your movement. You will see the arrow on your screen moving in unison. The arrow is

called a pointer, and the most important part is the very tip of its point. That's the only part the computer pays attention to. To use the mouse, slide it on the mouse pad until the pointer's point is on something, like a button or an icon.

The most commonly used output device is known as a monitor or VDU (Visual Display Unit). Your computer is not complete without the monitor, a TV-like device that usually sits on the top of the computer. The monitor displays text characters and graphics. It allows you to see the results of the work going on inside your system unit. The image that you see is made up of tiny dots called pixels. The sharpness of the picture depends on the number and size of these pixels. The more pixels, the sharper the image. This is called resolution.

**Vocabulary:**

- to divide – делить, разделять
- temperature fluctuations – температурные колебания
- to apply – применять, использовать
- hardware – аппаратура, аппаратное оборудование
- software – программное обеспечение
- data – данные, факты
- reliable – надежный
- to install – вводить, устанавливать

**1.1 Answer the questions based on the information found in the reading or on your own experience**

1. What is this text about?
2. What is the largest type of a computer?
3. What computers are commonly called as microcomputers?
4. What is the processor?
5. What is a monitor?
6. What is the most common input device?
7. What is the most common output device?

**1.2 Complete the table using information from the text**

	Size	Power	Memory	Use	Cost
Mainframe					
Minicomputer					
Microcomputer					

**You can compare the types of computers according to these examples**  
 The microcomputer is smaller than.....

The minicomputer is used in office, but .....

### 1.3 Explain these terms

Main memory; input and output devices; processor; monitor; printer; CD ROM; mouse.

### 1.4 Match these words (A) from the text to the definitions (B)

- | A                 | B   |
|-------------------|---|
| 1. processor      | 1. It displays the processed data                             |
| 2. memory         | 2. It holds the programs and data being used by the processor |
| 3. storage device | 3. It is used for the permanent                               |
| 4. input device   | 4. It is enables information to be fed into the computer      |
| 5. output device  | 5. It is the brain of computer                                |

### 1.5 Complete the table

Disk		
	Hard disc	Floppy disc
Advantages		
Disadvantages		

### 1.6 Put the questions to these answers

1. \_\_\_\_\_  
Computer can be divided into three main types, depending on their size and power.
2. \_\_\_\_\_  
Monitor is the electronic unit at the center of the computer system.
3. \_\_\_\_\_  
Peripherals include input and output devices.
4. \_\_\_\_\_  
A laser printer is a kind of output device to print information.
5. \_\_\_\_\_
6. \_\_\_\_\_  
A Laptop is a portable computer weighing about 2-4 kg.

Graphics are pictures and symbols a computer program can produce.

### **1.7 Complete the following word combinations**

- |                   |                   |
|-------------------|-------------------|
| 1. data .....     | 7. laser .....    |
| 2. .... ROM       | 8. .... - mail    |
| 3. hard .....     | 9. mini .....     |
| 4. floppy .....   | 10. output .....  |
| 5. input .....    | 11. .... computer |
| 6. .... processor | 12. .... unit     |

## **2 Software systems**

Programs, often called applications programs or software are series of instructions written in computer languages. These instructions are stored in files and tell your computer to perform a task.

Specialized programs, which enable the computer to be used for particular purposes are called applications programs. There are different types of applications program: database program, word processor and spreadsheet programs.

The programs, which control the basic function of a computer system, are called as system programs. They include the operating system, service programs, language translators and database systems.

The operating system is the most important type of software. The operating system is like a translator between you and your computer. It consist of a group of programs, which allow you communicate with your computer, your disk drivers and your printer, letting you use these resources to your advantage. It also helps you to manage programs and data. The operating system is usually supplied by the computer manufacturer.

We know some common operating systems: MS DOS, UNIX, CPIM, VME.

A database system is a set of systems programs, which allow the data from a database to be used by a number of different applications programs.

Language translator's function is to translate programs written in various computer languages into machine code. They also perform functions such a giving error messages. Language Translators include assemblers, compilers and interpreters.

Word processing programs are used for the preparation and editing of letters and other documents. The text is keyed in using the keyboard and displayed on the monitor and stored in the computer's memory. This allows the text to be edited before it is printed out into paper in its final form. Various editing facilities are also available.

