МИНИСТЕРСТВО ОБРАЗОВАНИЯ РЕСПУБЛИКИ БЕЛАРУСЬ

УЧРЕЖДЕНИЕ ОБРАЗОВАНИЯ
"ВИТЕБСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНОЛОГИЧЕСКИЙ УНИВЕРСИТЕТ"

АНГЛИЙСКИЙ ЯЗЫК

МЕТОДИЧЕСКАЯ РАЗРАБОТКА
ПО ТЕМЕ

«ПРОМЫШЛЕННОСТЬ И ТЕХНОЛОГИИ»

для студентов
специальности «Машины и аппараты лёгкой промышленности»
(36080101)

ВИТЕБСК
2005

УДК 802.0 (07)

Английский язык. Методическая разработка по теме "Промышленность и технологии" для студентов специальности "Машины и аппараты лёгкой промышленности".

Витебск: Министерство образования Республики Беларусь, УО "ВГТУ", 2005 г.

Составители: преп. Степанов Д. А., Сасновская А. В.

Настоящая методическая разработка предназначена для студентов II курса, изучающих машины и аппараты лёгкой промышленности. К каждому уроку разработаны лексические упражнения на формирование навыков чтения и профессионального общения.

Одобрено кафедрой иностранных языков УО "ВГТУ"
1 декабря 2005 г., протокол № 4

Рецензент: преподаватель кафедры иностранных языков УО "ВГТУ" Имперович В.В.

Редактор: преподаватель кафедры иностранных языков УО "ВГТУ" Новицкая В.Л.

Рекомендовано к опубликованию редакционно-издательским советом УО "ВГТУ"
" 21 " декабря 2005 г., протокол № 5

Учрежден ... гический
универси...

Подписан ... г. 23
Печать р... 800 р.

Отпечата... еля 2004 г.
210035, г...

CONTENTS

Unit I: The World of Engineering

SCIENCE AND TECHNOLOGY OF GREAT BRITAIN

Britain has been a world leader in science and technology, and since the Industrial Revolution the nation has been a pioneer in the use of machinery. The profession of modern engineering emerged from the work of the skilled craftsmen of the 18th and 19th centuries.

Modern science owes much to 16th-century philosopher and statesman Francis Bacon, whose theories of experimentation laid the foundation of the scientific method. Sir Isaac Newton, a scientific genius in physics and mathematics, formulated the laws of motion and gravity. Michael Faraday, another outstanding figure in British science, made important discoveries in chemistry and electricity. His work led to the creation of the electric generator. In physics, several British scientists carried on atomic research, most notably Ernest Rutherford, Sir Joseph John Thomson, and Sir John Douglas Cockcroft.

The technology of the Industrial Revolution was not developed by scientists but by practical craftsmen—locksmiths, carpenters, and blacksmiths. A key invention was a steam engine, which Scottish inventor James Watt developed in the late 18th century. Steam power was then used to run various machines, including the spinning jenny, invented by James Hargreaves in the 1760s; the spinning frame, invented by Sir Richard Arkwright; and the power loom invented by Edmund Cartwright. All of these early inventions of the Industrial Revolution were first used in the textile industry, where the mass production of cotton cloth by machine was revolutionary.

In the 20th century, British science and technology continued on the cutting edge. British technology pioneered in the development of radar and jet engines. In chemistry British scientists have developed a biodegradable plastic and are working on substitutes for chlorofluorocarbons, which destroy the Earth's ozone layer. British scientists in Antarctica discovered a hole in the ozone layer in 1985. They have also made advances in the fields of astrophysics and superconductivity. Scientific engineers also are at the forefront in developing semiconductors and fiber-optic cables.

Active Vocabulary

skilled craftsman – искусный мастер, ремесленник
to emerge from – появляться, возникать
statesman - государственный деятель
locksmith - слесарь
carpenter - плотник, столяр
blacksmith - кузнец
spinning jenny - прядильная машина периодического действия
spinning frame - прядильная машина
water frame - кольцепрядильная машина
power loom – механический ткацкий станок
cutting edge – передовой, современный этап
biodegradable plastic - разлагаемая микроорганизмами пластмасса

chlorofluorocarbons – хлорофторуглеродные соединения (CFC's)
superconductivity - сверхпроводимость
at the forefront - на первом месте

EXERCISES

1. Comprehension exercises.
1.1. Какие 2 из данных фактов рассматриваются в тексте:

1. Biography of Sir Isaac Newton.
2. Invention of steam engine.
3. Development of technology in Great Britain
4. Industrial Revolution
5. The modern stage of British science.

1.2. Подумайте над ответами на вопросы:

1. What country has a leading role in science and technology now? Why?
2. Which changes in the world technology did the invention of steam engine cause?

1.3. Найдите в тексте ответы на следующие вопросы:

1. How did the profession of modern engineering appear?
2. Whom does the modern science owe?
3. Who formulated the laws of motion and gravity?
4. What research did Ernest Rutherford, Sir Joseph John Thomson, and Sir John Douglas Cockcroft carry on?
5. Who invented a steam engine?
6. What was the steam power used for?
7. Where were the early inventions of the Industrial Revolution used in?
8. When was a hole in the ozone layer discovered?
9. How do chlorofluorocarbons influence on the ozone layer?
10. What was the role of practical craftsmen in the Industrial Revolution?

1.4. Определите, соответствуют ли следующие предложения содержанию текста. Сделайте необходимые изменения, чтобы утверждение стало верным.

1. The profession of modern engineering emerged from the work of the scientists of the 18th and 19th centuries.
2. Sir Isaac Newton formulated the laws of radioactivity.
3. Michael Faraday's research contributed to the creation of the electric generator.
4. Ernest Rutherford, Sir Joseph John Thomson, and Sir John Douglas Cockcroft worked on the creation of atomic bomb.
5. Spinning jenny, the spinning frame and other machinery were powered by steam.
6. Early inventions of the Industrial Revolution were first used in the military industry.

7. In the 20th century, Great Britain has a leading role in science and technology.
8. The chlorofluorocarbons substitutes destroy the Earth's ozone layer.
9. British technology was one of the first in the development of radar and jet engines.
10. British scientists in Antarctica created a hole in the ozone layer in 1985.

1.5. Найдите в тексте, какой вклад в развитие британской науки и техники сделали следующие люди:

1. Isaac Newton
2. Michael Faraday
3. Ernest Rutherford
4. James Watt
5. Francis Bacon

2. Vocabulary exercises.

2.1. Подберите синонимы из колонки B к словам из колонки A:

1. to emerge from	a. equipment
2. machinery	b. distinguished
3. outstanding	c. to demolish
4. discovery	d. growth
5. various	e. to appear
6. skilled	f. progress
7. production	g. different
8. to destroy	h. experienced
9. development	i. manufacture
10. advance	j. invention

2.2. Найдите определения к данным словам:

1. gravity	a. the science of systematic knowledge of the industrial arts,
2. physics	especially of the more important manufactures, as spinning,
3. technology	weaving, metallurgy
4. invention	b. a man of superior intellectual faculties
5. genius	c. the tendency of a mass of matter toward a center of attraction
	d. the science of nature, or of natural objects; that branch of science which treats of the laws and properties of matter,
	e. the act of finding out or construction of that which has not before existed

2.3. Найдите в тексте слова, которые имеют следующие значения:

1. A craftsman whose occupation is to make or mend locks.
2. A craftsman who mixes in iron with a forge, and makes iron utensils, horseshoes.

