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МИНОБРНАУКИ РОССИИ

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(ЮЗГУ)

Кафедра иностранных языков

УТВЕРЖДАЮ
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_____ О.Г. Локтионова
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Technical English (Part 2)

Методические указания для практических занятий и самостоятельной работы
по дисциплине «Иностранный язык» для студентов направлений подготовки 02.03.03, 04.03.01, 09.03.01, 09.03.03, 09.03.04, 10.03.01, 10.05.02, 11.03.02, 11.03.03, 12.03.04, 15.03.06, 18.03.01, 28.03.01, 30.05.03

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Technical English (Part 2) : методические указания для практических занятий и самостоятельной работы по дисциплине «Иностранный язык» для студентов направлений подготовки 02.03.03, 04.03.01, 09.03.01, 09.03.03, 09.03.04, 10.03.01, 10.05.02, 11.03.02, 11.03.03, 12.03.04, 15.03.06, 18.03.01, 28.03.01, 30.05.03 / Минобрнауки России, Юго-Зап. гос. ун-т; сост.: Е.А. Таныгина, А.Б. Ставинская. – Курск, 2026. – 38 с. – Библиогр.: с. 38.

Методические указания предназначены для усвоения необходимого минимума словарного состава текстов по техническим специальностям, включая общенаучную, терминологическую, служебную лексику, и включают в себя тексты для чтения, лексико-грамматические упражнения и тесты. Данное пособие также способствует формированию навыков перевода текста.

Предназначены для студентов для студентов направлений подготовки 02.03.03, 04.03.01, 09.03.01, 09.03.03, 09.03.04, 10.03.01, 10.05.02, 11.03.02, 11.03.03, 12.03.04, 15.03.06, 18.03.01, 28.03.01, 30.05.03 очной и заочной форм обучения.

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Module 7. ENGINEERING MATERIALS

KEY VOCABULARY

Exercise 1. Read and guess the meanings of the new words.

1) *access.* The earliest humans had an access to only a very limited number of materials.
2) *property.* A lot of materials with specialized properties were produced.
3) *to encompass.* Material science encompasses various classes of materials.
4) *alloy.* Metallic materials include metals and alloys.
5) *ferrous metals.* Metallic materials which contain iron are called ferrous metals.
6) *non-ferrous metals.* Metallic materials which do not contain iron are called non-ferrous metals.
7) *cast iron.* The most common ferrous metals are cast iron and steel.
8) *to infiuence.* Different elements in alloys influence properties of materials.
9) *brittleness.* Large amount of carbon in cast iron increases its brittleness.
10) *to rust.* Steel containing nickel or chromium does not rust.
11) *tungsten.* Steels which contain tungsten or cobalt are extremely hard.
12) *copper.* Aluminium and copper are widely used.
13) *ductile, malleable.* Copper is a ductile and malleable metal.
14) *frequent.* Copper is a frequent element of various metal alloys.
15) *brass, tin, lead.* Brass contains copper and zinc, bronze contains copper and tin/lead.
16) *representative.* Polymers are representatives of non-metallic materials.
17) *rubber.* One of the best-known natural polymers is rubber.
18) *thermoplastics, thermosets.* Plastics can be divided into thermoplastics and thermosets.
19) *to mould.* Thermoplastics can be heated and moulded numerous times.
20) *indispensable.* The properties of plastics are indispensable.

21) *fiexible.* Plastics are flexible.
22) *relevantly.* Plastics are relevantly cheap.
23) *subsequent cooling.* Ceramic materials are formed by the action of heat and subsequent cooling.
24) *clay.* Clay was one of the earliest materials used to produce ceramics.
25) *stiff.* Ceramics tend to be strong, stiff, brittle, and chemically inert.
26) *to vary.* Ceramics properties vary widely.
27) *insulator.* Porcelain is widely used to make electrical insulators.
28) *available.* A lot of engineering materials are available to engineer.
29) *to choose.* Engineers have to choose the engineering materials.
30) *purpose.* Engineers have to choose the engineering materials best suited the given purpose.
31) *to memorize.* Have you memorized the groups of engineering materials?
32) *to exist.* A wide variety of materials exists nowadays.
33) *to decline.* Some materials tend to have a declining usage.
34) *to save.* The manufacturers are switching from steel to aluminium to save weight of a car.
35) *to change.* The materials technology is constantly changing.
36) *to substitute*. Aluminium can substitute steel.
37) *to increase.* The popularity of aluminium is increasing.

Exercise 2. Try to enrich your vocabulary:

a) analyse the following words with different suffixes and divide them into two groups — nouns and adjectives:

development, civilization, natural, possible, various, traditional, ferrous, different, brittleness, stainless, structure, corrosion, resistance, thermal, electrical, frequent, indispensable, action, industrial, insulator, superconductor:

b) make up as many words as you can by combining different parts of the words:

super-	develop	-ment
in-	tradition	-al
re-	resist	-ance

differ	-ent
stain	-less
brittle	-ness
conduct	-or
mould	

Exercise 3. Divide the following words into two groups, those which describe or belong to a) metallic materials; b) non-metallic materials.

Ferrous, iron, polymers, alloys, thermoplastics, steel, chromium, polycarbonate, copper, rust, tungsten, cobalt, ductile, brass, electrical insulators, thermosets, non-ferrous, cobalt, nickel, zinc, aluminium, ductile, bronze, rubber, thermoset, plastics, polyvinylchloride, ceramics, clay, porcelain, malleable, cast iron.

Exercise 4. Think over the definitions of the words which appear in the texts and dialogues and then:

a) agree or disagree with the following definitions

1. *Common* means happening frequently or existing in large amounts or numbers.
2. *Rubber* is a strong substance that can bend easily and is used for making things such as tyres or boots.
3. *Non-ferrous metals* are metals that do not contain iron.
4. *Ferrous metals* are metals that contain iron.
5. *Amount* is a quantity of something.

b) match each word with its correct definition

cast iron, property, conductor, insulator, copper

1. Quality or a feature of something.
2. Ferrous metal.
3. Non-ferrous metal.
4. Substance that allows heat or electricity to pass through it.
5. Substance that reduces the amount of heat or electricity that can pass through something.

EXPLORING GRAMMAR

Exercise 1. Read the sentences, point out the Complex Object. Give the Russian equivalents.

1. The engineers consider this material to be rather brittle. 2. I wish them to make this experiment. 3. I heard the engineers change the technological process of producing this material. 4. They let him research this problem. 5. They allowed this alloy to be used in the production of these tools.

Exercise 2. Make up your own sentences with the Complex Object according to the models.

Model A: *They believe that this element infiuences the property of this material.*

They believe this element to infiuence the property of this material.