Spreadsheet programs are used in business for financial planning. This type of program displays information in the form of a table or array. Each column of the

array is labeled with a letter and each row is labeled with a number. Where a column and row intersect is known as a cell.

Vocabulary:

application – применение

instruction – инструкция

to let – позволять, разрешать

to supply – снабжать, поставлять

various facilities – различные возможности

to edit – редактировать

language translator – переводчик

computer manufacturer – производитель компьютеров

to exist – существовать

### **2.1 Answer the questions based on the information found in the reading of on your own experience or thinking**

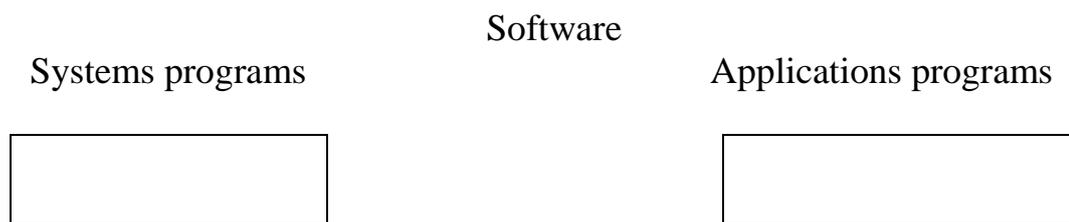
1. What type of application program is used for financial planning?
2. What is MS DOS?
3. Which program is used for the creation and manipulation of texts?
4. What is a database system? ?
5. Which program translates computer languages into machine code?

### **2.2 Find in the text definitions of the terms you find to be the most important for you**

### **2.3 Link each statement in column (A) with a purpose from column (B)**

- | A                                | B  |
|----------------------------------|--|
| 1. Applications programs letters | 1. Is used for preparation and editing of and other documents.   |
| 2. A word processor you          | 2. A set of systems programs which allow to store, look at or change a large quantity of information quickly and easily. |
| 3. A database system             | 3. Is used for particular purposes.  |
| 4. Graphics                      | 4. Are pictures and symbols a computer program can produce.  |

**2.4 Work in pairs. Read the text and complete this diagram using the correct terms**



**2.5 Pair work. Complete the table**

	Disadvantages	Advantages
Manual filing system		
Computer database		

**2.6 Speak about**

1. The application of computer systems in everyday life.
2. New developments in computer systems.

**2.7 Find out sentences with comparison degrees of adjectives**

### **3 Analogue and Digital Computers**

An analog computer is a device that simulates the behavior of another system, usually a physical system, in all its states. A very simple and widely used analogue computer is the slide-rule on which distances are equivalent to logarithms of numbers. The devices known as analogue computers are assemblies of electronic or electrical circuits the behavior of which is analogous to another (mechanical) system's behavior. The digital computer differs from the analogue computer in that it deals with numbers and not physical quantities. The simplest digital computer is the human hand, from which the decimal system is derived. The first man-made digital computers were probably the abacus, which is still used in many countries.

The evolution of the adding machine has culminated in electronic digital computers in which electronic signals are used as the operative discrete signals. When an ordinary desk calculating machine is used, the operator controls the sequence of operations. He supplies the input data and records the results. Also he may have to provide additional information from tables and other sources during

the calculation. In the case of electronic computers, working at extremely high speeds, the human operators are replaced by automatic devices. It is necessary, however, to provide a store to hold both the numbers that are fed into the computer and the operating instruction.

The basic sections of digital computers are therefore:

Input: receives the “raw data” and instructions from external sources and converts them into a suitable form for the computer to work on.

Store: memorizes numbers and instructions.

Calculator: does mathematical operations.

Control: initiates and follows the sequence of operations.

Output: presents the result of the calculations in an acceptable form.

Vocabulary:

analog and digital computers – моделирующие (аналоговые) и цифровые вычислительные машины

device – прибор, устройство

to simulate – моделировать

behavior – поведение, режим

assemblies – узлы

circuit – цепь

analogous – аналогичный, сходный

quantity – количество

to differ – отличаться

decimal – десятичная

to deal with – иметь дело с

to derive – происходить от, получать

abacus – счёты

to supply – снабжать, обеспечивать

### **3.1 Read and translate the word-combinations**

Analog computers, digital computers, mechanical system, decimal system, physical quantities, electronic signals, the operative discrete signals, desk calculating machine, the sequence of operations, the input data, extremely high speed, the basic sections, external sources.

