**МИНИСТЕРСТВО ОБРАЗОВАНИЯ
РЕСПУБЛИКИ БЕЛАРУСЬ**

УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ
**“ВИТЕБСКИЙ ГОСУДАРСТВЕННЫЙ
ТЕХНОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ”**

АНГЛИЙСКИЙ ЯЗЫК

**МЕТОДИЧЕСКИЕ УКАЗАНИЯ И КОНТРОЛЬНЫЕ ЗАДАНИЯ
ДЛЯ СТУДЕНТОВ I КУРСА СПЕЦИАЛЬНОСТИ**

1-36 01 01 “ТЕХНОЛОГИЯ МАШИНОСТРОЕНИЯ”

**ЗАОЧНОЙ ФОРМЫ ОБУЧЕНИЯ
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Английский язык: методические указания и контрольные задания для студентов I курса специальности 1-36 01 01 “Технология машиностроения” заочной формы обучения (сокращенный срок обучения – 4 года).

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Составитель: преп. Степанов Д.А.

Настоящие указания включают контрольную работу для студентов I курса заочной формы обучения (сокращенный срок обучения – 4 года). Работа составлена на основе специальной лексики и предусмотренного программой грамматического материала.

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СОДЕРЖАНИЕ ПРОГРАММЫ

Основная цель обучения студентов иностранному языку в неязыковом вузе предполагает при заочном обучении формирование умения самостоятельно читать литературу по специальности вуза для извлечения информации.

Данная программа предусматривает, главным образом, самостоятельную работу студентов. Работа под руководством преподавателя рассчитана на 14 учебных часов для групповых занятий. При заочной форме обучения, как правило, изучается тот же иностранный язык, который изучался в средней школе.

СТРУКТУРА КУРСА

I курс: 14 часов аудиторных занятий, 136 часов самостоятельной работы и консультации. Студент выполняет одну контрольную работу и сдает экзамен.

ТРЕБОВАНИЯ НА ЭКЗАМЕНЕ

К экзамену по английскому языку допускаются студенты, выполнившие письменную контрольную работу и сдавшие учебный материал по чтению.

На экзамене по английскому языку проверяются умения:

а) чтение и письменный перевод текста со словарем по специальности (до 1500 печатных знаков – 45 минут);

б) чтение без словаря и передача содержания прочитанного текста на русском языке (1000-1200 печатных знаков – 8 минут).

ВЫПОЛНЕНИЕ И ОФОРМЛЕНИЕ КОНТРОЛЬНОЙ РАБОТЫ

1. Контрольная работа предоставляется для проверки только в рукописном варианте в тетради. Титульную страницу следует оформить согласно требованиям.

Контрольная работа № 1 вариант №___

по дисциплине “Английский язык”

студента I курса заочного факультета
группы _____

_____
(Ф.И.О.)

зачетная книжка № _____

домашний адрес: _____

Работа выполнена “____”_____ 20__ г.

Работу проверил _____

2. Контрольная работа предлагается в пяти вариантах. Вы должны выполнить один из пяти вариантов в соответствии с последними цифрами студенческого шифра. Студенты, шифр которых оканчивается на 1 или 2, выполняют вариант № 1; на 3 или 4 – № 2; на 5 или 6 – № 3; на 7 или 8 – № 4; на 9 или 0 – № 5.

3. При выполнении контрольной работы оставляйте в тетради широкие поля для замечаний, объяснений и методических указаний рецензента.

   Материал контрольной работы следует располагать в тетради по следующему образцу:

Левая страница		Правая страница	
Поля	Английский текст	Русский текст	Поля

4. Выполненную контрольную работу направляйте для проверки и рецензирования в университет в установленные сроки.

5. Если контрольная работа выполнена без соблюдения указаний или не полностью, она возвращается без проверки.

6. При получении проверенной контрольной работы ознакомьтесь с замечаниями и проанализируйте отмеченные в работе ошибки.

7. Руководствуясь указаниями, проработайте еще раз учебный материал. Все предложения, в которых были обнаружены орфографические и грамматические ошибки или неточности перевода, перепишите начисто в исправленном виде в конце контрольной работы.

8. Отрецензированная контрольная работа является учебным документом, который необходимо сохранять; помните о том, что во время экзамена производится проверка усвоения материала, вошедшего в контрольную работу.

Вариант 1

I. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite) и переведите.

1. A robot operates automatically.
2. Industrial robots exhibit intelligent behavior.
3. First robots did not look like human beings.
4. An automatic exploring machine will land the Mars.

II. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite Passive) и переведите.