3. A frame or machine of wood or other material, in which a weaver forms cloth out of thread.
4. A machine that transforms mechanical into electrical energy.
5. A substance composed predominantly of a synthetic organic high polymer capable of being cast or molded.

2.4.Замените подчёркнутое слово словом или фразой из текста.

1. Ernest Rutherford was the earliest explorer in the use of radiation in his experiments.
2. The wheel was the most important invention of ancient times.
3. The formulating of nuclear reaction made possible the creation of atomic bomb.
4. Our plant takes a first place in heavy machinery production.
5. Only experienced engineers are able to solve this problem.

2.5. Дополните предложения подходящими по смыслу союзами из рамки. Какие союзы лишние?

and, since, though, because of, then, where, but, as,

1. Britain has been a pioneer in the use of machinery… the Industrial Revolution.
2. Modern science owes much to 16th-century philosopher… statesman Francis Bacon.
3. The technology of the Industrial Revolution was not developed by scientists… by practical craftsmen.
4. Steam power was… used to run various machines.
5. These inventions of the Industrial Revolution were used in the textile industry, … the mass production of cotton cloth by machine was revolutionary.

3. Text summary.

3.1. Подготовьте краткий пересказ текста, используя предложенный план:

1. Great Britain is a leader in science and technology
2. People who contributed to the development of British science.
3. Inventions which led to the Industrial revolution.
4. Science and technology of the 20th century.

3.2 Подготовьте доклад о развитии науки и техники в нашей стране.

4. Слова для запоминания:

to emerge from	locksmith	production	power loom
machinery	carpenter	to destroy	cutting edge
outstanding	blacksmith	development	superconductivity
discovery	spinning jenny	advance	at the forefront
various	spinning frame	gravity	invention
skilled	water frame	physics	genius

WHAT IS ENGINEERING

Engineering is the profession that puts scientific knowledge to practical use. 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. Engineers have had a direct role in the creation of most of modern technology--the tools, materials, techniques, and power sources that make our lives easier.

The field of engineering includes a wide variety of activities. For example, engineering projects range from the construction of huge dams to the design of tiny electronic circuits. Engineers may help produce guided missiles, industrial robots, or artificial limbs for the physically handicapped. They develop complex scientific equipment to explore the reaches of outer space and the depths of the oceans. Engineers also plan our electric power and water supply systems, and do research to improve automobiles, television sets, and other consumer products. They may work to reduce environmental pollution, increase the world's food supply, and make transportation faster and safer.

There are a multitude of mechanical engineering advancements that are crucial to our everyday lives, making them easier, faster and more efficient. For example, medical engineering companies are now developing surgical robotic systems for orthopaedic, spinal and dental surgery. Environmental engineers in the UK are producing world-leading technology in emission control. UK based mechanical engineers in the defence industry are creating an innovative protection system for the International Space Station. This describes just a few of the exciting, innovative and challenging projects that mechanical engineers are involved in.

In ancient times, there was no formal engineering education. The earliest engineers built structures and developed tools by trial and error. Today, special college training prepares engineers to work in a certain branch or field of engineering and standards of quality and performance guide them on the job.

Active Vocabulary

engineering – машиностроение, инженерное искусство
to design structures, machines, and products – проектировать устройства, инструменты и изделия
techniques - методы
tiny electronic circuit - микропроцессор
guided missile – управляемая ракета
equipment - оборудование
electric power and water supply systems – системы электро- и водоснабжения
to reduce - сокращать
multitude - множество
orthopaedic - ортопедический
emission control – контроль выбросов в окружающую среду
challenging – многообещающий

by trial and error – методом проб и ошибок
performance - производительность

EXERCISES

1. Comprehension exercises.
1.1. Какие 2 из данных фактов рассматриваются в тексте:

1. Danger of environmental pollution.
2. Role of engineering in human's life.
3. Engineering activities.
4. Development of surgical robots.
5. Engineering education in ancient times.

1.2. Подумайте над ответами на вопросы:

1. What is the main function of the engineer?
2. Is the engineering profession important nowadays?

1.3. Найдите в тексте ответы на следующие вопросы:

1. What does engineering, as the profession, do?
2. What do the engineers look for?
3. What activities are included into the engineering?
4. Where are artificial limbs used for?
5. How did the earliest engineers build structures and develop tools?
6. What mechanical engineering advancements do you now? Give your own examples.
7. What scientific equipment to explore outer space and the oceans invented by engineers?
8. What do the engineers use to design different products?
9. What do we use power and water supply systems for?
10. What standards guide engineers on their jobs?

1.4. Определите, соответствуют ли следующие предложения содержанию текста. Сделайте необходимые изменения, чтобы утверждение стало верным.

1. The word engineering comes from the Greek word *ingeniare*.
2. Engineers develop new methods for using of existing resources.
3. Engineering projects include the construction of huge dams and the design of tiny electronic circuits.
4. Making transportation faster and safer engineers increase environmental pollution.
5. Mechanical engineering advancements do not influence our everyday lives.
6. Engineering is used in medicine as well.
7. Engineering education was extremely popular in ancient times.
8. The earliest engineers did thorough experiments before building structures and developing tools.

9. Environmental engineers are producing an innovative protection system for the International Space Station.
10. Modern technology is the result of engineering.

1.5. Назовите сферы человеческой деятельности, в которых используются следующие инженерные изделия:

1. A bridge
2. A robot
3. An airplane
4. A crane
5. An assembly line

2. Vocabulary exercises.

2.1. Подберите синонимы из колонки B к словам из колонки A:

A	B
1. to mean	a. to search for
2. to look for	b. navigated
3. guided	c. false
4. to increase	d. producing
5. artificial	e. contamination
6. to range from… to	f. secure
7. creation	g. education
8. pollution	h. to denote
9. training	i. to enlarge
10.safe	j. vary from ... to

2.2. Подберите антонимы из колонки B к словам из колонки A:

A	B
1. complex	a. natural
2. to reduce	b. dangerous
3. artificial	c. huge
4. safe	d. narrow
5. guided	e. attack
6. tiny	f. slow
7. wide	g. simple
8. defense	h. inefficient
9. efficient	i. uncontrollable
10.fast	j. enlarge

2.3. Найдите определения к данным словам:

1. science	a. Any branch or department of systematized knowledge considered as a distinct field of investigation or object of study.
2. electronic circuit	
3. robot	
4. pollution	b. A computer-controlled machine that is programmed to move, manipulate objects, and accomplish work while interacting with its environment.
5. environment	c. A contamination of Earth's environment with materials that interfere with human health, the quality of life, or the natural functioning of ecosystems.
	d. The condition of the water, air, soil, plants and animals, natural surroundings.
	e. A small piece of semiconducting material containing in an electronic circuit

2.4. Найдите в тексте слова, которые имеют следующие значения:

1. A self-propelled weapons which are guided in flight toward a target either by remote control or by internal mechanisms.
2. A barrier or special construction which prevents the flow of a liquid or harnesses the river to the production of electricity.
3. The branch of medical science which treats of manual operations for the healing of diseases or injuries of the body.
4. The system which provides water for domestic, industrial and irrigation needs.
5. The mechanical devices which are designed to reproduce the form, and the function, of a lost or absent part.