### **3.2 Words for activation**

analog, digital, to simulate, slide-rule, logarithms, assemblies, decimal, abacus, evolution, discrete, input, output, calculation, calculator, sequence, “raw data”, to derive, to deal with, to culminate, to supply.

### **3.3 Questions**

1. What is an analog computer?

2. Can analogue computers be described as assemblies of electronic or electrical circuits?
3. What is the difference between the digital computer and the analog one?
4. Was the abacus the first man-made digital computer?
5. Has the evolution of the adding machine culminated in the creation of electronic digital computers?
6. Are electronic signals used in digital computers as the operative discrete signals?
7. What's the task of the operator when using an ordinary desk calculating machine?
8. How many sections does the computer consist of?

### **3.4 Give English equivalents for the words in brackets**

1. Electronic (цифровые) computers are used in many countries.
2. The (счёты) was the first (искусственный) digital computer.
3. In digital computers electronic signals are used as the (дискретные, отдельные) signals.
4. An operator supplies the computer with the (входными данными) and (записывает) the results.
5. A human operator is replaced by (автоматическими приборами).
6. The (сырьё) and instructions for the computer are supplied by the input.
7. The (накопитель) (запоминает) numbers and instructions.
8. The (расчётчик, вычислитель) does mathematical operations.

### **3.5 Say if the following statements are true or false**

1. An analogue computer is a device that simulates ...
  - a) the behavior of another system
  - b) does not simulate the behavior of another system
  - c) the slide-rule
2. Analog computers are ....
  - a) assemblies of electrical circuits
  - b) assemblies of electronical and electrical circuits
3. The digital computer ...
  - a) differs from the analog computer
  - b) is alike the analog computer
4. The digital computer deals with ...
  - a) numbers
  - b) physical quantities
5. The operator controls ...
  - a) the sequence of operations
  - b) the input data

6. Automatic devices ...
- a) can replace the human operators
  - b) cannot replace the human operators
7. The digital computers have ...
- a) 4 basic sections
  - b) 5 basic sections

### **3.6 Find out sentences with The Perfect tense**

### **3.7 Retell the text**

## **4 Computer machines**

What is a computer? The electronic system of a computer is very complex. Its electronic brains produce information. It is a complex instrument made up of hundreds of electronic devices, miles of electronic wire. At a panel desk connected to the instrument, an operator feeds facts, figures, and symbols into the machine, to be stored on magnetic tape or punched cards. More than 100,000 pieces of information can be stored in one machine, and when the operator wants answers, he asks the machine in a special language to process the information taken from storage, and for solving the problem. How long did it take you to multiply the large numbers? In one third of a second a computer can multiply two 127 - digit numbers.

In one whole second, it can add 4,000 five-digit numbers; in two seconds it can complete 320 long – division problems. The same machine does the work of thousands of trained mathematicians in any given time period, and without the mistakes which human beings are bound to make. The machine can flash its answers on a screen, can print them on paper, and store them away on magnet tapes or cards. The electronic machine can give any answer or combination of possible answers, from the information fed to it for storage.

But ... it is human beings who do the thinking, who feed information to the machines which help us to find answers and produce facts faster and more accurately. Machines work for us, but they do not think for us.

Vocabulary:

brain – мозг

to store – запасать

storage – хранение, склад, хранилище

tape – лента

card – карта, карточка

digit – цифра, однозначное число

long-division – долгое деление

are bound to make – обычно делают  
panel desk – щит, пульт управления  
to process – обрабатывать  
punched cards - перфокарты

#### **4.1 Read and translate the word-combinations**

electronic system, electronic devices, panel desk, magnetic type magnetic card, digit numbers, long-division problems, human beings, automatic controls.

#### **4.2 Words for activation**

to store, storage, to train, to flash, to print, tape, card, channel desk, digit, brain, digit numbers, to feed, symbols, to multiply, to process

#### **4.3 Questions**

1. Is the electronic system of a computer very complex?
2. What do its electronic brains do?
3. What is a computer made up of?
4. What does an operator do at a panel desk?
5. How many pieces of information can be stored?
6. How does the operator speak to a machine?
7. Where is the information of a computer stored?
8. How does a computer give its answers?
9. Machines work for us, do not they?