1. They consider that this material contains iron. 2. They suppose that this steel is stainless. 3. We expect that they form ceramics by the action of heat and subsequent cooling. 4. We know that ceramics is strong, stiff, brittle and chemically inert. 5. We believe that they use this material in this structure.6. They think that this alloy contains nickel.

Model B: *We know that he investigated this problem.*

We know him to have investigated this problem.

1.He believes that they made an experiment. 2. He thinks that they used these data for their experiment. 3. We know that they described the experiment in the scientific article. 4. We expect that manufacturers increased the aluminium application in the production. 5. We consider that materials technology changed.

Exercise 3. Fill in the blanks to streamline the use of the Complex Object. The words in brackets are given to help you.

1. He supposes … to study here (she). 2. We think the early humans … a very limited number of materials (to use). 3. We believe … to make an experiment (they). 4. I believe him … an experiment long ago (to make). 5. She knows him … this problem last year (to investigate).

Exercise 4. Make up sentences according to the models to practise the use of the Complex Object.

Model A: *Мы знаем, что они провели эксперимент. We know them to have made an experiment.*

1. Мы знаем, что он исследовал эту проблему. 2. Мы полагаем, что он учился здесь. 3. Мы думаем, что они изменили технологический процесс. 4. Мы считаем, что они решили эту проблему. 5. Мы знаем, что она выбрала самый лучший доклад.

Model B: *Она разрешила ему участвовать в конференции. She let him take part in the conference.*

1. Он позволил им изменить технологический процесс. 2. Она за- ставила их решить эту проблему. 3. Мы позволили ей выбрать лучший вариант. 4. Он заставил их исследовать эту проблему. 5. Они заставили инженеров выбрать конструкционные материалы с определенными механическими свойствами.

READING

Exercise 10. Read the text.

DIFFERENT KINDS OF ENGINEERING MATERIALS

Materials played a major role in the development of societies. Civilizations were named by the level of their materials development, e.g. the Stone Age, the Bronze Age, and the Iron Age. The earliest humans had an access to only a very limited number of natural materials. Modern technologies have made it possible to produce new materials. We believe more than 50,000 materials with specialized properties to have been developed by now. Materials science encompasses various classes of materials, but the traditional groups of engineering materials are metallic materials (metals and alloys) and non-metallic materials (polymers, ceramics, etc.).

Metallic materials include ferrous (those that contain iron) and non-ferrous (those that do not contain iron) metals. It should be noted that while describing alloys which are metallic materials it is possible to use the term “metals”. The most common ferrous metals are cast iron and steel, which are both alloys. Different elements in alloys influence properties of materials: large amount of carbon in cast iron increases its brittleness; stainless steels contain- ing nickel or chromium do not rust; steels, which contain tungsten or cobalt, are extremely hard, etc. We consider the most widely used non-ferrous metals to be aluminium and copper. Aluminium alloys are widely used in engineering structures and components where light weight or corrosion resistance is required. Copper is a ductile, malleable metal with a very high thermal and

electrical conductivity. It is a frequent element of various metal alloys: brass (copper and zinc), bronze (copper and tin/lead).

Polymers are representatives of non-metallic materials. One of the best known natural polymers is rubber. However, most of the polymers used in industry are not natural but synthetic; they are generally called 'plastics'. Plastics can be divided in two categories: thermoplastics and thermosets. Thermoplastics can be heated and moulded numerous times. Common engineering thermoplastics are ABS (acrylonitrile butadiene styrene); polycarbonate; PVC (polyvinylchloride). Thermosets can be heated and moulded only once, they cannot be remoulded. The most common engineering thermosets are epoxy resins and polyamides. The properties of plastics are indispensable: they are lightweight, hard, easy to shape and colour, flexible, non-rusting, relevantly cheap, etc.

Ceramic materials are inorganic, non-metallic materials which are formed by the action of heat and subsequent cooling. Clay was one of the earliest materials used to produce ceramics, but many different ceramic materials are now being used in domestic and industrial products. Ceramics tend to be strong, stiff, brittle, chemically inert. They are non-conductors of heat and electricity, but still their properties vary widely. For example, porcelain is widely used to make electrical insulators, but some ceramic compounds made from a metal and a non-metal are superconductors.

Thus, at present a lot of engineering materials are available to engineer, who has to choose the one best suited to serve the given purpose.

Exercise 2. Agree or disagree with the following statements.

1. A lot of materials were available to early humans. 2. The traditional groups of engineering materials are metals and alloys. 3. It is possible to use the term 'metals' instead of 'metallic materials'. 4. Representatives of nonmetallic materials are ceramics. 5. Copper is a frequent element of various metal alloys.

KEY VOCABULARY DEVELOPMENT

Exercise 1. Match the adjectives in column A with the nouns in column B to form meaningful phrases and then identify them at the sentence level in the text. It will help you understand the text in

detail.

A	B	
1)	stiff	a) amount
2)	electrical	b) steel
3)	various	c) element
4)	ferrous	d) conductivity
5)	ductile	e) insulators
6)	brittle	f) materials
7)	indispensable	g) ceramics
8)	stainless	h) cast iron
9)	frequent	i) properties
10)	large	j) metals

Exercise 2. Decide which of the verbs on the left collocate with the nouns on the right and then identify the word combinations at the sentence level in the text. It will help you understand the text precisely.

1)	to encompass	a) classes
2)	to influence	b) thermoplastics
3)	to contain	c) material
4)	to change	d) properties
5)	to choose	e) nickel
6)	to mould	f) technology
7)	to substitute	g) popularity
8)	to increase	h) steel
9)	to save	i) groups
10)	to memorize	j) weight

Exercise 3. Try to enrich your vocabulary:

a) find words in the text which have the same meanings as the following words:

for example, people, to embrace, big, an element, different, to manufacture, aim;

b) find words in the text whose meanings are opposite to the meanings of the following words:

the latest, unlimited, synthetic, small, decrease, soft, heavy, low, rare, the worst, stiff, expensive, organic, conductors;

c) replace the words in italics with the words with similar

meanings:

1. Materials science includes *different* classes of materials. 2. Materials science *embraces* the traditional classes of engineering materials: metallic and non-metallic materials. 3. Clay was used *to manufacture* ceramics. 4. There are a lot of alloys containing copper, *for example,* brass, bronze, etc. 5. Ancient *people* had an access to a very limited number of natural materials.

Exercise 4. Complete the sentences: change the word in capitals at the end of each sentence to form a word that fits suitably in the blank space.