2.5. Замените подчёркнутое слово словом или фразой из текста.

1. The chief goal of academic education is to apply scientific knowledge to practical use.
2. There exists a great variety of challenging projects in various fields of science.
3. After installing of the new equipment the number of workers was lowered.
4. This group of researches uses the most advanced methods in their work.
5. To make better the efficiency of this machine we need to use synthetic materials.

2.6. Поставьте слова в правильном порядке, чтобы получились предложения.

1. with the construction, of, deals, engineering, buildings, roads, bridges.
2. began to, kinds of work, specialize, engineers, in, certain.
3. new fields of, are emerging, and technological, as a result of, engineering, breakthroughs
4. the structure, materials engineering, various materials, studies, and uses of.
5. design, mechanical engineers, and operate, all kinds of machines
6. nuclear engineers, nuclear power plants, construct, and design.

7. human use, is, human engineering, machines, to make, the purpose of, for?
8. engineers, a new machine, discovered, the efficiency of.
9. the, computer engineering, current trend in, is, microminiaturization.
10. manufacturing, articles, of, does, by, machinery, making, mean?

2.7. Прочитайте отрывок, заполните пропуски словами в рамке.

based, concerned, contributed(x2), science, occurred, attempts, learned, technology, nuclear

Science 1… to explain how and why things happen. Technology is 2… with making things happen. Since 1850, science has 3… much to modern technology. However, technology has often 4 …to science. In addition, not all technology is 5… on science, nor 6… is necessary to all 7…. For example, people made objects of iron for hundreds of years before they 8… about the changes that 9… in the structure of the metal during ironmaking. But some modern technologies, such as 10… power production and space travel, depend heavily on science.

2.8. Заполните предложения словами в правильной форме.

1. This machine is capable of performing any operation of very great… .	complex
2. This system can produce a great number of…operations.	engine
3. The industry requires highly… equipment.	develop
4. They observed… in productive efficiency.	reduce
5. The… of this device will take more than a year.	create
6. Scientists decided to launch a new space… program.	explore
7. A new plan was approved after several serious….	improve
8. These results are of… use.	practice
9. New scientific… make work easier to do.	discover
10. The field of engineering includes a wide… of activities.	vary

3. Text summary

3.1. Подготовьте краткий пересказ текста, используя предложенный план:

1. The meaning of the word engineering.
2. The role of engineers.
3. Engineering activities.
4. Engineering advancements.
5. Engineering education.

3.2. Напишите 10-15 предложений о том, как развивались инженерные науки в истории человечества.

4. Слова для запоминания:

to mean	complex
to look for	to reduce
guided	artificial
to increase	safe
artificial	tiny
to range from… to	wide
creation	defense
pollution	efficient
training	fast
safe	guided missile
science	dam
electronic circuit	water supply
robot	challenging
environment	by trial and error

Why Study Mechanical Engineering

Thousands of years ago 'mechanical engineers' invented the wheel. Today's mechanical engineers have created the London Eye - the most modern and advanced wheel of the 21st century. The London Eye is a massive mechanical marvel that is placed close to the River Thames. Mechanical engineering played a vital part in the design, manufacture and installation of the Eye, something that was originally believed to be impossible. Now it is both an extremely popular tourist attraction and an inspiration to future engineers.

Mechanical engineering courses in British universities offer the highest quality teaching and research. Mechanical engineers are among the most highly paid professionals in UK business.

Mechanical engineering is concerned with design, development, installation, operation and maintenance of anything that has movable parts. As a result, there are job opportunities for mechanical engineers in practically every field of work, transport, health, defence, manufacturing, entertainment, finance, publishing, building, design and research. Mechanical engineering projects can range from designing heart valves and artificial limbs, clockwork radios and dentists' drills to building racing cars, jet engines or space modules.

A career in mechanical engineering would suit a 'behind the scenes' or 'in front of the camera' type person. The only pre-requirements are high academic qualifications and a passion for learning and enthusiasm for making things happen.

How to choose the right course and university

Mechanical engineering courses vary widely in content, assessment and teaching. Deciding which course to do is no easy task, but your choice can guarantee your future career prospects. The basic mechanical engineering degree course includes certain major subjects - communication, drawing and computer aided design (CAD) and engineering control, electrical machines and power, fluid mechanics, materials, stress analysis, thermodynamics and heat transfer, dynamics and vibration, electronics, manufacturing systems, measurement and instrumentation, statics and structures. Courses can also cover a number of other supplementary subjects, for example - business management, accountancy and informational technologies(IT).

Active Vocabulary

mechanical engineering - машиностроение
to invent – изобретать
marvel – чудо, предмет удивления
to manufacture – производить, изготавливать
installation - установка
inspiration – вдохновение, воодушевление
to be concerned with - занятый чем-л.; связанный с чем-л.
maintenance – техническое обслуживание

movable - подвижный
opportunity – возможность
heart valves – сердечные клапаны
artificial limbs – искусственные протезы
jet engine – реактивный двигатель
to suit – подходить, соответствовать
pre-requirement – предварительное требование
making things happen – осуществлять, реализовывать, создавать
assessment - оценка
career prospects – профессиональные перспективы
computer aided design (CAD) – система автоматизированного проектирования (САПР)
stress analysis - исследование напряжённого состояния
heat transfer - термодинамика
to cover – охватывать, освещать
supplementary subjects – факультативные предметы
accountancy – бухгалтерский учёт

EXERCISES

1. Comprehension exercises.
1.1. Какие утверждения рассматриваются в тексте:

1. Invention of the wheel was made by the mechanical engineers.
2. The London Eye is a mechanical marvel.
3. Social rank of engineers in Great Britain.
4. The range of engineering projects.
5. Requirements of personal characteristic for an engineer.
6. Choosing of the course and university.
7. Engineering subjects.

1.2. Подумайте над ответами на вопросы:

1. Why have you chosen the career of a mechanical engineer?
2. Which engineering subjects do you study at the University?