1. A picture is drawn by a robot.
2. The first flexible multipurpose manipulator was developed in California.
3. The word “robot” was introduced by a Czech writer.
4. Nanorobots will be used for medicine purposes.

III. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present или Past Perfect) и переведите.

1. Robots have dominated in automobile factories.
2. Mass production has increased due to robotics.
3. Japan had become the leader in the production of industrial robots by 1980’s.
4. People had expressed fears about robots in books and films.

IV. Перепишите предложения, содержащие разные формы сравнения прилагательных и наречий, и переведите их.

1. The more the control system seems to have the ability to make choices, the more likely the machine is to be called a robot.
2. Robots can operate under the most dangerous conditions.
3. Androids are quite often described in science fiction.
4. Newly designed robots look like living beings.

V. Перепишите и переведите предложения, содержащие модальные глаголы.

1. An artificial arm can lift objects and use instruments.
2. Robots may work inside large machines to diagnose mechanical problems.
3. They must use a robot to detonate that explosive device.
4. Engineers should observe human behavior to design an android.

VI. *Перепишите и переведите предложения, содержащие эквиваленты модальных глаголов.*

1. Leonardo's robot was able to sit up, wave its arms and move its head and jaw.
2. Intelligent robots aren't allowed to do any harm to people.
3. To measure radioactivity they had to use robots.
4. Fuel is to be delivered by a robot.

VII. *Перепишите и переведите предложения, обращая внимание на функции причастия I.*

1. The robot accomplishes work while interacting with its environment.
2. The gripper is moved from one position to another, changing its orientation.
3. Their plan was to build a thinking machine.
4. A controlling mechanism is placed inside the robot.

VIII. *Перепишите и переведите предложения, обращая внимание на функции причастия II.*

1. A mechanical arm moves objects into a desired position.
2. Compared with their fictional prototypes, real robots are still dim-witted and clumsy.
3. Engineers are developing mobile robots equipped with television cameras for sight.
4. Controlled by a surgeon, a robot can accomplish the operation.

IX. *Перепишите и переведите предложения, обращая внимание на формы и функции инфинитива.*

1. A computer-controlled machine is programmed to move and manipulate objects.
2. Robot's ability to identify the source of sounds has been improved.
3. It is easy to control the robot.
4. To assist people in dangerous jobs is the task of robots.

X. *Перепишите и переведите предложения, обращая внимание на функции герундия.*

1. Most robots today are stationary structures with a single arm capable of lifting objects and using tools.
2. A robot arm can extend by telescoping.
3. Domestic robots for cleaning and maintenance are common in and around homes.
4. An android responds to questions, either by nodding or shaking of the head.

XI. Прочитайте и переведите текст. Перепишите и письменно переведите абзацы 2, 3, 5.

ROBOT

1. Robot is a mechanical device that operates automatically. It can move around, operate a mechanical limb, sense and manipulate its environment, and exhibit intelligent behavior, especially behavior which mimics humans or other animals.

2. Stories of artificial helpers and attempts to create them have a long history but fully autonomous machines only appeared in the 20th century. The first digitally operated and programmable robot, the Unimate, was installed in 1961 to lift hot pieces of metal from a die casting machine.

3. Today, industrial robots are in widespread use performing jobs more cheaply or with greater accuracy and reliability than humans. They are also employed for jobs which are too dirty, dangerous or dull to be suitable for humans. Robots are widely used in manufacturing, assembly and packing, transport, earth and space exploration, surgery, weaponry, laboratory research, and mass production of consumer and industrial goods.

4. The word robot was introduced to the public by Czech writer Karel Čapek (Карел Чапек) in his play R.U.R. (Rossum's Universal Robots). The play begins in a factory that makes artificial people called robots.

5. Robots vary in design and size, but few resemble the humanlike machines that appear in works of science fiction. Most robots today are stationary structures with a single arm capable of lifting objects and using tools. But engineers are developing mobile robots equipped with television cameras for sight and electronic sensors for touch. These robots are controlled by both stored instructions and feedback they receive from the sensors.

6. Robots, their design, manufacture, and application are studied by robotics. For robotic engineers, the physical appearance of a machine is less important than the way its actions are controlled. The more the control system seems to have the ability to make choices, the more likely the machine is to be called a robot.

Вариант 2

I. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite) и переведите.

1. A mechanical engineer designs, tests, builds, and operates machinery of all types.
2. The term civil engineering came into use in the 18th century.
3. In ancient Rome, engineers built large aqueducts and bridges.
4. The construction of a new road will not cause harm to the environment.

II. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite Passive) и переведите.

1. Most machines are designed for space exploration.
2. This device is tested in our laboratory.
3. The first locomotive was invented in Great Britain.
4. A new course of engineering will be introduced at our University next year.

III. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present или Past Perfect) и переведите.

1. This method of metal treatment has existed since ancient time.
2. They have gained a lot of experience in operating complex equipment.
3. People had dreamt of flying long before the first airplane was constructed.
4. His theory had won world's recognition when he proved it.

IV. Перепишите предложения, содержащие разные формы сравнения прилагательных и наречий, и переведите их.

1. Einstein's Theory of Relativity is as famous as Newton's Theory of Gravity.
2. Electronics is the fastest developing field of engineering.
3. Highly-trained specialists are engaged into this project.
4. This experiment is hardly possible.

V. Перепишите и переведите предложения, содержащие модальные глаголы.

1. This system can work under high pressure and temperature.
2. Engineering students may choose various subjects.
3. He must design his own project before the graduation.
4. You shouldn't forget safety requirements while producing the experiment.

VI. Перепишите и переведите предложения, содержащие эквиваленты модальных глаголов.

1. People were able to use metals to make weapon and primitive tools.
2. This machine is not allowed to be operated for more than 2 hours.
3. Laser has to be applied for cutting this alloy.
4. Instruments are to be tested by the end of the week.

VII. Перепишите и переведите предложения, обращая внимание на функции причастия I.

1. Falling objects with different masses have the same speed.

2. A heating system may cause explosion.
3. We've got a new substance, mixing three types of plastics.
4. Watching birds, man tried to create an aircraft.

VIII. Перепишите и переведите предложения, обращая внимание на функции причастия II.

1. They have made no use of a discovered element.
2. He was recognized as a trained specialist.
3. Convinced that all the parameters are correct, they began to construct the bridge.
4. Introduced to new data, he found a mistake in the design.

IX. Перепишите и переведите предложения, обращая внимание на формы и функции инфинитива.

1. The Latin word "ingeniare" means to design or to create.
2. To become an engineer, students complete a four-year bachelor's degree program at a college or university.
3. A new drill to bore hard alloys is designed in our laboratory.
4. To design is to work out the structure or form of an object, by making a sketch, or plans.

X. Перепишите и переведите предложения, обращая внимание на функции герундия.

1. Engineers invent many objects by watching animals' behavior.
2. Building of a new house requires knowledge in various fields of engineering.
3. They are involved in exploring of a new planet.
4. We are thinking of creating a new means of communication.

XI. Прочитайте и переведите текст. Перепишите и письменно переведите абзацы 1, 4, 5.

ENGINEERING

1. The word engineering comes from the Latin word *ingeniare*, which means to design or to create. Engineers use principles of science to design structures, machines, and products of all kinds. They look for better ways to use existing resources and often develop new materials.

People invented farming tools, designed elaborate irrigation networks, and built the first cities.

2. The construction of the Egyptian pyramids was one of the greatest engineering feats of ancient times. In ancient Rome, engineers built large aqueducts

and bridges and vast systems of roads. The Chinese erected major sections of the monumental Great Wall of China.

3. Early engineers used such simple machines as the inclined plane, wedge, and wheel and axes. During the Middle Ages, inventors developed machines to harness water, wind, and animal power.

4. For students considering a career in engineering, the most important subjects to take in high school are mathematics, science, and English. Helpful electives include foreign languages; economics, history, and other social studies courses; and composition and public speaking.

Many programs require the completion of an independent study or design project, including a formal report, before graduation.

5. Most students complete a four-year bachelor's degree program at a college or university. They study mathematics, science courses, economics, history, languages. Undergraduate students often take part in cooperative education programs as special engineering trainees. They alternate between going to school and working for companies.

6. Some engineering students study for another year after receiving a bachelor's degree. They undertake a program of advanced course work in a specialized field and earn a master's degree.

7. Some universities, colleges, and technical institutes offer two-year and four-year degree programs in certain specialized areas, such as computer maintenance and electronics. The graduates of these programs form an important part of professional engineering teams.

Вариант 3

I. *Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite) и переведите.*

1. Energy consists of several different forms.
2. Many physicists believe that energy and matter are two aspects of the same phenomenon.
3. Primitive people had only the strength of their arms and the use of fire.
4. The application of nuclear energy will begin a new era of the use of energy.

II. *Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite Passive) и переведите.*

1. Any form of energy is transformed into another form.
2. Energy of falling water was used to run mills.
3. Classical mechanics is based on the concept of conservation of energy.
4. A lot of energy will be released by splitting an atom.

III. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present или Past Perfect) и переведите.