#### **4.4 Give English equivalents for the words in brackets**

1. (Электронные мозги) called (цифровыми) computer (выдают, производят) information.
2. A computer is a (сложный) instrument made up of hundreds of electronic (приборов).
3. An operator at a (пульте управления, вводит) facts, figures, and symbols into the machine.
4. All these (данные, цифры и символы) are stored on magnetic (ленте) or on (карточках).
5. More than 100, 000 pieces of information (могут храниться) in one machine.
6. An operator asks the machine in a special language (обрабатывать) information taken from (хранилище).

7. In one third of a second a computer can (умножить) two 127 (цифровых чисел).
8. A computer can (закончить) 320 long-division problems in two seconds.

#### **4.5 Say if the following statements are true or false**

1. A computer can ...
  - a) produce information
  - b) multiply large digit numbers
  - c) complete long-division problems
  - d) answer without mistakes
  - e) store the informations
2. A computer does the work of thousands of trained mathematicians.
3. A computer works for human beings
4. A computer ...
  - a) can
  - b) cannot think for us

#### **4.6 Find out sentences with modal verbs**

#### **4.7 Retell the text**

### **5 Today's Astonishing computers**

Not long ago computers were not very reliable and comparatively slow in operation. Since then, several generations of complex electronic computing equipment have been developed, each being significantly better than the one before it. Almost every day a new use is found for these astonishing devices to help man.

We know a computer to be a complex electronic device that can store and process vast quantities of information. Following instructions, computing equipment will perform calculations such as addition, subtraction, multiplication and division, and provide the answers to a large variety of problems in a tiny fraction of time.

A computer is known to be the "heart" of an electronic data processing system, other parts of equipment being auxiliary.

There are two main types of computing equipment – digital and analogue. They work differently and yield different results. The digital computer is performing a much broader range of functions than the analogue one.

The analogue computer, as its name implies, produces analogues or parallels of the process to be described or the problem to be solved. Both the digital and the analogue computers must be "programmed". This means they must be set up in

such a way that they can produce a result from the information fed into them, and the information itself must be organized so that it can be handled by the machines. These devices working by electronic impulses perform at fantastic speed and with great precision.

Looking to the future, computer makers see no end to the things they would like to accomplish. The computer of the future seems to be developed by using bionics – biological functions of plants and animals – as a guide in designing electronic circuits.

Nowadays computer makers are working at the problem of introducing small computers into our everyday life making them personal. They are trying to develop a computer that will understand human language.

Each new generation of computers opens up new possibilities for basic and applied research.

Vocabulary:

accomplish – выполнять

auxiliary – вспомогательный

data – данные, информация

describe – описывать

digital – цифровой

generation – поколение

plant – растение

precision – точность

process – обрабатывать

range – диапазон

reliable – надёжный

set up – организовать

yield - выпускать

## **5.1 Read and translate the word-combinations**

complex electronic computing, astonishing devices, complex electronic device, vast quantities of information, a tiny fraction of time, electronic data, range of functions, to be handled by the machines, electronic impulses, computer makers.

## **5.2 Questions**

1. What is a computer?
2. What calculations can a computer perform?
3. What two types of computer do you know?
4. Do digital and analogue computers work in the same way?
5. How do digital and analogue computers work?

### 5.3 Fill in the gaps with the words

1. Almost every day a new use is found for these astonishing ... to help man.
2. The ... computer is performing a much broader range of functions than the analogue one.
3. We know a computer to be a complex electronic device that can ... and process vast quantities of information.
4. Not long ago computers were not very ... and comparatively slow in operation.

### 5.4 Complete the sentences according to the text

1. Following instructions, computing equipment will perform calculating such as addition, subtraction, multiplication ...
2. A computer is known to be the heart of an electronic data processing ...
3. The computer of the future seems to be developed by using bionics – biological functions of plants ...
4. Nowadays computer makers are working at the problem of introducing small computers into ...
5. Since then, several generations of complex electronic computing equipment have been developed.
6. The analogue computer, as its name implies, produces analogues or parallels of the process ...