1.3. Найдите в тексте ответы на следующие вопросы:

1. How is the most modern and advanced wheel of the 21st century called?
2. What is the London Eye? Does it have any practical use?
3. What does the London Eye mean for engineers?
4. What is mechanical engineering concerned with?
5. How do engineering projects range?
6. Whom does career in mechanical engineering suit?

7. What are the main requirements for an engineer professional?
8. What depends on the choice of an academic course?
9. Which subjects are included into the basic mechanical engineering course?

1.4. Определите, соответствуют ли следующие предложения содержанию текста. Сделайте необходимые изменения, чтобы утверждение стало верным.

1. Thousands of years ago 'mechanical engineers' invented the wheel which was called the London Eye.
2. The London Eye is a bridge that crosses the River Thames.
3. The London Eye inspires future engineers.
4. Mechanical engineers get high salaries in Great Britain.
5. British universities provide engineering education of the highest quality.
6. Mechanical engineers have plenty of career opportunities.
7. Mechanical engineers are good actors as they can play secondary and leading parts.
8. Mechanical engineering courses are very different.
9. It is very easy to choose the course.
10. Business management is the major engineering subject.

1.5. Определите, какие из приведённых ниже учебных предметов являются обязательными для инженерных специальностей, а какие прикладными:

1. Computer Aided Design.
2. Electronics.
3. Industrial management.
4. Machines and Power.
5. Materials and Stress Analysis
6. Accounting
7. Manufacturing Systems.
8. Labor Safety.

2. Vocabulary exercises

2.1. Подберите синонимы из колонки B к словам из колонки A:

A	B
1. massive	a. important
2. marvel	b. training
3. vital	c. job
4. impossible	d. main
5. inspiration	e. wonder
6. teaching	f. enormous
7. opportunity	g. to comprise
8. career	h. enthusiasm
9. major	i. chance
10.to cover	j. unbelievable

2.2. Подберите антонимы из колонки В к словам из колонки А:

A	B
1. modern	a. statics
2. close to	b. compulsory
3. future	c. wrong
4. professional	d. dismantling
5. movable	e. amateur
6. enthusiasm	f. far from
7. installation	g. past
8. dynamics	h. fixed
9. supplementary	i. indifference
10.right	j. outdated

2.3. Найдите определения к данным словам:

1. engineering	a. the branch of mechanics which treats of the motion of bodies and the action of forces in producing or changing their motion.
2. design	b. inquiry or examination in seeking facts or principles
3. research	c. the art and science by which the mechanical properties of matter are made useful to man in structures and machines;
4. mechanics	d. the science, or branch of applied mathematics, which treats of the action of forces on bodies.
5. dynamics	e. a plan or scheme formed in the mind of something to be done

2.4. Найдите в тексте названия учебных предметов, которые означают:

1. The branch of physics which treats of the mechanics of liquids, or of their laws of equilibrium and of motion.
2. The act or the art of representing any object on paper by means of lines and shades.
3. The science which treats of the mechanical action or relations of heat.
4. The branch of mechanics which treats of the equilibrium of forces.
5. The application of computers in the design and manufacture of components used in the production.

2.5. Замените подчёркнутое слово словом или фразой из текста.

1. Enormous dam was constructed to embank the river.
2. The first horseless carriage which shook, rattled and rolled was a technical miracle of 19th century.
3. Good knowledge of mathematics is necessary in this sphere of activity.
4. The position of a mechanical engineer should agree with his abilities.
5. The engineers assured that those machines would last 5 years.

2.6. Поставьте слова в правильном порядке, чтобы получились предложения.

1. demands, the development of, skills, workers, new technologies, with, computer and engineering.
2. specialize in, engineering, today, the applied sciences, educational institution, and.
3. are involved in, projects, innovative, the mechanical engineers.
4. benefit from, people, last century, this, mechanical engineering, advancements of.
5. efficiency, a mechanical engineer, products, must design, for economy, and.
6. many, large, in engineering, do, professionals, industries, require, highly educated.
7. manufacture and construction, methods of, engineering, scientific, are applied in.
8. not only, larger and more complex, them, engineers, realize, dream of, structures, but also.
9. Engineers in industry work with machines as well as with people.
10. deals with, and time-study engineering, the relation to, of a machine, the position, other equipment.

3. Text summary.

3.1. Подготовьте краткий пересказ текста, используя предложенный план:

1. The London marvel of the millennium.
2. Job opportunities for engineers.
3. Professional requirements and characteristics.
4. Engineering courses and subjects to study.

3.2. Расскажите, почему вы выбрали профессию инженера. Какими качествами и навыками должен обладать будущий инженер.

4. Слова для запоминания:

massive	modern
marvel	close to
vital	future
impossible	professional
inspiration	movable
teaching	enthusiasm
opportunity	installation
career	dynamics
major	supplementary
to cover	right
static	engineering
drawing	design
to invent	research
artificial limbs	mechanics
jet engine	dynamics
computer aided design	stress analysis

Unit II: Great Inventions and People Who Make Them

James Watt and Invention of Steam Engine

Steam engine is a mechanical device used to transfer the energy of steam into mechanical energy for a variety of applications, including propulsion and generating electricity. The basic principle of the steam engine involves transforming the heat energy of steam into mechanical energy by permitting the steam to expand and cool in a cylinder equipped with a movable piston. In most power generation applications the steam engines have been replaced by steam turbines because of their low efficiency.

The first piston engine was developed in 1690 by the French physicist and inventor Denis Papin and was used for pumping water. Papin's engine was a crude machine in which the actual work was done by air rather than steam pressure.

The first practical steam engine, the so-called atmospheric engine, was built by the English inventor Thomas Newcomen in 1712. This device had a vertical cylinder and a piston that was counterweighted. Steam admitted to the bottom of the cylinder at very low pressure acted with the counterweight to move the piston to the top of the cylinder. When the piston reached this point, a valve opened automatically and sprayed a jet of cold water into the cylinder. Newcomen's engine was not efficient, but it was sufficiently practical to be used extensively for pumping water from coal mines.

The Scottish engineer and inventor James Watt produced a series of inventions that made possible the modern steam engine. Watt devised a method in which the reciprocating pistons of engines drove a revolving flywheel. He accomplished this by means of a crankshaft, as in modern engines. Watt's other improvements and inventions included application of the principle of double action, whereby steam was admitted to each end of the cylinder alternately to drive the piston back and forth. He also equipped his engines with throttle valves to control speed and also with governors in order to maintain automatically a constant speed of operation.

At the beginning of the 19th century the British engineer and inventor Richard Trevithick and the American inventor Oliver Evans devised successful noncondensing engines using the high-pressure steam.