1. … steels which contain nickel do not rust STAIN.
2. Materials were very important in the … of societies DEVELOP.
3. Carbon increases … in cast iron BRITTLE.
4. There are … kinds of engineering materials DIFFER.
5. Corrosion … is one of the aluminium properties RESIST.

Exercise 5. Insert the words at the sentence level: fill in the blanks with the missing words (the first letter of each word is given).

1. A lot of materials with specialized p… have been developed. 2. Metallic materials which contain iron are called f… metals. 3. Steels which contain t… are extremely hard. 4. Copper is a m… metal. 5. Copper is a f… element of various alloys. 6. R… is a natural polymer. 7. T… can be moulded numerous times. 7. The plastics properties are i… . 8. Ceramics are strong and s… . 9. Materials science e… different groups of materials. 10. Metallic materials include metals and a… .

TEST 7

1. Choose the proper words and fill in the blanks.

1. Materials which consist of two or more elements combined by chemical reaction present a category of ... .

A. elements C. mixtures
B. compounds D. composite materials

2. ... is a matrix with a reinforced material inside it.

A. An element C. A mixture
B. A compound D. A composite material

3. ... includes two or more elements which are not chemically bound.

A. An element C. A mixture
B. A compound D. A composite material

4. ... cannot be broken into separate constituents.

A. An element C. A mixture
B. A compound D. A composite material

5. Cast iron and steel are ... .

A. elements C. mixtures
B. compounds D. composite materials

6. Copper is ... .

A. an element C. a mixture
B. a compound D. a composite material

7. Polymers are representatives of ... .

A. ceramics C. non-metallic materials
B. plastics D. thermosets

8. ... polymers are usually called "plastics".

A. Natural B. Synthetic C. Cheap D. Non-rusting

9. Ceramics are ... .

A. ductile B. stiff C. malleable D. lightweight

10. A lot of engineering materials are ... to engineer.

A. flexible B. brittle C. available D. subsequent

2. The text contains different mistakes: 2 - in spelling, 5 - in grammar. Correct the mistakes and rewrite the text.

There are various clases of materials. They can be divide into two groups: metals and non-metals. Metals includes ferrous and non-ferrous metals. Cast iron and steel is common ferrous metals. Copper and aluminium is non-ferrous metals. Non-metals embraces polimers, ceramics, etc.

Module 8. ENGINEERING MATERIALS TECHNOLOGY (1)

KEY VOCABULARY

Exercise 1. Read and guess the meanings of the new words.

1) *forming, cutting, joining.* Metalworking processes can be categorized as forming, cutting, and joining processes.

2) *to embrace.* Metalworking embraces forming, cutting, and joining.

3) *casting, castings.* Casting is a forming process during which metal castings are produced.

4) *to pour into a mold.* Heated liquid material is usually poured into a mold.

5) *hollow cavity.* A mold contains a hollow cavity of the desired shape.

6) *to solidify.* Heated liquid metal cools and solidifies in a mold.

7) *to eject.* A casting is ejected from the mold.

8) *to complete.* A casting is ejected or broken out of the mold to complete the process.

9) *foundry.* All metal castings are produced in foundries.

10) *rolling, extrusion, drawing.* All technological processes of metalworking with the application of force or pressure embrace final metallurgy(which includes rolling, extrusion, and drawing) and workpieces and machine parts manufacturing.

11) *forging, forgings.* Forging is one of the oldest metalworking processes during which forgings are produced.

12) *open die forging, impression die forging, closed die forging.* Workpieces and machine parts manufacturing embraces open die forging, impression die forging, closed die forging, etc.

13) *to improve.* Forging improves the mechanical properties of metals.

14) *grain.* Forging minimizes the internal grain size in metal.

15) *drawing out, upsetting, squeezing.* There are different kinds of forging operations: drawing out, upsetting, squeezing in compression dies.

16) *cross section.* While drawing out the workpiece length increases and its cross section decreases.

17) *die.* Most forging operations use metal-forming dies.

18) *to withstand.* Metal-forming dies must be precisely designed and carefully heat-treated to withstand the tremendous forces and pressure.

19) *fiat, shaped.* Open die forging uses flat and shaped dies.

20) *to achieve.* On completing open die forging, forgings require their considerable machining to achieve the final shape.

21) *to attach to the anvil.* In impression die forging, the metal workpiece is placed in a die which is attached to the anvil.

22) *to drop.* The hammer is dropped on the workpiece to make the metal flow and fill the die cavities.

23) *excess metal, fiash.* Excess metal flows out of the die and forms flash.

24) *to prevent from.* The flash cools more rapidly than the rest of material so it helps prevent from forming more flash.

25) *lubrication.* The disadvantage of closed die forging is the need for better lubrication and workpiece placement.

26) *sheet metal forming.* Sheet metal forming is one of the manufacturing processes.

27) *stamping, punching, bending.* Sheet metal forming includes stamping, punching, bending, etc.

28) *to involve.* Recent developments involve the heating of dies or workpieces.

29) *powder metallurgy.* Forming processes embrace casting, metalworking with the application of force or pressure, and powder metallurgy.

30) *molten metal.* Heated liquid metal is called molten metal.

31) *billet, bar, ingot.* Metal components can be formed by using metal powder instead of molten metal, billets, bars or ingots.

32) *sintering.* Sintering is the process when the powder is placed into a die, compressed and then heated until the powder particles join together structurally.

Exercise 2. Try to enrich your vocabulary:

a) analyse the following words with different suffixes and divide them into two groups — nouns and adjectives:

various, pressure, cavity, numerous, section, extrusion, final, mechanical, internal, plastic, deformation, temperature, different, operation, compres- sion, tremendous, considerable, impression, variation, advantage, additional, lubrication, placement, thickness, dimensional, productivity, requirement, centrifugal, central, electricity, facility, production, equipment, desirable, economical, controllable;

b) make up as many words as you can by combining different parts of the words:

multi- dimension -al impress -ion
differ -ent
compress -ion
product -able
place -ment
equip -ure
press consider require direction

Exercise 3. Divide the following words or phrases into three groups, those which describe or belong to a) casting; b) metalworking with the application of force or pressure; c) powder metallurgy.

Rolling, extrusion, foundry, flash, cross-section, drawing, forging, sheet metal forming, hollow cavity, pour, grain, drawing out, upsetting, flat die, shaped die, excess metal, lubrication, solidify, workpiece, recrystallization, punching, bending, billet, bar, ingot, molten metal, squeezing in compression dies.