1. Potential energy represents work that has already been done.
2. The discovery of electricity has led to higher demand for sources of energy.
3. The consumption of oil had reached its peak by the 1970s.
4. Scientists had developed very few alternative sources of energy by the end of the 20^{th} century.

IV. Перепишите предложения, содержащие разные формы сравнения прилагательных и наречий, и переведите их.

1. The nucleus of some atoms can produce millions of times more energy than available chemicals can.
2. Energy is constantly changing from the potential to the kinetic state.
3. Heat energy is the most commonly used form of energy.
4. The most important sources of energy are fossil fuels, water power, and nuclear energy.

V. Перепишите и переведите предложения, содержащие модальные глаголы.

1. Future energy sources may include fuel cells, solid and liquid wastes, and hydrogen.
2. Energy can be stored for its use in future.
3. Government must control the use of natural resources.
4. Losses in the form of heat energy should be avoided.

VI. Перепишите и переведите предложения, содержащие эквиваленты модальных глаголов.

1. In many countries people have to use coal to heat their houses and other buildings.
2. Radioactive wastes are to be isolated to protect the environment from radioactivity.
3. Waste disposal is not allowed in this area.
4. Without friction any mechanism will be able to work constantly.

VII. Перепишите и переведите предложения, обращая внимание на функции причастия I.

1. The word “kinetic” comes from the Greek word meaning to make.
2. Oil-consuming nations try to find cheaper sources of energy.
3. Hydrogen burns easily giving off a huge amount of heat.
4. A standing train has potential energy, a moving train has kinetic one.

VIII. Перепишите и переведите предложения, обращая внимание на функции причастия II.

1. Waste heat produced by industrial processes can be used for heating.
2. Gasified coal releases fewer pollutants.
3. Controlled nuclear reactions are difficult to achieve.
4. When burned, coal releases sulphur and dioxide.

IX. Перепишите и переведите предложения, обращая внимание на формы и функции инфинитива.

1. Energy is needed to do work.
2. Petroleum is easier to get out of the ground.
3. A new battery to store electric energy is being developed.
4. Some animals were tamed to transport people and goods.

X. Перепишите и переведите предложения, обращая внимание на функции герундия.

1. Chemists have developed various methods of turning coal into gas or liquid.
2. Water supplies energy without polluting the environment.
3. Central heating and electric lighting need much energy.
4. Energy can be produced by harnessing the river.

XI. Прочитайте и переведите текст. Перепишите и письменно переведите абзацы 1, 2, 4.

ENERGY

1. Energy is the name given to the ability to do work. Work and energy are measured in the same units. People often confuse energy, power, and force. Force is a push or a pull on an object or body. The amount of work is determined by the strength of the force used and the distance through which it moves. Power measures the rate at which work is done.

2. Energy is one of the two fundamental ideas in physics. The other is matter. These two ideas are not completely separate. Many physicists believe that energy and matter are merely two aspects of the same thing, much as ice, water, and water vapor are three different aspects of water.

3. All human life depends upon the energy in the universe. Most of the energy on earth comes from the sun. The sun's rays are needed so that plants can make food. Animals and human beings use the energy found in food to operate their bodies and muscles. The sun's energy is stored up in coal, wood, and oil, which people burn to do work for them.

4. Throughout history, people have developed sources of energy to do their work. Primitive people had only the strength of their arms and the use of fire. They later discovered how to use the energy of the wind to move sailing vessels. They used water to turn mills. They tamed animals as new sources of energy. The animals pulled plows and wagons. A new stage in development came with the invention of the steam engine. The discovery of electricity created an even more important way of using energy. In a similar way, so did the invention of the gasoline engine. A new era of the use of energy began with the application of nuclear energy.

5. We use forms of energy to operate machinery; to heat and cool our homes and offices; to cook; to provide light; and to transport people and goods. Heat energy is the most commonly used form of energy.

6. The world's chief sources of energy are fossil fuels, water power, and nuclear energy. Wood, solar, wind, tidal, chemical, and geothermal sources also provide energy. Future energy sources may include fuel cells, solid and liquid wastes, hydrogen, and magnetohydrodynamic generators.

7. Energy use creates serious problems. They include the depletion of fuel reserves and environmental effects. As fuels become scarce, their price goes up. Many people then call for controls on these sources of energy.

Вариант 4

I. *Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite) и переведите.*

1. Electricity produces light and heat.
2. Electricity consists of a flow of tiny particles.
3. People knew about electricity in ancient times.
4. Future transport will run on electric energy.

II. *Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite Passive) и переведите.*

1. Electrons are contained in everything.
2. Electrical effects were observed in ancient Greece.
3. The term "electricity" was introduced by Sir Thomas Browne, an English physician.
4. Great amounts of electricity will be generated from sun rays by solar cells.