Active Vocabulary

engine - двигатель
to transfer – передавать, превращать
propulsion - силовая установка, двигатель
to permit - позволять
piston - поршень
efficiency – эффективность, коэффициент полезного действия
to pump – качать; pump *n* - насос
counterweight - противовес
valve - клапан

to spray - впрыскивать
jet - струя
extensively – в значительной степени, широко
devise – прибор, устройство, механизм
reciprocating - совершающий возвратно-поступательное движение
flywheel (fly wheel) - маховик
to accomplish – завершать, выполнять
crankshaft - коленчатый вал
alternately - поочерёдно; попеременно
back and forth – взад и вперёд
throttle valve - дроссельный клапан
governor – зд. регулятор
to maintain – сохранять, поддерживать
noncondensing - неконденсирующийся

EXERCISES

1. Comprehension exercises.
1.1. Какие 2 из данных фактов рассматриваются в тексте:

1. The efficiency of steam turbines.
2. Means for pumping water.
3. Principles of the steam engine.
4. Development of the steam engine.
5. James Watt's biography.

1.2. Подумайте над ответами на вопросы:

1. Why did people need in a steam engine?
2. What type of engine is likely to replace all the existing engines?

1.3. Найдите в тексте ответы на следующие вопросы:

1. What kind of a device is the steam engine?
2. What is the work of a steam engine based on?
3. Why has a steam turbine replaced the steam engine?
4. When was the first steam engine build? What was it used for?
5. Who made the first modern steam engine?
6. How does a steam engine work?
7. What was the Watt's engine equipped with?
8. What did other Watt's inventions include?
9. When was the first noncondensing engine devised?
10. What steam is used in a noncondensing engine?

1.4. Определите, соответствуют ли следующие предложения содержанию текста. Сделайте необходимые изменения, чтобы утверждение стало верным.

1. Transformation of heat energy into mechanical makes a steam engine work.
2. The work of the first steam engine was done by water pressure.
3. The first steam engines were used for generating electricity.
4. James Watt improved the steam engine.
5. Steam was admitted to each end of the cylinder simultaneously that made piston move back and forth.
6. It was impossible to control the speed of Watt's engine.
7. A valve sprayed a jet of hot water into the cylinder.
8. Steam engines were used to pump water from coal mines.
9. The first modern steam engine was invented in Great Britain.
10. At present steam engines are mostly replaced by steam turbines.

1.5. Опишите паровой двигатель следующих изобретателей:

1. Denis Papin
2. Thomas Newcomen
3. James Watt
4. Richard Trevithick and Oliver Evans

2. Vocabulary exercises.

2.1. Подберите синонимы из колонки B к словам из колонки A:

A	B
1. to transfer	a. to let in
2. to involve	b. continual
3. to replace	c. to reach
4. efficiency	d. rotating
5. crude	e. to include
6. jet	f. to substitute
7. revolving	g. effectiveness
8. to accomplish	h. to transform
9. to admit	i. current
10.constant	j. coarse

2.2. Подберите антонимы из колонки B к словам из колонки A:

A	B
1. to permit	a. top
2. actual	b. variable
3. practical	c. potential
4. vertical	d. failed
5. bottom	e. simultaneously
6. extensively	f. horizontal

7. double	g. to prevent
8. alternately	h. rarely
9. constant	i. theoretical
10.successful	j. single

2.3. Найдите в тексте названия частей парового двигателя, которые имеют следующие определения:

1. A compound machine by which any physical power is applied to produce a given physical effect.
2. A sliding piece which either is moved by, or moves against, fluid pressure. It is used in steam engines to receive motion from the steam, and in pumps to transmit motion to a fluid.
3. The chamber of a steam engine in which the piston is moved by the force of steam.
4. A mass of metal in one side of flywheel which balances the weight.
5. A heavy wheel attached to a machine which has revolving motion to keep its parts moving at an even speed.
6. A plug or cover which opens or closes to permit or prevent passage of a fluid or steam.

2.4. Замените подчёркнутое слово словом или фразой из текста.

1. A number of mechanical devices have their own built-in power unit.
2. This apparatus is fitted up with expensive devices.
3. Steam turbines have found their use in driving electric generators and powering ocean liners and large machinery.
4. Nowadays some industries substitute plastics and other synthetics for natural materials.
5. This machine allows a cutting tool to move up and down as well as backwards and forwards.
6. The installation of steam engines helped manufacturers keep production at a high level.
7. Invention of the steam engine enabled the invention of a locomotive.
8. The mechanical engineers thought out the method of more efficient use of fuel.
9. Earlier water pumps were driven with the help of animal power.
10. James Watt introduced valve regulators in his engine.

3. Text summary.

3.1. Подготовьте краткий пересказ текста, используя предложенный план:

1. The basic principle of a steam engine.
2. The invention of the first piston engine.
3. The steam engine of Thomas Newcomen.
4. James Watt and his steam engine.
5. Further improvements of a steam engine.

3.2. Подготовьте доклад о каком-либо изобретении и человеке его сделавшим, которое изменило жизнь людей в лучшую или худшую сторону.

4. Слова для запоминания:

to transfer	to permit
to involve	actual
to replace	practical
efficiency	vertical
crude	bottom
jet	extensively
revolving	double
to accomplish	alternately
to admit	successful
constant	engine
crankshaft	piston
flywheel	valve
counterweight	cylinder

Invention of Loom

The use of the hand loom dates from ancient times and was practiced by Chinese and Middle Eastern civilizations before it began in Europe. The use of the hand loom is widespread in many developing countries, and is still used in industrialized countries.

The hand loom is mounted on a frame that gives the necessary support to the moving parts. The warp threads are parallel to the ground. At the back of the frame is a cylinder around which the warp threads are wrapped that keeps the warp threads under tension.

In a hand loom the picking is performed by hand. The weaver passes the shuttle containing a spool of filling thread through the shed. After each passage through the shed, the filling thread is beaten up against the previous one by moving forward a comb of closely spaced wire teeth. After this beating up, the weaver drops the heddles that were raised and lifts the ones that were lowered, thus changing the shed.

The first move toward mechanization of the loom was the flying shuttle, patented by the British inventor John Kay in 1733. This consisted of a lever mechanism that drove the shuttle across the loom along a track. The flying shuttle greatly increased the speed of weaving and permitted picking to be performed by one person.

The first successful mechanized loom was perfected by British inventor, Edmund Cartwrigh in 1786. The power loom essentially resembles the hand loom, but has several accessories, such as mechanisms to stop the loom if the warp or filling breaks or if the shuttle does not travel the entire distance across the loom, and a mechanism for changing shuttles without stopping the loom. At one end of these looms, a magazine containing several full spools of thread is placed; the loom has a device that rejects an empty spool and substitutes a full spool.

A further refinement is the Jacquard loom, perfected by the French inventor Joseph Marie Jacquard in the early 1800s. The weaving process is controlled by a series of cards with holes punched in them that correspond to the weave pattern. Extremely elaborate weave patterns can be produced by this system. For weaving fabrics with dyed threads the changing of shuttles in accordance with the color scheme of the fabric is accomplished by the use of multiple shuttle boxes, each holding a shuttle with a different-colored thread.