### 5.5 Choose antonyms from the second column to the words of the first column.

modern	to exclude
regular	old
outer	to weaken
to strengthen	inner
to include	impossible
possible	irregular
rapidly	future
past	quickly
powerless	inefficient
efficient	powerful
unlimited	limited
accurate	non – conductor
conductor	inaccurate

### 5.6 Find out sentences with the complex subject

## 5.7 Retell the text

### 6 A new microcomputer

An entirely new microcomputer has been developed in Russia. The microcomputer is equipped with an arithmetical logical device which carries pre-set programs. Because of this the microcomputer can perform various logical functions. In other words, it possesses a solving field for various commands. It is comparatively easy to change commands or add new ones.

The arithmetical logical device is known to be adjusted by computers of a higher level. The memory device based on semiconductors keeps information for several days, even with the power supply unplugged. In this case the microcomputer automatically switches over to the micro-accumulator.

The new computer is very small in size and weight, resistant to temperature fluctuations, reliable and easy to operate. It does not require special ventilation. It can be used in computer control complexes as an information- processing unit and also as a built-in computer in various analyzing and display devices. It receives data, calculates the optimum conditions and supplies signals for the control of technological processes. For example, in pressure-die casting the microcomputer receives information about the temperature in the furnace, the speed of the liquid metal movements, location of the various devices, etc. the computer processes the data and controls the casting, i.e. keeps the temperature and the pressure within required limits, and commands the beginning of the casting operation. The program is written by technicians, and the operator inserts the required data.

The field of application of the new computer appears to be vast. It can analyze various substances in oil, gas, chemical and food industries, as well as soil and plants. It can also be used for processing information about conditions in the environment, for control of conveyors and other equipment.

#### Vocabulary:

add – добавлять

entirely – совершенно

environment – окружение, среда

fluctuation – колебание

food – пища

furnace – печь

insert – вводить

pre-set – заранее составленный

pressure-die casting – литье, полученное под давлением

soil – почва

unit – блок

unplug – отключать

vast - обширный

### **6.1 Read and translate the word-combinations**

Arithmetical logical device, pre-set programmes, logical functions, information-processing unit, display devices, calculate the optimum conditions, the speed of the liquid metal movements, the computer processes, control of conveyors.

### **6.2 Questions**

1. Where has an entirely new microcomputer been developed?
2. What is the microcomputer equipped with?
3. What is the memory device based on?
4. Can the new computer analyze various substances in oil, gas, chemical and food industries, as well as soil and plants?
5. Where can the new computer be used?

### **6.3 Fill the gaps with the verbs**

1. It is comparatively easy ... commands or add new ones.
2. The new computer is very small in size and weight, resistant ... fluctuations, reliable and easy to operate.
3. The field of application of the new computer ... to be vast.
4. The arithmetical logical device is known to be ... by computers of a higher level.
5. Because of this the microcomputers can ... various logical functions.

### **6.4 Complete the sentences according to the text**

1. It receives data, calculates the optimum conditions and supplies signals ...
2. It can be used in computer control complexes as an information-processing unit and also as a built-in ...
3. The memory device based on semiconductors keeps information for several days ...
4. The new computer is very small in size and weight, resistant ...
5. It can analyze various substances in oil, gas, chemical and food industries  
....

## 6.5 Complete the table for word- combination

Verb	Noun	Adjectives
Identify	...	...
...	...	Vaporous
Amplify	...	...
...	Idealization	...
...	...	Strong
...	Variety	...
...	...	Limitless
...	Precision	...
treat	...	...

## 6.6 Find out sentences with Passive voice

## 6.7 Retell the text

## 7 The development of the Computer

The inventions and ideas of many mathematicians and scientists led to the development of the computer. The first mechanical calculating machines were invented during the 1600's. One of the more notable of these devices was built in 1642 by the French mathematician and scientist Blaise Pascal.

During the 1830's, an English mathematician named Charles Babbage developed the idea of a mechanical digital computer. He tried to construct a machine called an analytical engine. The machine contained the basic elements of an automatic computer and was designed to perform complicated calculations according to a sequence of instructions. However, the technology of Babbage's time was not advanced enough to provide the precision parts needed to complete the machine.