Exercise 4. Think over the definitions of the words which appear in the texts and dialogues and then:

a) agree or disagree with the following definitions

1. *Cavity* is a hole or space inside a solid object.
2. *Foundry* is a factory where metal or glass is heated and made into different objects.
3. *Cross section* is the inside of the object that you can see by cutting through the middle of it from top to bottom.
4. *Die* is a block of metal used for pressing or cutting something into shape or pattern.
5. *Hammer* is a tool used for hitting things.

b) match each word with its correct definition

to embrace, to pour, to attach, to withstand, to divide

1. To make liquid or substance to flow in a continuous stream.
2. To accept and include something.
3. To separate people or things into smaller groups or parts.
4. To fasten or join one thing to another.

5. To be strong enough not to be harmed or destroyed by something.

EXPLORING GRAMMAR

Exercise 1. Read the sentences, point out the Complex Subject. Give the Russian equivalents.

1. Metalworking is known to be categorized as forming, cutting and joining processes. 2. Forging processes are expected to be performed at various tem- peratures. 3. True closed die forging proves to keep the workpiece from form- ing flash. 4. Over 70% of all metal castings appear to be produced in foundries via a sand casting process. 5. Sheet metal forming is certain to include such operations as stamping, punching, bending, etc.

Exercise 2. Make up your own sentences according to the models. Model A: *It is expected that he will be a good engineer.*

He is expected to be a good engineer.

1. It is expected that he will test it experimentally. 2. It is known that a forging is stronger than an equivalent casting. 3. It is believed that this forging process will be performed below the recrystallization temperature. 4. It is said that sand casting is relatively cheap. 5. It is known that forging is one of the oldest metalworking processes.

Model B: *Will he take part in this manufacturing process? — Yes, he is certain to take part in this manufacturing process.*

1. Will he work in this foundry? 2. Will this forging require further processing? 3. Will this metal be forged cold? 4. Will this metal stock be passed through a pair of rolls? 5. Will this excess metal flow out of the die?

Exercise 3. Fill in the blanks to streamline the use of the Complex Subject. The words in brackets are given to help you.

1. He … to have done this experiment (известно). 2. Castings … to be produced in foundries (несомненно). 3. Forgings … to be produced at various temperatures (определенно). 4. Do you … to watch one of the metalworking forming processes (случайно)? 5. He … to be a good engineer (говорят).

Exercise 4. Make up sentences according to the models to practise the use of the Complex Subject.

Model A: *Несомненно, они исследуют эту проблему (to be certain).*

They are certain to investigate this problem.

1. Маловероятно, что они будут проводить этот эксперимент сегод- ня (to be unlikely). 2. Вероятно, существуют различные типы ковочных операций (to be likely). 3. Затвердевшая заготовка обязательно выбивается из литейной формы (to be sure). 4. Большинство операций ковки определенно используют бойки или штампы для формоизменяющих операций (to be certain). 5. Вряд ли он примет участие в конференции (to be unlikely).

Model B: *Кажется, эта проблема будет исследована (to seem).*

This problem seems to be researched.

1. Кажется, этот процесс улучшит механические свойства металла (to seem). 2. Кажется, он переведет этот текст (to seem). 3. Оказывается, существуют многочисленные способы литья (to prove). 4. Кажется, он достигнет цели (to seem). 5. Оказывается, бойки должны пройти термообработку (to prove).

READING

Exercise 1. Read the text.

METALWORKING FORMING PROCESSES

Modern metalworking processes, though diverse and specialized, can be categorized as forming, cutting, and joining processes. Forming processes are supposed to be classified in different ways. One way of classification includes casting, bulk forming processes, and sheet forming processes. Another way embraces casting, metalworking with the application of force or pressure, powder metallurgy. The latter is considered more common.

Casting is known to involve pouring heated liquid material into a mold which contains a hollow cavity of the desired shape, and then allowing it to cool and to solidify. The solidified part, a casting, is ejected or broken out of the mold to complete the process. There are numerous metal casting techniques but over 70% of all metal castings

are produced in foundries via a sand casting process, which is characterized by using sand as the mold material.

All technological processes of metalworking with the application of force or pressure are known to be divided into final metallurgy processes (rolling, extrusion, drawing); workpieces and machine parts manufacturing processes (open die forging, impression die forging, closed die forging, sheet metal forming, etc.).

Forging is considered to produce a piece, a forging, that is stronger than an equivalent casting as it improves the mechanical properties of metals by minimizing the internal grain size in metal under controlled plastic deformation. Forging processes can be performed at various temperatures; they are generally classified by whether the metal temperature is above or below the recrystallization temperature. There are different kinds of forging operations available: drawing out (the workpiece length increases and its cross section decreases), upsetting (the workpiece length decreases and its cross section increases), squeezing in closed compression dies (it produces multidirectional flow), etc. Most forging operations use metal-forming dies. Dies must be precisely designed and carefully heat-treated to shape correctly the workpiece and withstand the tremendous forces and pressure.

Open die forging uses flat and shaped dies with almost no limit in size of forgings ranging from a few up to several hundred thousand kilograms but requiring their considerable machining to achieve the final shape.

In impression die forging, a metal workpiece is placed in a die resembling a mold which is attached to the anvil. The hammer die is usually shaped as well. The hammer is dropped on the workpiece to make the metal flow and fill the die cavities. Excess metal flows out of the die and forms flash. The flash cools more rapidly than the rest of the material so it helps prevent from forming more flash and also forces the metal to fill completely the die cavity. In the end of this operation the flash is removed.

A variation of impression die forging is believed to be flashless forging, or true closed die forging. In this type of forging the die cavities are completely closed to keep the workpiece from forming flash. The major advantage of this process is that there is little or no escape of excess metal. The disadvantages include additional cost due to a more

complex die design and the need for better lubrication and workpiece placement.

There is a variety of sheet metal forming manufacturing processes, such as stamping, punching, bending, etc. These types of forming processes are performed at room temperature. However, some recent developments involve the heating of dies or workpieces. Sheet metal forming is characterized by the fact that the thickness of the sheet metal changes little while processing.

Metal components can also be formed by using metal powder instead of molten metal, billets, bars or ingots. The powder is placed into a die and compressed into a solid mass, and then it is heated until the powder particles join together structurally. This process is often called sintering. Besides, metal powder can be shaped by rolling, extruding, etc.

Exercise 2. Agree or disagree with the following statements.

1. Casting is a process performed on the liquid materials. 2. Final metal- lurgy includes rolling, extrusion, and drawing. 3. A casting is stronger than an equivalent forging. 4. Forging processes can be performed only below the recrystallization temperature. 5. Sintering is a process of powder metallurgy.

KEY VOCABULARY DEVELOPMENT

Exercise 1. Match the adjectives in column A with the nouns in column B to form meaningful phrases and then identify them at the sentence level in the text. It will help you understand the text in detail.