Today, the conventional power loom is considered archaic, noisy, and generally inefficient. Various alternative looms have been developed, most of which attempt to do without the shuttle. They are known as shuttleless looms. Another important type of shuttleless loom is the fluid-jet loom, which uses a high-pressured burst of air or water to propel the filling thread through the shed. Many modern fabric-producing factories use shuttleless looms because they are quieter and faster than conventional looms.

Active Vocabulary

to date from – датироваться, брать начало с
loom – ткацкий станок
to mount - устанавливать
warp thread – нить основы
to wrap - наматывать
tension - натяжение
picking - выщипывание
shuttle - челнок
shed - зев (ткацкого станка)
spool - катушка; бобина
comb - гребень
heddle - галево
weaving - ткачество
to perfect – совершенствовать, улучшать
accessories - детали
to reject - удалять
refinement - усовершенствование
to punch - пробивать отверстия
to attempt - пытаться
conventional - традиционный

EXERCISES

1. Comprehension exercises.
1.1. Какие 2 из данных фактов рассматриваются в тексте:

1. The structure of a hand loom.
2. The development of weaving process in ancient times.
3. Types of woven fabrics.
4. Efficiency of the loom.
5. Principles of work of the loom.
6. The profession of a weaver.

1.2. Подумайте над ответами на вопросы:

1. What role did the loom have for the development of textile industry?
2. Why do engineers design new alternative kinds of a loom?

1.3. Найдите в тексте ответы на следующие вопросы:

1. Where did the first looms appear?
2. What is the function of the frame in a loom?

3. What is placed at the back of the frame?
4. How is the picking performed in a hand loom?
5. Who introduced a flying shuttle? How does it work?
6. When was the first mechanized loom invented? What differs it from a hand loom?
7. What controls the weaving process in a Jacquard loom?
8. How is the weaving of fabrics with dyed threads performed on a Jacquard loom?
9. What do the modern looms attempt to?
10. How does the fluid-jet loom work?

1.4. Определите, соответствуют ли следующие предложения содержанию текста. Сделайте необходимые изменения, чтобы утверждение стало верным.

1. Europe was the first to use a hand loom for weaving.
2. Only one person is needed to operate a loom with a flying shuttle.
3. A mechanized loom distinctively differs from a hand loom.
4. Spools of thread are replaced automatically in a mechanized loom.
5. A Jacquard loom was invented in Great Britain.
6. It is impossible to weave complex patterns on a Jacquard loom.
7. The conventional power loom is widely spread today and has no alternative.
8. A fluid-jet loom has no shuttle.
9. Fluid-jet looms are in demand because they are noiseless and have a high speed of production.
10. The frame is one of the movable parts of the loom.

1.5. Расположите в хронологическом порядке появление следующих устройств:

1. A Jacquard loom.
2. A flying shuttle.
3. A hand loom.
4. A fluid-jet loom.
5. An automatic changing of shuttles.

2. Vocabulary exercises.

2.1. Подберите синонимы из колонки B к словам из колонки A:

A	B
1. to mount	a. settle
2. by hand	b. manually
3. to perfect	c. improve
4. to resemble	d. look like
5. accessories	e. equipment
6. to reject	f. remove
7. elaborate	g. exquisite
8. in accordance with	h. conforming to

9. burst	i. impulse
10.quiet	j. noiseless

2.2. Подберите синонимы из колонки B к словам из колонки A:

A	B
1. forward	a. modern
2. to stop	b. full
3. empty	c. start
4. archaic	d. unusual
5. conventional	e. backward

2.3. Найдите определения к данным словам:

1. loom	a. The act or art of forming cloth in a loom by the union or intertexture of threads.
2. shuttle	b. An instrument used in weaving for passing or shooting the thread of the woof from one side of the cloth to the other.
3. shed	c. A frame or machine of wood or other material, in which a weaver forms cloth out of thread.
4. weaving	d. The passageway between the threads of the warp through which the shuttle is thrown.
5. fabric	e. Cloth of any kind that is woven or knit from fibers.

2.4. Найдите в тексте слова, которые имеют следующие значения:

1. A very small twist of flax, wool, cotton, silk, or other fibrous substance, drawn out to considerable length.
2. The threads which are extended lengthwise in the loom.
3. One of the sets of parallel doubled threads which guides the warp threads in a loom.
4. A hollow cylinder of wood with a ridge at each end which is used to wind thread or yarn upon.
5. A toothed instrument which is used for separating and cleansing wool, flax, hair

2.5. Замените подчёркнутое слово словом или фразой из текста.

1. The invention of a car goes back to the 19th century.
2. Powered looms are prevailing in textile industry.
3. Threads are wound round the spool automatically.
4. A modern loom comprises both conventional and modernized elements.
5. Shuttleless looms speeded up the weaving process.
6. This fabric is made from colored threads.

7. The weaving on a hand loom is ineffective and costly process.
8. Engineers together with weavers try to refine conventional loom.
9. Traditional means of weaving are still used nowadays.
10. Fluid-jet looms have replaced noisy and slow conventional looms.

3. Text summary.

3.1. Подготовьте краткий пересказ текста, используя предложенный план:

1. The hand loom and its use.
2. The process of weaving on a hand loom.
3. The first mechanization of the loom.
4. The loom of Edmund Cartwright.
5. The Jacquard loom.
6. Shutleless and fluid-jet looms.

3.2. Расскажите о возникновении и дальнейшей модификации прядильного станка (spinning loom) или любой другой машины либо устройства.

4. Слова для запоминания:

to mount	forward
by hand	to stop
to perfect	empty
to resemble	archaic
accessories	conventional
to reject	loom
elaborate	shuttle
in accordance with	shed
burst	weaving
quiet	fabric
settle	equipment
manually	remove
improve	exquisite
look like	conforming to
noiseless	impulse

Invention of Cotton Gin

Cotton gin is the machine used to separate the fibers of cotton from the seeds. Before the invention of the cotton gin, seeds had to be removed from cotton fibers by hand; this labor-intensive and time-consuming process made growing and harvesting cotton uneconomical. The cotton gin allowed the seeds to be removed mechanically and rapidly from the cotton fibers, making cotton production economical and leading to dramatic growth in cotton industry.

The American inventor Eli Whitney is generally credited with inventing the cotton gin in 1793. He designed and built a model for a machine that would separate the seeds from the fibers of the short-staple cotton plant, work that until that time had been done by hand.

Whitney's cotton gin, also called a saw gin, consisted of a cylinder to which a number of sawlike teeth were attached. As the cylinder revolved, the teeth passed through the closely spaced ribs of a fixed comb. When cotton was fed into the gin, the teeth caught the cotton fibers and pulled them through the comb. The seeds, which were too large to pass between the ribs, were left behind. This principle, with virtually no modifications, is still employed in modern automatic saw gins used to process the bulk of cotton crop.