Another important contribution to the development of the computer was made in the mid-1800's by George Boole, an English logician and mathematician. Boole devised a system of formulating logical statements symbolically so that they could be written and proved in a way similar to that of ordinary algebra.

In 1930 the first reliable analog computer was built. This machine called a differential analyzer, solved differential equations.

During the 1940's John Neumann, an American mathematician, introduced an idea that improved computer design. He proposed that programs could be coded as numbers and stored with data in a computer's memory.

The invention of the transistor in 1947 of related solid-state devices during the 1950's and 1960' resulted in the production of faster and more reliable

electronic computers. The new machines also were smaller and less expensive than earlier models.

The continued miniaturization of electronic equipment during the late 1960's and 1970's led to further advances in computer technology. The development of the integrated circuit enabled engineers to design both minicomputers and high-speed mainframes with tremendous memory capacities.

Researches are seeking ways improve memories and auxiliary storage equipment. They expect to produce an efficient magnetic bubble unit, which is faster and cheaper to operate than mechanical tape or disk units. A magnetic bubble unit is a semiconductor chip that stores data in tiny, cylindrically shaped areas called bubbles.

Vocabulary:

invention – изобретение

development – развитие

to invent – изобретать

engine – двигатель

to perform – выполнять

to complete – закончить

contribution – вклад

similar – похожий

ordinary – обычный

tremendous – громадный

to improve – улучшить

equipment – оборудование

magnetic – магнитный

bubble – цилиндр

tiny – крохотный

## 7.1 Read and translate the word-combinations

mechanical calculating machine, digital computer, analog computer, analytical engine, sequence of instructions, logical statement, in a way similar to, differential analyzer, to make an important contribution to, solid –state device, the continued miniaturization, integrated circuit, high-speed mainframe, tremendous memory capacities, auxiliary storage equipment, magnetic bubble unit.

## 7.2 Questions

1. What did the inventions and ideas of many mathematicians and scientists lead to?
2. When were the first mechanical calculating machines invented?

3. Who developed the idea of a mechanical digital computer?
4. The technology of Babbage's time was not advanced enough, was it?
5. What was built in 1930?
6. What did John Von Neumann introduce during 1940's?
7. What is a magnetic bubble unit?
8. Who devised a system of formulating logical statements symbolically?

### **7.3 Say if the following statements are true or false**

1. Charles Babbage developed the idea of an electronic digital computer
2. George Boole devised a system of formulating logical statements symbolically
3. The invention of the transistor in 1947 resulted in the production of faster and more reliable electronic computers
4. Scientists are also working to decrease computing speed

### **7.4 Fill the gaps with the words**

1. The first mechanical ... machines were invented during the 1600's.
2. In 1930 the first reliable ... computer was built.
3. The new ... also were smaller.
4. Researches are seeking ways ... memories and auxiliary storage equipment.
5. A magnetic ... units is a semiconductor chip that stores data in tiny? Cylindrically shaped areas called bubbles.

### **7.5 Choose the correct definition of the following words.**

#### *Approach*

- a. coming near to
- b. approximation, a way to solve a problem
- c. way, path, road

#### *sustain*

- a. enable to keep up, maintain
- b. suffer, undergo
- c. keep from falling

#### *relay*

- a. supply of fresh horses to take the place of tired ones

- b. device which receives signals and transmits them with greater strength, thus increasing the distance over which they are carried
- c. place from which radio programs are broadcast after being received from another station

*item*

- a. each single thing, part or objects in a list
- b. detail or paragraph (of news)
- c. number of a program

*off- the- shelf*

- a. commercially available
- b. ready to use
- c. possible or likely

## **7.6 Find out sentences with The Continuous tense**

## **7.7 Retell the text**

## **8 Computers and Cybernetics**

The computer or high-speed electronic machines of today have created entirely new technical possibilities in automatic control of industrial processes. First designed for solving mathematical problems, they soon paved the way for a new field of science – cybernetics – that studies general principles of control both in life and non-live systems. The importance of cybernetics is great in the sphere of engineering science. A newly developed field of knowledge is technical cybernetics. Its objectives are to control automatic industrial processes, to study problems of transmission of information and to develop new principles of automatic control.