A	B	
1)	various	a) material
2)	mechanical	b) processes
3)	flashless	c) deformation
4)	hollow	d) techniques
5)	liquid	e) cavity
6)	numerous	f) property
7)	major	g) forces
8)	plastic	h) cost
9)	tremendous	i) forging

10) additional j) advantage

Exercise 2. Decide which of the verbs on the left collocate with the words on the right and then identify the word combinations at the sentence level in the text. It will help you understand the text precisely.

1)	to embrace	a) liquid material
2)	to pour	b) heating
3)	to compress	c) properties
4)	to eject	d) dies
5)	to remove	e) flash
6)	to attach	f) tremendous forces
7)	to improve	g) die cavities
8)	to fill	h) categories
9)	to withstand	i) powder
10)	to involve	j) castings

Exercise 3. Try to enrich your vocabulary:

a) find words in the text which have the same meanings as the following words:

usually, to include, to reduce, to finish, to manufacture, to name, different, types, to form, some, too, quickly, main, billet;

b) find words in the text whose meanings are opposite to the meanings of the following words:

solid, bulk, full, to begin, open, above, to increase, to heat, advantage, worse;

c) replace the words in italics with the words with similar meanings:

1. While upsetting, the workpiece length *decreases* and its cross section increases. 2. Castings are ejected from the molds *to complete* the process. 3. Modern metalworking processes are *diverse* and specialized. 4. Metal-forming dies must be designed carefully *to shape* correctly the workpiece. 5. The flash cools more *rapidly* than the rest of the material.

Exercise 4. Complete the sentences: change the word in capitals at the end of each sentence to form a word that fits suitably in the blank space.

1. In … die forging excess metal flows out of the die and forms flash IMPRESS.

2. In closed die forging the workpiece needs a better … PLACE.

3. Forgings require their … machining to achieve the final shape in open die forging CONSIDER.

4. There are … sheet metal forming processes DIFFER.

5. One of the forging operations is squeezing the workpiece in the … dies COMPRESS.

Exercise 5. Insert the words at the sentence level: fill in the blanks with the missing words (the first letter of each word is given).

1. Casting involves pouring m… metal into a mold where it cools and solidifies into the shape of the mold. 2. A mold contains a h… cavity. 3. A casting is e… from the mold. 4. Metal castings are produced in f… . 5. Forging i… the mechanical properties of metals. 6. Most forging operations use d… . 7. In impression die forging a die is attached to the a… . 8. Excess metal flow out of the die and forms f… . 9. True closed die forging needs better l… . 10. There is a variety of s… metal forming processes.

TEST 8

1. Choose the proper words and fill in the blanks.

1. Forming processes ... casting, metalworking by the application of force or pressure, powder metallurgy.

A. achieve B. embrace C. improve D. complete

2. A mold ... a hollow cavity.

A. improves B. achieves C. completes D. contains

3. Molten metal is allowed ... .

A. to achieve B. to improve C. to solidify D. to complete

4. Final metallurgy processes include ..., extrusion, drawing.

A. rolling B. casting C. forging D. stamping

5. Forging operations embrace drawing out, ..., squeezing in compression dies.

A. rolling B. upsetting C. forging D. stamping

6. In impression die forging a die is attached to the ... .

A. hammer B. flash C. anvil D. mold

7. The ... cools more rapidly than the rest of the material.

A. anvil B. flash C. mold D. hammer

8. There is little or no escape of ... metal in closed die forging.

A. flashless B. major C. excess D. available

9. Closed die forging needs more complex ... design.

A. flash B. die C. anvil D. mold

10. is a metalworking process which uses tensile forces to stretch metal.

A. Rolling B. Drawing C. Extrusion D. Casting

2. The text contains different mistakes: 4 – in spelling, 3 – in grammar. Correct the mistakes and rewrite the text.

Casting is one of the main manufacturing proceses. Casting is a process of poring molten metall into a mold where it solidify into the shape of a mold. Casting was well establish in the Bronze Age when it was use to form bronze pieces now found in muzeums.

Module 9 ENGINEERING MATERIALS TECHNOLOGY (2)

KEY VOCABULARY

Exercise 1. Read and guess the meanings of the new words.

1) *specified geometry.* Material is brought to specified geometry by removing excess material.

2) *chips or swarf.* In cutting metals the excess metal is chips or swarf.

3) *machining, burning.* Cutting is nearly fully represented by machining, burning, and some special processes.

4) *oxy-fuel cutting torch.* Using an oxy-fuel cutting torch to separate a plate of steel into smaller pieces is an example of burning.

5) *chemical milling.* Chemical milling is an example of a special process.

6) *etching and masking chemicals.* Chemical milling removes excess material by the use of etching and masking chemicals.

7) *turning.* Turning is a cutting process for producing a cylindrical surface.

8) *lathe.* Turning can be done on a lathe.

9) *continuous supervision.* Turning frequently requires continuous supervision.

10) *cutting tool.* Turning uses cutting tools.

11) *single-point.* Turning usually uses single-point cutting tools.

12) *to traverse along axes.* A cutting tool is traversed along two axes of motion.

13) *either ... or ...* . Turning can be either on the outside of the cylinder or on the inside.

14) *boring.* Turning on the inside of the cylinder is known as boring.

15) *milling.* Milling is a process of removing material to form the final part.

16) *comparatively.* Milling is a comparatively complex process.

17) *milling cutter.* A milling machine includes a milling cutter, a worktable, etc.

18) *multipoint.* A milling cutter is usually multipoint.

19) *axis — axes.* A milling cutter rotates about its axis.

20) *slot cutting, planing, drilling, threading, rabbeting.* Milling machines can perform a vast number of complex operations, such as slot cutting, planing, drilling, threading, rabbeting, etc.

21) *grinding.* A grinding machine is a machine used for producing very fine finishes.

22) *abrasive wheel.* A grinding machine uses an abrasive wheel as a cutting device.

23) *to meet specifications.* Finished parts should meet specifications.

24) *temporary and permanent joining.* One can distinguish between temporary and permanent joining techniques.

25) *fastening.* Sometimes mechanical fastening is called temporary mechanical joining.

26) *bolts, screws, studs.* Mechanical fastening includes joining processes which use bolts, screws, studs, etc.

27) *welding, brazing, soldering, riveting.* Permanent joining processes embrace welding, brazing, soldering, and riveting.