III. *Перепишите предложения, укажите в скобках видо-временную форму глагола (Present или Past Perfect) и переведите.*

1. Humans have known about the existence of static electricity for thousands of years.

2. A number of countries have restricted the use of electric heating in new buildings.
3. The use of electricity in telegraphs had enabled communications in minutes across the globe.
4. Such people as Nikola Tesla, Thomas Edison, Alexander Graham Bell and Lord Kelvin, had turned electricity from a scientific curiosity into an essential tool for modern life.

IV. Перепишите предложения, содержащие разные формы сравнения прилагательных и наречий, и переведите их.

1. Electricity is one of the most important forms of energy.
2. Electrons are the smallest units of electricity.
3. Electrical activity takes place constantly everywhere in the universe.
4. Electrical energy can be sent instantaneously over long distances.

V. Перепишите и переведите предложения, содержащие модальные глаголы.

1. Electricity can be generated in many ways and from many different sources.
2. The bulb filament may burn out if too much electric current flows through it.
3. Fuel cells must be constantly refilled as they do not store chemicals.
4. Batteries should not be connected in parallel unless they have approximately the same voltage.

VI. Перепишите и переведите предложения, содержащие эквиваленты модальных глаголов.

1. Some organisms, such as sharks, are able to detect and respond to changes in electric fields.
2. Most of power plants had to burn coal or oil to make steam to run turbines.
3. It’s not allowed to touch a lead with broken insulation.
4. Used batteries are to be utilized according to the instruction.

VII. Перепишите и переведите предложения, обращая внимание на функции причастия I.

1. Electric current is formed by moving electric charges.
2. Printing press is powered by electricity.
3. In alternate current electrons move changing their direction constantly.
4. Electricity flows through a wire creating an electromagnetic field.

VIII. Перепишите и переведите предложения, обращая внимание на функции причастия II.

1. Only negatively charged electrons flow in a metal wire.
2. Resistance is measured in units called ohms.
3. Complex electric circuits may have thousands of parts connected in many loops.
4. Increased resistance causes higher voltage.

IX. Перепишите и переведите предложения, обращая внимание на формы и функции инфинитива.

1. To create electric current charges must be either negative or positive.
2. A conductor with high resistance is used to convert electric energy into heat.
3. Electric current can be dangerous.
4. The use of electric power in the world continues to increase annually.

X. Перепишите и переведите предложения, обращая внимание на функции герундия.

1. Electricity is controlled by increasing or decreasing voltage.
2. Particle accelerators aid in revealing the structure of atoms.
3. Static electricity can be generated by rubbing a glass rod with a piece of silk cloth.
4. Lightning is an example of electric discharge.

XI. Прочитайте и переведите текст. Перепишите и письменно переведите абзацы 2, 3, 8.

ELECTRICITY

1. Electricity is one of the most important forms of energy. Electricity produces light and heat, and it provides power for household appliances and industrial machinery. Electric power also enables us to have telephones, computers, motion pictures, television, and radio.

2. Most of the electricity that we use daily consists of a flow of tiny particles called electrons. Electrons are the smallest units of electricity. They are much too tiny to be seen, even with a microscope. Everything around us, including our bodies, contains electrons. Some of the effects of electricity may be seen in nature. For example, lightning is a huge flash of light caused by electricity.

3. People began to learn about electricity as early as the 500's B.C. Thales (Фалес), a Greek philosopher of about this time, observed that amber attracted small bits of straw after being rubbed with cloth. In 1600, William Gilbert, a physician of Queen Elizabeth I of England, discovered that such materials as diamond, glass, sulfur, and wax behaved like amber. He called these materials electrics, a term based

on electrum, the Latin word for amber. In 1646, another English physician, Sir Thomas Browne, devised the word “electricity”.

4. Almost all the world’s electricity is produced at power plants by large machines called generators. Most of these plants burn coal or oil to make steam, which provides the energy to run the generators.

5. In homes, electric dishwashers, irons, vacuum cleaners, and washing machines, electric blenders, food processors, grills, microwave ovens, stoves, and toasters save hours of labor. Electric air conditioners and fans cool homes in summer, electric heaters provide warmth during the winter.

6. Modern industry could not exist without electricity. Electric motors run drills, lathes, milling machines, and other tools. Electricity melts and welds metals. Powerful electric cranes lift huge loads. Delicate electronic instruments measure the thickness of steel with microscopic precision.

7. In transportation, electric elevated and subway trains carry millions of people to and from work. Some cities have electric streetcars or trolley buses. Motor vehicles equipped with spark plugs use electric sparks to explode the gasoline that runs their engines.