One disadvantage of the saw gin is that it tends to damage the fiber, particularly in the case of long-staple cottons. For ginning such cottons, which include the Egyptian, pima, and Sea Island varieties, the roller gin is used. In the roller gin the cotton is carried on the surface of a leather-covered roller that has a blade fixed parallel to the axis of the roller and nearly touching its surface. The cotton fiber passes under the blade on the roller, but the seeds cannot pass the blade and are forced out of the fiber. The roller gin is slow, so it is used only for premium grades of cotton.

Active Vocabulary

cotton gin - волокноотделитель
fiber - волокно
time-consuming - трудоемкий
labor-intensive - трудоемкий
harvesting – уборка урожая
rapidly - быстро
dramatic - внезапный и существенный
to credit with – связывать с
short-staple - коротковолокнистый
to pass through – проходить через
to feed into – наполнять, загружать (материал, сырьё)
to employ – зд. применять
bulk – объём, масса
to tend to – иметь тенденцию, стремиться к
surface - поверхность
blade - лезвие

force out – удалять, отсеивать
premium grade – высший сорт

EXERCISES

1. Comprehension exercises.
1.1. Какие 2 из данных фактов рассматриваются в тексте:

1. Harvesting of cotton.
2. Process of separating seeds from cotton fiber.
3. Kinds of cotton.
4. Roller gin.
5. Premium grades of cotton.

1.2. Подумайте над ответами на вопросы:

1. What changes did the cotton gin make in the textile industry?
2. What part of the United Sates do you think Eli Whitney lived in?

1.3. Найдите в тексте ответы на следующие вопросы:

1. What is cotton gin used for?
2. How were the seeds removed before the invention of cotton gin?
3. What does a cotton gin consist of?
4. What is the main disadvantage of cotton gin?
5. What cottons is the roller gin used for?
6. How is the blade fixed in a roller gin?
7. When was the cotton gin invented?
8. What was Eli Whitney?
9. What is another name for a cotton gin?
10. Which cottons are processed by a roller gin?

1.4. Определите, соответствуют ли следующие предложения содержанию текста. Сделайте необходимые изменения, чтобы утверждение стало верным.

1. Cotton gin is used to harvest cotton.
2. Economy benefited greatly from the invention of a cotton gin.
3. Eli Whitney was a farmer by profession.
4. Large seeds are separated from cotton by the comb.
5. Automatic gins use the principle which was introduced by Eli Whitney.
6. Cotton gin processes long staple cottons very accurately.
7. The roller gin was mady in Egypt.
8. The cotton fiber passes over the blade of the gin.
9. As the roller gin is very fast it is used for first-rate cottons.
10. The cotton gin was invented in Great Britain.

1.5. Определите, какие характеристики волокноотделителя являются преимуществом, а какие его недостатком:

1. Economy of labor.
2. Speeding up of the technological process.
3. Damage of the fiber.
4. Simplicity of the design.
5. Quite often breakdown.

2. Vocabulary exercises.

2.1. Подберите синонимы из колонки B к словам из колонки A:

A	B
1. to separate from	a. to fasten
2. to credit with	b. swiftly
3. to attach	c. to relate to
4. rapidly	d. to put into
5. to damage	e. top area
6. surface	f. first rate
7. to force out	g. to detach
8. premium grade	h. to break
9. to feed	i. drawback
10.disadvantage	j. to remove

2.2. Найдите определения к данным словам:

1. cotton gin	a. An instrument for cutting or dividing substances, as wood, iron, etc., consisting of a thin blade of steel, with a series of sharp teeth on the edge.
2. harvesting	b. A machine for separating the seeds from cotton.
3. blade	c. The cutting part of an instrument.
4. fiber	d. The gathering of a crop of any kind.
5. saw	e. Any fine, slender thread or threadlike substance.

2.3. Найдите в тексте слова, которые имеют следующие значения:

1. A soft, downy substance, resembling fine wool, consisting of the unicellular twisted hairs which grow on the seeds of this plant.
2. A ripened ovule, consisting of an embryo with one or more coverings.
3. The fiber of wool, cotton, flax, or the like.
4. A living being which has a root, stem, and leaves.

2.4. Замените подчёркнутое слово словом или фразой из текста.

1. Charles Mackintosh usually relates to the invention of waterproof raincoat known as a mackintosh.
2. The process of processing cotton fibers became inexpensive after the cotton gin was invented.
3. The principles of mechanics are used in various simple and complex machines.
4. Only first-rate steel is produced by this metal work.
5. The great number of slaves was used for cleansing cotton in the United States.

2.5. Поставьте слова в правильном порядке, чтобы получились предложения.

1. machinery, can be used, synthetic, spinning, only, for, fibers.
2. the development, revolutionized, of, the cotton industry, the spinning jenny, in England.
3. the fibers, after, separation, clean, special machines, and, dry.
4. could clean, cotton, as 50 people, in a day, as much, cotton gin, could.
5. was, the "interchangeable system", the promoter of, best-known, Whitney.

3. Text summary.

3.1. Подготовьте краткий пересказ текста, используя предложенный план:

1. Cotton gin and its influence on cotton production.
2. Invention of Eli Whitney.
3. The structure of Whitney's cotton gin.
4. The functioning of a roller gin.

3.2. Напишите 10-15 предложений о принципах работы какого-либо прибора или оборудования

4. Слова для запоминания:

to separate from	to detach	cotton gin
to credit with	to break	harvesting
to attach	to remove	blade
rapidly	premium grade	fiber
to damage	to feed	saw
surface	disadvantage	to fasten
to force out	drawback	swiftly
to put into	to relate to	top area
		first rate

Unit III: Manufacturing and Industries

Manufacturing Process

Manufacturing means producing goods that are necessary for modern life from raw materials. The word manufacture comes from the Latin *manus* (hand) and *facere* (to make). Originally manufacturing was accomplished by hand, but most of today's modern manufacturing operations are highly mechanized and automated.

There are three main processes involved in virtually all manufacturing: assembly, extraction, and alteration. Assembly is the combination of parts to make a product. For example, an airplane is assembled when the manufacturer puts together the engines, wings, and fuselage. Extraction is the process of removing one or more components from raw materials, such as obtaining gasoline from crude oil. Alteration is modifying or molding raw materials into a final product—for example, sawing trees into lumber.

Science and engineering are required to develop new products and to create new manufacturing methods, but there are other factors involved in the manufacturing process. Legal matters, such as obtaining operating permits and meeting industrial safety standards, must be adhered to. Manufacturing has existed as long as civilizations have required goods: bricks to build the Mesopotamian city of Erech, clay pots to store grain in ancient Greece, or bronze weapons for the Roman Empire. In the Middle Ages, silk factories operated in Syria, and textile mills were established in Italy, Belgium, France, and England. New routes discovered from Europe to the Far East and to the New World during the Renaissance stimulated demand for manufactured goods to trade. Factories were built to produce gunpowder, clothing, cast iron, and paper. The manufacturing of these goods was primarily done by hand labor, simple tools, and, rarely, by machines powered by water.