Exercise 2. Try to enrich your vocabulary:

a) analyse the following words with different suffixes and

divide them into two groups — nouns and adjectives:

collection, special, technological, available, cylindrical, continuous, supervision, operator, computer, numerical, motion, various, final, cutter, operation, horizontal, vertical, abrasive, inorganic, specification, different, per- manent, mechanical;

b) make up as many words as you can by combining different parts of the words:

		differ	-
n-			ic
		comp	-
e-	ute		ion
		collec	-
	t		ent
		organ	-
			er
		move	

Exercise 3 Divide the following words or phrases into four groups, those which describe or belong to a) turning; b) milling; c) grinding; d) joining:

lathe, bolts, single-point, multipoint, screws, threading, worktable, tubular, planing, rabbeting, welding, slot cutting, riveting, studs, milling cutter, brazing, drilling, soldering.

Exercise 4. Think over the definitions of the words which appear in the texts and dialogues and then:

a) agree or disagree with the following definitions

1. *A hole* is space in the surface of something that goes partly or completely through it.
2. *To remove* is to take something away.
3. *Chemical* is a substance produced by a process involving chemistry.
4. *A lathe* is a machine that holds a piece of wood or metal and makes it move around so that you can cut and shape evenly.
5. *To traverse* is to move over or across an area.

b) match each word with its correct definition

drilling, turning, grinding, boring, welding

1. Joining process.
2. Producing cylindrical surfaces.
3. Making holes.
4. Turning inside of the cylinder.
5. Producing very fine finishes.

EXPLORING GRAMMAR

Exercise 1. Read the sentences, point out the verbals. Give the Russian equivalents. If you have some difficulties, use the grammar reference at the end of the book.

1. This is the material to be removed. 2. To produce fine finishes a grinding machine uses an abrasive wheel. 3. Finished parts should meet specifications. 4. Turning is a cutting process. 5. I can't explain it without watching the process. 6. They began grinding the workpiece. 7. He made the workpiece rotate. We consider this material to be rather hard. 9. Milling is known to be a very complex process. 10. A milling cutter proves to be a multipoint tool.

Exercise 2. Make up your own sentences according to the models. Model A: *Turning is a cutting process. It produces a cylindrical surface.*

Being a cutting process, turning produces a cylindrical surface.

a. Milling is a comparatively complex process. It forms the final part.

b. An oxy-fuel cutting torch is a tool for the burning process. It cuts a plate of steel into smaller pieces. 3. A grinding machine is a cutting machine. It produces very fine finishes. 4. A milling machine is a cutting machine. It performs a vast number of complex operations. 5. Chemical milling is an example of a special process. It removes excess material by the use of etching and masking chemicals.

Model B: *The workpiece which should be turned is rather hard.*

The workpiece to be turned is rather hard.

c. The metal parts which should be cut are in the foundry. 2. The complex operations which should be done embrace slot cutting and threading. 3. A piece of material which should be turned is made of wood or metal. 4. The milling cutter which should be used is rather hard. 5. The cutting tool which should be traversed along two axes of motion

produces precise diameters and lengths.

Exercise 3. Fill in the blanks to streamline the use of the infinitive constructions. The words in brackets are given to help you.

1. He is known … this experiment (провел). 2. He is believed … this experiment (проведет). 3. We suppose this experiment … (будет проведен). 4. We thought that experiment … (проведен). 5. This experiment is known to … (был проведен).

Exercise 4. Make up sentences according to the models to practise the use of the infinitive constructions.

Model A: *Мы не ожидали, что этот процесс может быть осуществлен.*

We didn't expect this process to be realized.

1. Мы не предполагали, что эта операция может быть выполнена на токарном станке. 2. Мы не ожидали, что сверление может быть осуществлено на фрезерном станке. 3. Мы не верили, что он выполнит эту операцию. 4. Мы не думали, что этот процесс такой сложный. 5. Мы не предполагали, что обточка может производиться на внутренней стороне цилиндра.

Model B: *Кажется, этот процесс может быть осуществлен (to seem).*

This process seems to be realized.

1. Кажется, этот процесс улучшит свойства металла (to seem). 2. Безусловно, обточка будет выполнена на токарном станке (to be certain). 3. Оказывается, фрезерование - сложный процесс (to prove). 4. Известно, что обточка - это процесс обработки резанием для изготовления цилиндрических поверхностей (to know). 5. Предполагается, что сверление будет происходить на фрезерном станке (to suppose).

READING

Exercise 1. Read the text.

CUTTING AND JOINING PROCESSES

Besides forming processes, metalworking includes cutting and joining processes. Cutting is considered to be a collection of processes wherein material is brought to a specified geometry by removing excess material.

In cutting metals the excess metal is chips or swarf. Cutting is nearly fully represented by machining, burning, and some special processes. Machining is most commonly known to be a chip producing process. Drilling a hole in a metal part is the most common example of a chip producing process. Burning is a process during which metal parts are cut into pieces. Using an oxy-fuel cutting torch to separate a plate of steel into smaller pieces is an example of burning. Chemical milling is an example of a special process that removes excess material by the use of etching and masking chemicals.

In metalworking a lot of chip producing technological processes are available, such as turning, boring, milling, drilling, grinding, etc.

Turning is a cutting process for producing a cylindrical surface. It can be done on a lathe, which frequently requires continuous supervision by the operator, or by using modern computer numerical control (CNC) lathes. When turning, a piece of material (wood, metal, plastics, or stone) rotates and a cutting tool (usually single-point) is traversed along two axes of motion to produce precise diameters and lengths. Turning can be either on the outside of the cylinder or on the inside (also known as boring) to produce tubular components of various sizes.

Milling is a comparatively complex process of removing material to form the final part. It is generally done on a milling machine, which includes a milling cutter (usually multipoint) that rotates about its axis, and a worktable that can move in multiple directions. Milling machines can perform a vast number of complex operations, such as slot cutting, planing, drilling, threading, rabbeting, etc. There are two common types of milling machines: the horizontal and vertical mills.

A grinding machine is a machine used for producing very fine finishes. As a rule, a grinding machine uses an abrasive wheel as a cutting device to remove material from the workpiece. It can be made of various sizes and types of stones or inorganic materials.

Finished parts that meet specifications are assembled into different kinds of machines. For this purpose, temporary and permanent joining techniques exist. Mechanical fastening, sometimes called temporary mechanical joining, includes joining processes which use bolts, screws, studs, etc. Permanent joining processes embrace welding, brazing, soldering, and riveting.

Exercise 2. Agree or disagree with the following statements.
1. Cutting is represented by machining and burning. 2. Chip producing processes include turning, milling, brazing, etc. 3. Joining processes embrace welding, brazing, soldering, and riveting. 4. A milling machine contains a multipoint milling cutter, a worktable, etc. 5. An abrasive wheel can be made of inorganic materials.

KEY VOCABULARY DEVELOPMENT

Exercise 1. Match the adjectives in column A with the nouns in column B to form meaningful phrases and then identify them at the sentence level in the text. It will help you understand the text in detail.