8. Nearly all research equipment depends on electricity. Electron microscopes help researchers learn the secrets of cells, and particle accelerators aid in revealing the structure of atoms. Physicians photograph internal parts of the body and treat diseases with X-rays generated by electricity.

Вариант 5

I. *Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite) и переведите.*

1. The computer performs calculations and processes information.
2. Computers solve complicated problems.
3. In 1642 Blaise Pascal, a French mathematician, and physicist, invented a machine that added and subtracted.
4. A computer will have the ability to learn to solve problems on its own.

II. *Перепишите предложения, укажите в скобках видо-временную форму глагола (Present, Past, Future Indefinite Passive) и переведите.*

1. Information is displayed on monitors.
2. One million trillion mathematical problems were solved by 448 computers for two years.
3. Exotic computers such as biological computing machines will be developed in future.
4. Information will be transmitted faster and more accurately.

III. Перепишите предложения, укажите в скобках видо-временную форму глагола (Present или Past Perfect) и переведите.

1. The speed of data transferring has enlarged considerably.
2. Computers have served as main operators of spacecraft.
3. Calculating machines had appeared before the first digital computer was built.
4. They had had improved the operating system after it was attacked by hackers.

IV. Перепишите предложения, содержащие разные формы сравнения прилагательных и наречий, и переведите их.

1. Computers are becoming faster and cheaper.
2. The first computers were as large as a two-storeyed building.
3. Hackers are people who illegally gain access to computer systems.
4. Modern computers treat great amounts of information simultaneously.

V. Перепишите и переведите предложения, содержащие модальные глаголы.

1. The information can be seen on a display or printed.
2. You may use this computer for entertainment.
3. Anti-virus bases must be updated.
4. All the passwords should be kept in a secure place.

VI. Перепишите и переведите предложения, содержащие эквиваленты модальных глаголов.

1. New computers will be able to hear and speak.
2. Guest users are not allowed to change the code of the program.
3. They don’t have to print the picture.
4. You are not to delete files.

VII. Перепишите и переведите предложения, обращая внимание на функции причастия I.

1. A working processor produces much heat.
2. Increasing power and versatility of computers simplifies day-to-day life.
3. Using semiconductors, electronic engineers reduced the size of computers.
4. Designers cut on time and expenses applying special computer programs.

VIII. Перепишите и переведите предложения, обращая внимание на функции причастия II.

1. Installed in a proper directory, the program started working.

2. Integrated memory allows storing of huge amounts of information.
3. Recovered data weren't reliable anymore.
4. Copied to a CD, files can be removed from a hard drive.

IX. Перепишите и переведите предложения, обращая внимание на формы и функции инфинитива.

1. An input device is used to enter instructions and data into the computer.
2. To program a computer is creative work.
3. The Internet was initially a network to sustain a nuclear war.
4. He is going to outperform the computer.

X. Перепишите и переведите предложения, обращая внимание на функции герундия.

1. In a TV set a microcomputer performs tuning to a particular television frequency.
2. Programming is a profession that requires college training.
3. Hand-held computers are used for communicating, calculating and scheduling.
4. Supercomputers perform complex and time-consuming operations by breaking a task into small pieces.

XI. Прочитайте и переведите текст. Перепишите и письменно переведите абзацы 2, 3, 7.

COMPUTER

1. Computer is a machine that performs calculations and processes information with astonishing speed and precision. A computer can handle vast amounts of information and solve complicated problems. The most powerful computers can perform billions of calculations per second.

2. The first devices that resemble modern computers date to the mid-20th century (1940-1945), although the computer concept and various machines similar to computers existed earlier. Early electronic computers were the size of a large room, consuming as much power as several hundred modern personal computers.

3. The most common type of computer is the digital computer. Digital means having to do with numbers. Digital computers perform tasks by changing one set of numbers into another set. All data – numerals, pictures, sounds, symbols, and words – are translated into numbers inside the computer.

4. Digital computers are so widespread that the word computer alone almost always refers to a digital computer. The largest digital computers are parts of computer systems that fill a large room. The smallest digital computers – some so

tiny they can pass through the eye of a needle – are found inside wrist watches, pocket calculators, and other devices.

5. All digital computers have two basic parts – a memory and a processor. The memory receives data and holds them until needed. The processor changes data into useful information by converting numbers into other numbers.

6. The smallest digital computers consist only of the memory and the processor. But larger digital computers are part of systems that also contain input equipment and output equipment. The operator uses an input device, such as a keyboard, to enter instructions and data into the computer. Typical output devices include printers and visual displays that resemble television screens.