One of the main problems of technical cybernetics is the development of control algorithms to be used in processing and control of information flows. The algorithms worked out for employment in control machines are called programs. These are based on subdivision of the computation process into simple arithmetical operations and on determination of the logical operations to be performed with a view to fulfill the program which gives the sequence of the machine's operations, and must be coded or expressed in the adopted code system.

Two systems of computers are now created for control computer design.

One of these is the development of general-purpose control machines which may have much wider application but require more complicated logical circuitry and a greater number of instructions and commands employed in the computer.

This approach permits control of a great variety of industrial units with the aid of one and the same computer.

The second system utilizes modern microcomputer techniques to develop special-purpose machines designed to control a particular process. This leads to the creation of more easily operated and low-cost control computers. Tests of some control computers manufactured for specific industrial units have shown their efficiency and quite sufficient reliability.

In Russia both systems of control are applied. Electronic digital computers perform both arithmetical and logical operations, making it possible to govern processes under rather complicated conditions.

Vocabulary:

cybernetics - кибернетика

to create – создавать

entirely – всецело

to design – предназначать

to solve – решать

subdivision – подразделение

computation – вычисление

determination – решительность, определение

to fulfill – исполнять

to code – передавать шифром

to adopt – принимать, усваивать

low-cost – низкой стоимости

### **8.1 Read and translate the word-combinations**

high-speed electronic machine, non-live systems, technical cybernetics, automatic industrial processes, problems of transmission, to control algorithms, general-purpose control machines, complicated logical circuitry, industrial units, modern microcomputer techniques, special – purpose machines, low-cost computers, sufficient reliability, electronic digital computers, rather complicated conditions.

### **8.2 Words for activation**

cybernetics, algorithms, computation, application, circuitry, unit, aid, creation, efficiency, reliability, low-cost, sufficient, to create, to solve, to fulfill, to code, to adopt, to permit, to utilize, to lead, to govern.

### **8.3 Questions**

1. What have the computers of high –speed electronic machines created?

2. What does cybernetics study?
3. Is the importance of cybernetics especially great in the sphere of engineering sciences?
4. What is the field of acting of technical cybernetics?
5. What is one of the main problems of technical cybernetics?
6. Where are the algorithms used? For what purpose are they used?
7. How many systems of computer are now created for control computer design?
8. What is the first system? What is its application?

#### **8.4 Give English equivalents for the words in brackets**

1. The computers are the (высокоскоростные электронные) machines.
2. First they were (спроектированы) for (решение) mathematical problems.
3. The computers have created now a new field of science (кибернетику).
4. Cybernetics studies general principles of control both in life and (не жизненными) systems.
5. The (алгоритмы) worked out for employment in control machines is called (программами).
6. These programs are based on (подразделение) of the (вычислительного) process into simple arithmetical operations and on (решение) of the logical operations.
7. The program must be (закодирована) or expressed in the (принятой кодовой) system.

#### **8.5 Say if the following statements are true or false**

1. The computer control ...
  - a) life systems
  - b) non-live systems
2. Cybernetics is a new field of science for ...
  - a) controlling automatic industrial processes
  - b) studying problems of transmission of information
3. Algorithms are used in ...
  - a) controlling of information flows
  - b) controlling of machines
4. Algorithms are ...
  - a) programs
  - b) arithmetical operations
5. The first system of computers has ...
  - a) a very complicated logical circuitry

- b) a very simple circuitry
- 6. The second system of computers is ...
  - a) low-cost
  - b) more easily operated
  - c) used for specific industrial units
  - d) not very efficient.

## **8.6 Find out sentences with The Infinitive**

## **8.7 Retell the text**

## **9 Electronic Computers**

Electronic circuits work a thousand times more rapidly than nerve cells in the human brain. A problem more rapidly takes the human brain 2 years in order to solve it can be solved by a computer in one minute. The heart of the electronic computer is its vacuum tubes or transistors. In order to work a computer must have instructions; this is called “programming”.

There are two main types of electronic computers: analogue and digital. In analogue computers problems are solved by analogy, the problems which analogue computers can solve are the following: mechanical forces, speeds, rotations, etc. Analogue computers are used for investigation of mechanical processes, in general, they are used for scientific 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 very large and powerful. All the data connected with the problem which must be solved are converted into electrical pulses by very fast electronic switches and these pulses are stored and counted. With modern electronic devices a single switching operation can take place in a few nanoseconds.