A	B
1) abrasive	a) surface
2) common	b) joining
3) horizontal	c) control
4) modern	d) supervision
5) tubular	e) wheel
6) various	f) examples
7) permanent	g) mills
8) numerical	h) computers
9) cylindrical	i) sizes
10) continuous	j) components

Exercise 2. Decide which of the verbs on the left collocate with the words or phrases on the right and then identify the word combinations at the sentence level in the text. It will help you understand the text precisely.

1) to remove	a) supervision
2) to meet	b) a specified geometry
3) to bring to	c) a hole
4) to produce	d) a lathe
5) to drill	e) specifications
6) to cut into	f) excess material
7) to traverse	g) a cutting tool
8) to require	h) chips
9) to do on	i) in multiple directions

10) to move j) pieces

Exercise 3. Try to enrich your vocabulary:

a) find words in the text which have the same meanings as the following words:

embrace, to cut, application, often, to revolve, great, kinds, tool, various;

b) find words in the text whose meanings are opposite to the meanings of the following words:

single-point, limited, inside, simple, common, horizontal, organic, temporary;

c) replace the words in italics with the words with similar meanings:

1. A plate of steel is *separated* into smaller pieces by using an oxy-fuel cutting torch. 2. A milling cutter *rotates* about its axis. 3. A grinding machine uses an abrasive wheel as the cutting *device*. 4. Finished parts are assembled into *different* kinds of machines. 5. Metalworking *includes* forming, cutting and joining processes.

Exercise 4. Complete the sentences: change the word in capitals at the end of each sentence to form a word that fits suitably in the blank space.

1. An abrasive wheel is made of … materials ORGAN.
2. Modern … numerical control lathes are used in manufacturing COMPUTE.
3. Cutting embraces a … of processes COLLECT.
4. There are … chip producing processes DIFFER.
5. Chemical milling … excess material by the use of etching chemicals MOVE.

Exercise 5. Insert the words at the sentence level: fill in the blanks with the missing words (the first letter of each word is given).

1. In cutting metals the excess material is c… . 2. M… is most commonly known to be a chip producing process. 3. Cutting embraces machining, b… , and some special processes. 4. T… is a cutting process for producing a cylindrical surface. 5. A lathe requires c… supervision by the operator. 6. A cutting tool is traversed along two a… of motion. 7. B… is turning on the inside of the cylinder. 8. M… is a complex

process of removing material to form the final part. 9. A milling machine usually uses a m… milling cutter. 10. Milling machines can perform t… .

TEST 9

1. Choose the proper words and fill in the blanks.

1. Metalworking includes forming, cutting, and ... processes.

A joining B. soldering C. knurling D. drilling

2. Cutting embraces ..., burning, and some special processes.

A. Joining B. machining C. milling D. producing

3. Machining is represented by turning, ..., milling, drilling, grinding.

A. knurling B. boring C. etching D. riveting

4. Turning is a cutting process for producing a cylindrical … .

A. motion B. lathe C. surface D. tool

5. A cutting tool is traversed along two … of motion.

A. axes B. axis C. lengths D. diameters

6. … material is removed.

A. Excess B. Torch C. Etching D. Masking

7. A milling cutter rotates about its … .

A. axis B. axes C. lengths D. diameters

8. A worktable of the milling machine can move in … directions.

A. etching B. multiple C. soldering D. milling

9. Milling machines can perform slot cutting, threading, … .

A. welding B. brazing C. riveting D. rabbeting

10. Permanent joining processes embrace welding, brazing, … .

A. riveting B. temporary C. drilling D. cutting

2. The text contains different mistakes: 4 – in spelling, 3 – in grammar. Correct the mistakes and rewrite the text.

The turning processes are typicaly carried out on a lathe. It is consider to be the oldest cuting mashine. It can be of four diferent types, which can pro- duced various shapes of materials. In general, turning use simple single-point cutting tools.

Module 10. DIFFERENT TYPES OF VEHICLES

KEY VOCABULARY

Exercise 1. Read and guess the meanings of the new words.

1) *to adopt.* The resolution was adopted.

2) *to be devoted.* The module was devoted to the engineering materials technology.

3) *vehicles and trailers.* One of the units of the resolution is devoted to the classification of vehicles and trailers.

4) *to be defined.* Vehicle categories may be defined according to their classification.

5) *carriage.* Category 'M' embraces motor vehicles with at least four wheels designed and constructed for the carriage of passengers.

6) *omnibuses and coaches.* Omnibuses and coaches are passenger vehicles.

7) *chassis frame, engine, fuel.* Passenger vehicles may be classified according to the type of chassis frame, engine, fuel, etc.

8) *desirable.* It is desirable to go there by a coach.

9) *goods.* Motor vehicles for the carriage of goods include light commercial vehicles and large goods vehicles.

10) *truck or lorry.* 'A large goods vehicle' is the EU term for any truck (lorry) with mass over 3.5 tonnes.

11) *to vary.* Trucks vary greatly in size, power, and configuration.

12) *bulky equipment.* A pickup is desirable for the transportation of bulky equipment.

13) *non-self propelled vehicles.* Trailers and semitrailers are non-self propelled vehicles.

14) *to be towed.* Trailers and semirailers are constructed to be towed by power-driven vehicles.

15) *purpose.* Special purpose vehicles perform special functions with spe- cial body arrangement and equipment.

16) *motor caravans, armoured vehicles, ambulances.* Special purpose vehicles embrace motor caravans, armoured vehicles, ambulances, etc.

17) *wheeled, with caterpillar tracks.* Agricultural tractors may be wheeled or with caterpillar tracks.

18) *to pull, to push.* Agricultural tractors are designed to pull,

push, carry or actuate certain tools, machines or trailers.

19) *non-road mobile machinery.* The term ‘non-road mobile machinery’ means any mobile machine, transportable industrial equipment or vehicle with or without body not intended for the use of passenger- or goods- transport on the road.

20) *to install the internal combustion engine.* The internal combustion en- gines are installed in the non-road mobile machinery.

21) *earthmoving machinery.* Non-road mobile machinery embraces earthmoving machinery.

22) *off-road vehicles.* Category ‘G’ embraces off-road vehicles.

23) *paved or gravel surface.* Off-road vehicles can drive on and off paved or gravel surface.

24) *capable.* Off-road vehicles are capable of driving on and off paved or gravel surface.

25) *tyres with deep open treads.* Off-road vehicles usually have large tyres with deep open treads.

26) *fiexible suspension.* Off-road vehicles are also characterized by a flexible suspension.

27) *versatile.* Off-road vehicles have versatile application.