7. The microprocessor plays an important role in almost all modern computers. A microprocessor is an electronic device consisting of thousands, or even millions, of transistors and related circuitry on a chip, usually of silicon. Microprocessors are as small as a fingernail, yet have the computing power of much larger computers built before microprocessors were developed. Moreover, a microprocessor generally costs much less than would comparable equipment made up of many components.

SUPPLEMENTARY READING

Isaac Newton

Isaac Newton was born in 1642 in England. His father had died two months before his birth. When Isaac was three his mother remarried, and Isaac remained with his grandmother. He was not interested in the family farm, so he was sent to Cambridge University to study.

Isaac was born just a short time after the death of Galileo, one of the greatest scientists of all time. Galileo had proved that the planets revolve around the sun, not the earth as people thought at the time. Isaac Newton was very interested in the discoveries of Galileo and others. Isaac thought the universe worked like a machine and that a few simple laws governed it. Like Galileo, he realized that mathematics was the way to explain and prove those laws. Isaac Newton was one of the world's great scientists because he took his ideas, and the ideas of earlier scientists, and combined them into a unified picture of how the universe works.

Isaac explained the workings of the universe through mathematics. He formulated laws of motion and gravitation. These laws are math formulas that explain how objects move when a force acts on them. Isaac published his most famous book, Principia, in 1687 while he was a mathematics professor at Trinity College, Cambridge. In the Principia, Isaac explained three basic laws that govern the way objects move. He then described his idea, or theory, about gravity. Gravity is the force that causes things to fall down. If a pencil falls off a desk, it will land on the floor, not the ceiling. In his book Isaac also used his laws to show that the planets revolve around the suns in orbits that are oval, not round.

When most people think of Isaac Newton, they think of him sitting under an apple tree observing an apple fall to the ground. When he saw the apple fall, Newton began to think about a specific kind of motion – gravity. Newton understood that gravity was the force of attraction between two objects. He also understood that an object with more matter –mass- exerted the greater force, or pulled smaller object toward it. That meant that the large mass of the earth pulled objects toward it. That is why the apple fell down instead of up, and why people don't float in the air.

Isaac thought about gravity and the apple. He thought that maybe gravity was not just limited to the earth and the objects on it. What if gravity extended to the moon and beyond? Isaac calculated the force needed to keep the moon moving around the earth. Then he compared it with the force the made the apple fall downward. After allowing for the fact that the moon is much farther from the earth, and has a much greater mass, he discovered that the forces were the same. The moon is held in an orbit around earth by the pull of earth's gravity.

Isaac Newton's calculations changed the way people understood the universe. He also showed that the force of gravity was affected by distance and by mass. He was not the first to understand that the orbit of a planet was not circular, but more elongated, like an oval. What he did was to explain how it worked.

Nikola Tesla

Nikola Tesla was born in 1856 in Austria-Hungary and emigrated to the U.S. in 1884 as a physicist. He pioneered the generation, transmission, and use of alternating current (AC) electricity, which can be transmitted over much greater distances than direct current.

Tesla patented a device to induce electrical current in a piece of iron (a rotor) spinning between two electrified coils of wire. This rotating magnetic field device generates AC current when it is made to rotate by using some form mechanical energy, like steam or hydropower. When the generated current reaches its user and is fed into another rotating magnetic field device, this second device becomes an AC induction motor that produces mechanical energy. Induction motors run household appliances like clothes washers and dryers. Development of these devices led to widespread industrial and manufacturing uses for electricity.

The induction motor was only part of Tesla's overall conception. In a series of history-making patents, he demonstrated a polyphase alternating-current system, consisting of a generator, transformers, transmission layout, and motor and lights. From the power source to the power user, it provided the basic elements for electrical production and utilization. Our AC power system remains essentially unchanged today.

In 1888, George Westinghouse, head of the Westinghouse Electric Company, bought the patent rights to Tesla's system of dynamos, transformers and motors. Westinghouse used Tesla's alternating current system to light the World's Columbian Exposition of 1893 in Chicago. Then in 1896, Tesla's system was used at Niagara Falls in the world's first large hydroelectric plant. The Tesla coil, invented in 1891, is still used in radio and television sets, car starters, and a wide variety of electronic equipment.

Tesla's work with radio-frequency waves laid the foundation for today's radio. He experimented with wireless transmission of electrical power, and received 112 patents for devices ranging from speedometers to extremely efficient electrical generators to a bladeless turbine still in use today. He suggested that it was possible to use radio waves to detect ships (later developed as RADAR), and his work with special gas-filled lamps set the stage for the creation of fluorescent lighting.