Computers serve us in many different ways. Let us take some examples.

An electronic computer capable of performing 1000000 mathematical operations per second was put into operation in Dunbar, the physics center near Moscow. It is used to solve the complex mathematical problems of modern physics. One of the computer’s specialties is high-speed processing of data obtained from physics experiments.

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 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 quality 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 and 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 on punched cards and supplies a vocal translation within 20 second.

The newspaper The Times (London) writes: “ ‘Time is money’ is one of the foundations of the Ministry’ s of Transport approached to transport problems”. If we can save a lot of people time on their daily journeys to work, then we are saving a parts 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 systems are 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.

#### Vocabulary:

circuit – цепь

rapidly – быстро

transistor – транзистор

analogue – аналоговый

digital – цифровой

rotation –

investigation – расследование

accuracy – точность

count –

powerful – мощный

unique –

collars –

keyboard – клавиатура

money – деньги

journey – путешествие

efficient – эффективный

adjust - регулировать

## **9.1 Read and translate the word-combinations**

Nerve cells, human brain, vacuum tubes, mechanical forces, mechanical forces, mechanical processes, electrical pulses, electronic switches, electronic computer, ordinary typesetting machines, road space, traffic signals, rush hours.

## **9.2 Questions**

1. What is an analog computer?
2. What is the heart of the electronic computer?
3. How many types are there in electronic computer?
4. What analogue computers are used for?
5. What are problems solved by in digital computers?
6. How many mathematical operations can an electronic computer perform per second that was put into operation in Dubna?
7. What newspaper was born only thanks to computers?
8. What computer has developed Kyoto University?

## **9.3 Say if the following statements are true or false**

1. An electronic computer capable of performing 100 mathematical operations per second was put into operation in Dunbar, the physics center near Moscow.
2. In digital computers problems are solved by counting.
3. The computer adjusts traffic signals and gives a free flow of traffic.
4. A problem more rapidly takes the human brain 2 years in order to solve it can be solved by a computer in one minute.
5. The Reading Evening Post is a newspaper that was born only thanks to cars.

## **9.4 Complete the sentences according to the text**

1. All the data connected with the problem which must be solved are converted into electrical pulses .....
2. The heart of the electronic computer .....
3. Analogue computers are used for investigation of mechanical processes, in general, they are used for scientific and engineering problems .....
4. There are two main tapes of electronic .....
5. More than 500 detectors count the cars passing over them .....
6. The computer adjusts traffic signals .....

## **9.5 Read the following definitions of computer terms; give Russian equivalents of noted words and word combinations**

1. *Hardware* means the different types of equipment a computer consists of.
2. A computer's hardware comprises a *central processing unit (CPU)* which is the heart and brain of the computer.
3. *Input and output devices* capable of putting information into a computer and getting it out of it are types of peripheral equipment. *Peripherals* are the units connected to the CPU: input devices, output devices and storage devices.
4. The simplest and most common type of input device is a keyboard, containing a typewriter *keyboard*.
5. A *laser printer* is a kind of output device to print information.
6. *Software* means the programs needed to operate computer equipment.
7. A *word processor* is a computer used to write documents, letters and reports, or the software that is used for this purpose.
8. *Databases* are programs, which allow you to store look at or change a large quantity of information quickly and easily.

## **9.6 Find out sentences with Passive voice**

## **9.7 Retell the text**

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Райымкүл Зарина Әбдікамалқызы

ПРОФЕССИОНАЛЬНО-ОРИЕНТИРОВАННЫЙ АНГЛИЙСКИЙ ЯЗЫК

Методические указания  
Practical English for special purposes for students in informatics  
для специальности 5В060200

Редактор Н. М. Голева  
Специалист по стандартизации Н. К. Молдабекова

Подписано в печать \_\_\_\_\_  
Тираж 50  
Объем 1,8 уч.- изд.л.

Формат 60x84 1/16  
Бумага типографская № 1  
Заказ \_\_\_\_ . Цена 900 тң.

Копировально-множительное бюро  
некоммерческого акционерного общества  
«Алматинский университет энергетики и связи»  
050013, Алматы, ул. Байтурсынова, 126