Manufacturing processes can produce either durable or nondurable goods. Durable goods are products that exist for long periods of time without significant deterioration, such as automobiles, airplanes, and refrigerators. Nondurable goods are items that have a comparatively limited life span, such as clothing, food, and paper.

Active Vocabulary

manufacturing - производство
raw materials - сырьё
to accomplish – выполнять, завершать
assembly - сборка
extraction – выделение, извлечение
alteration - изменение
molding – формовка, модификация
lumber - деревоматериалы
to permit - позволять
to adhere - придерживаться

to require - требовать
clay pot – глиняный горшок
to establish – устанавливать, учреждать
trade - торговля
tools - инструменты
durable – долговечный, предназначенный для длительного пользования
deterioration - изнашивание
life span - жизненный отрезок

EXERCISES

1. Comprehension exercises.
1.1. Какие 2 из данных фактов рассматриваются в тексте:

1. Assembly of an airplane.
2. Main manufacturing processes.
3. Industrial safety standards.
4. History of Mesopotamia.
5. The role of manufacturing for different civilizations.
7. Hand labor.

1.2. Подумайте над ответами на вопросы:

1. Why should manufacturing process be studied by engineers?
2. What is the role of science and engineering in manufacturing process? Give examples, please.

1.3. Найдите в тексте ответы на следующие вопросы:

1. What words does the word *manufacture* come from?
2. Which processes are involved in manufacturing?
3. What is assembly?
4. What process is used to obtain gasoline from crude oil?
5. How long has manufacturing existed?
6. What is required to develop new products and to create new manufacturing methods?
7. How was the manufacturing of goods done in ancient times?
8. What kinds are the most of manufactured goods divided into?
9. What goods are called durable? Give the examples, please.
10. What goods are called nondurable? Give the examples, please.

1.4. Определите, соответствуют ли следующие предложения содержанию текста. Сделайте необходимые изменения, чтобы утверждение стало верным.

1. Modern manufacturing operations are mostly performed by machines.
2. Extraction is the combination of parts to make a product.
3. Gasoline is obtained from crude oil by alteration.
4. Alteration is the modification of form but not substance of raw material.
5. Industrial safety standards are the part of manufacturing process.
6. Manufacturing appeared in ancient Greece.
7. New routes from Europe to the Far East stimulated the trade.
8. Hand labor was widely used in manufacturing process in ancient times.
9. Nondurable goods last for a long time.
10. Buildings, bridges, roads are the examples of durable products.

1.5. Определите, к какому типу производства относятся следующие процессы:

1. Manufacturing of clothing.
2. Steel production.
3. Manufacturing of machine tools.
4. Paper production.
5. Making of plastic bottles.
6. Fiber processing.
7. Manufacturing of household appliances.

2. Vocabulary exercises.

2.1. Подберите синонимы из колонки B к словам из колонки A:

A	B
1. necessary	a. to satisfy requirements
2. come from	b. continual
3. put together	c. to keep
4. molding	d. factory
5. meet standards	e. durability
	f. to originate
6. exist	g. to be
7. to store	h. to assemble
8. durable	i. essential
9. life span	j. shaping
10.mill	

2.2. Подберите антонимы из колонки B к словам из колонки A:

A	B
1. final	a. refinement
2. simple	b. often

3. deterioration	c. unrestricted
4. rare	d. ready-made product
5. limited	e. initial
6. raw material	f. complex

2.3. Найдите определения к данным словам:

1. assembly 2. manufacturing 3. extraction 4. raw material 5. alteration	a. Any product that comes from mines, farms, forests, before it is separated for use in factories, mills and similar places. b. The process of removing components from raw materials. c. The process of by modifying raw material into a final product, generally by changing the form. d. The process of gathering and combining different parts together in order to make a product. e. The process of making articles by hand or machine, especially in large quantities.

2.4. Найдите в тексте вещества и материалы, которые имеют следующие значения:

1. A highly volatile mixture of fluid hydrocarbons, obtained from petroleum.
2. Timber sawed or split into the form of beams, joists, boards, planks, hoops.
3. A block or clay tempered with water, sand, molded into a regular form, burnt in a kiln.
4. A soft earth, which is plastic, or may be molded with the hands, consisting of hydrous silicate of aluminum.
5. The fine, soft thread produced by various species of caterpillars in forming the cocoons within which the worm is inclosed.
6. A black, granular, explosive substance, consisting of an intimate mechanical mixture of niter, charcoal, and sulphur.
7. A hard form of iron which contains carbon and silicon and is used to make automobile engine blocks and the like.
8. A substance in the form of thin sheets or leaves for writing or printing on, or to be used in wrapping. It is made of rags, straw, bark, wood, or other fibrous material, which is first reduced to pulp, then molded, pressed, and dried.
9. Petroleum in its natural state, as obtained from the ground before refining.

2.5. Замените подчёркнутое слово словом или фразой из текста.

1. Manufacturing process is becoming extremely computerized at present.
2. Knowledge and skills are needed to create new methods of production.
3. It is quite difficult to comply with requirements they demand.
4. Textile factories make up a significant part of Belarusian industry.
5. This model of the computer has very short durability.

2.6. Поставьте слова в правильном порядке, чтобы получились предложения.

1. design, manufacturers, that, will be, must, easy and safe, products, to use.
2. the, designs, the public's interest, attract, new.
3. search for, manufactured, that, engineers, new materials, will improve, items.
4. new uses, not only, new products, research, old ones, but also, finds, develops, for.
5. manufacturing, machinery, activity, is, food processing, the most important, the production of.
6. engineers, provides such as, a manufacturing company, people, factory workers, to many, and, jobs.
7. is, the leading, in the country, manufacturing industry, metalworking.
8. steel, iron, most, manufacturing, is used in.
9. manufacturing, many of, Japan, the raw materials, for, must import.
10. petrochemical, the various compounds of, is based on, carbon, hydrogen, and, production,

3. Text summary.

3.1. Подготовьте краткий пересказ текста, используя предложенный план:

1. The origin of manufacturing.
2. The manufacturing processes.
3. The role of science and engineering.
4. Production of durable and nondurable goods.

3.2. Расскажите о процессе создания какого-либо изделия, начиная с его проектирования и заканчивая его сборкой.

4. Слова для запоминания:

necessary	assembly
come from	manufacturing
put together	extraction
molding	raw material
meet standards	alteration
exist	gasoline
to store	lumber
durable	brick
life span	clay
mill	oil
final	rare
simple	limited
deterioration	raw material