Tesla was Thomas Edison's rival at the end of the 19th century – in fact, he was more famous than Edison throughout the 1890's. His invention of polyphase AC electric power earned him worldwide fame but not fortune. At his zenith his circle of friends included poets and scientists, industrialists and financiers. Yet Tesla died alone and almost penniless in a New York hotel room in 1943. During his life, Tesla created a legacy of genuine invention that still fascinates today. After his death, the world honored him by naming the unit of magnetic flux density the "tesla."

Why is cyberspace security important?

Electronic computing and communication pose some of the most complex challenges engineering has ever faced. They range from protecting the confidentiality and integrity of transmitted information and deterring identity theft to preventing the scenario recently dramatized in the Bruce Willis movie “Live Free or Die Hard,” in which hackers take down the transportation system, then communications, and finally the power grid.

As that movie depicted, networks of electronic information flow are now embedded in nearly every aspect of modern life. From controlling traffic lights to routing airplanes, computer systems govern virtually every form of transportation. Radio and TV signals, cell phones, and (obviously) e-mail all provide vivid examples of how communication depends on computers – not only in daily life, but also for military, financial, and emergency services. Utility systems providing electricity, gas, and water can be crippled by cyberspace disruptions. Attacks on any of these networks would potentially have disastrous consequences for individuals and for society.

In fact, serious breaches of cybersecurity in financial and military computer systems have already occurred. Identity theft is a burgeoning problem. Viruses and other cyber-attacks plague computers small and large and disrupt commerce and communication on the Internet.

Yet research and development for security systems has not progressed much beyond a strategy akin to plugging the hole in the dike – cobbling together software patches when vulnerabilities are discovered.

Historically, the usual approach to computer protection has been what is called “perimeter defense.” It is implemented by placing routers and “firewalls” at the entry point of a sub-network to block access from outside attackers. Cybersecurity experts know well that the perimeter defense approach doesn’t work. All such defenses can eventually be penetrated or bypassed. And even without such breaches, systems can be compromised, as when flooding Web sites with bogus requests will cause servers to crash in what is referred to as a “denial of service” attack or when bad guys are already inside the perimeter.

The problems are currently more obvious than the potential solutions. It is clear that engineering needs to develop innovations for addressing a long list of cybersecurity priorities. For one, better approaches are needed to authenticate hardware, software, and data in computer systems and to verify user identities. Biometric technologies, such as fingerprint readers, may be one step in that direction.

Make solar energy economical

As a source of energy, nothing matches the sun. It out-powers anything that human technology could ever produce. Only a small fraction of the sun's power output strikes the Earth, but even that provides 10,000 times as much as all the commercial energy that humans use on the planet.

Already, the sun's contribution to human energy needs is substantial – worldwide, solar electricity generation is a growing, multibillion dollar industry. But solar's share of the total energy market remains rather small, well below 1 percent of total energy consumption, compared with roughly 85 percent from oil, natural gas, and coal.

Those fossil fuels cannot remain the dominant sources of energy forever. Whatever the precise timetable for their depletion, oil and gas supplies will not keep up with growing energy demands. Coal is available in abundance, but its use exacerbates air and water pollution problems, and coal contributes even more substantially than the other fossil fuels to the buildup of carbon dioxide in the atmosphere.

For a long-term, sustainable energy source, solar power offers an attractive alternative.

Its availability far exceeds any conceivable future energy demands. It is environmentally clean, and its energy is transmitted from the sun to the Earth free of charge. But exploiting the sun's power is not without challenges. Overcoming the barriers to widespread solar power generation will require engineering innovations in several arenas – for capturing the sun's energy, converting it to useful forms, and storing it for use when the sun itself is obscured.

Many of the technologies to address these issues are already in hand. Dishes can concentrate the sun's rays to heat fluids that drive engines and produce power, a possible approach to solar electricity generation.

But today's commercial solar cells, most often made from silicon, typically convert sunlight into electricity with an efficiency of only 10 percent to 20 percent, although some test cells do a little better.

Given their manufacturing costs, modules of today's cells incorporated in the power grid would produce electricity at a cost roughly 3 to 6 times higher than current prices, or 18-30 cents per kilowatt hour. To make solar economically competitive, engineers must find ways to improve the efficiency of the cells and to lower their manufacturing costs.

Prospects for improving solar efficiency are promising. Current standard cells have a theoretical maximum efficiency of 31 percent because of the electronic properties of the silicon material. But new materials, arranged in novel ways, can evade that limit, with some multilayer cells reaching 34 percent efficiency. Experimental cells have exceeded 40 percent efficiency.

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