Exercise 2. Try to enrich your vocabulary:

a) analyse the following words with different suffixes and divide them into two groups - nouns and adjectives:

harmonization, economic, commission, resolution, construction, classifi- cation, passenger, agricultural, numerous, commercial, transportation, bulky, European, special, function, arrangement, equipment, ambulance, transportable, industrial, internal, combustion, scraper, grader, capable, flexible, suspension, application, desirable;

b) make up as many words as you can by combining different parts of the words:

in-	construct	-(at)ion transport	-an
Europe		-ment	
arrange		-able equip	
land			

Exercise 3. Divide the following words or phrases into four groups, those which describe or belong to a) passenger vehicles; b)

vehicles for the carriage of goods; c) non-road mobile machinery; d) off-road vehicles.

Coach, truck, pickup, omnibus, scraper, gravel surface, flexible suspension, lorry, excavator, caterpillar track, grader, bus, motor car, bulky equipment, large tyres, bulldozer, deep open treads.

Exercise 4. Think over the definitions of the words which appear in the texts and dialogues and then:

a) agree or disagree with the following definitions

1. *Bulky* is too big to be carried or stored easily.
2. *Bulldozer* is a heavy vehicle with a large curved open container at the front used for moving earth and stones, destroying buildings, etc.
3. *Coach* is a long comfortable vehicle for carrying a large number of passengers, especially on long journeys.
4. *Omnibus* is an old word meaning a 'bus'.
5. *Trailer* is a long container that can be fixed to a vehicle and used for moving heavy objects or large animals.

b) match each word with its correct definition

scraper, excavator, pickup, ambulance, truck

1. A machine used for removing a layer from a surface.
2. A large road vehicle used for carrying goods.
3. A vehicle for taking people to hospital.
4. A truck with an open back and low sides.
5. A large machine for digging holes in the ground.

EXPLORING GRAMMAR

Exercise 1. Read the sentences, point out the Subjunctive Mood. Give the Russian equivalents. If you have some difficulties, use the grammar reference at the end of the book.

1.It would be desirable to be present at the conference. 2. It would be to the point to look through this resolution. 3. It is required that special purpose vehicles should have special body arrangement and equipment. 4. They recommended that you should use this pickup. 5. I wish we were there. 6. He bought an off-road vehicle so that you might drive on and off paved or gravel surface. 7. If I had time I could be present at the conference. 8. If I had had time last Monday I would have

attended the conference.

Exercise 2. Make up your own sentences according to the models. Model A: *I am sorry I cannot define this term.*

I wish I could define this term.

1. I am sorry I cannot buy this motor car. 2. I am sorry I cannot carry the luggage. 3. I am sorry I cannot drive off the road. 4. I am sorry I cannot take part in the discussion. 5. I am sorry I cannot board the bus.

Model B: *I am sorry we didn't think about it before.*

I wish we had thought about it before.

1. I am sorry I didn't do it for you before. 2. I am sorry we didn't attend that conference. 3. I am sorry they didn't tell you then about it. 4. I am sorry I wasn't there before. 5. I am sorry you didn't use that equipment.

READING

Exercise 1. Read the text.

VEHICLE CATEGORIES

On the 30th of November, 2011 at the World Forum for Harmonization of Vehicles, the Inland Transport Committee of Economic Commission for Europe adopted 'Consolidated Resolution on the Construction of Vehicles'. One of the units of the resolution is devoted to the classification of powerdriven vehicles and trailers. Vehicle categories are defined according to the following classification: motor vehicles with at least four wheels designed and constructed for the carriage of passengers (category 'M'); motor vehicles with at least four wheels designed and constructed for the carriage of goods (category 'N'); trailers (category 'O'); special purpose vehicles; agricultural and forestry tractors (category 'T'); non-road mobile machinery; off-road vehicles (category 'G').

There are numerous types of passenger vehicles: light passenger vehicles (motor cars or cars), people carriers or mini-buses, buses (omnibuses), coaches, etc. They may be classified according to the types of chassis frame, engine, fuel, as well as the purpose for which they are used.

Motor vehicles for the carriage of goods include light commercial vehicles (also light goods vehicle) and large goods vehicles, LGV (also

heavy goods vehicle, HGV). ‘A large goods vehicle’ is the European Union (EU) term for any truck (lorry) with mass over 3.5 tonnes. Trucks vary greatly in size, power and configuration. Light commercial vehicles with mass not more than 3.5 tonnes are called light vans. When a vehicle is required for the transportation of bulky equipment, a pickup would be often desirable.

Trailers and semi-trailers are any non-self propelled vehicles. It is required that they should be towed by power-driven vehicles.

Special purpose vehicles embrace the vehicles of categories ‘M’, ‘N’ or ‘O’ for the carriage of passengers or goods and for performing special functions with special body arrangement and equipment. They include motor caravans, armoured vehicles, ambulances, etc.

Agricultural and forestry tractors are power-driven vehicles, either wheeled or caterpillar tracks, which are designed to pull, push, carry or actuate certain tools, machines or trailers.

The term ‘non-road mobile machinery’ means any mobile machine, transportable industrial equipment or vehicle with or without body not intended for the use of passenger- or goods- transport on the road, in which the internal combustion engine is installed. Non-road mobile machinery embraces earthmoving machinery, such as scrapers, bulldozers, graders, excavators, etc.

Off-road vehicles are considered to be any types of vehicles which are capable of driving on and off paved or gravel surface. They are generally characterized by having large tyres with deep open treads, a flexible suspension, or even caterpillar tracks. They have a versatile application, e.g. several types of motorsports involve racing off-road vehicles.

Exercise 2. Agree or disagree with the following statements.

1. The classification of power-driven vehicles was defined at the World Fo- rum for Harmonization of Vehicles. 2. Numerous types of passenger vehicles are known to be included into category ‘M’. 3. Category ‘G’ represents offroad vehicles. 4. Light commercial vehicles are considered to be passenger vehicles. 5. Agricultural tractors may be either wheeled or with caterpillar tracks. 6. The vehicles of ‘M’, ‘N’ or ‘O’ categories may be special purpose vehicles. 7. Trailers are non-self propelled vehicles.

Exercise 3. Fill in the blanks to streamline the use of the Subjunctive Mood. The words in brackets are given to help you.

1. It … useful to investigate this problem (to be). 2. There … no results without these experiments (to be). 3. He suggested that you … this article (to read). 4. I wish I … about it (to know). 5. I brought the book for you so that you … it (to read). 6. If I were you, I … these lectures (to attend). 7. If you had visited the library yesterday, you … some more information about it (to find). 8. It … difficult to define this term (to be). 9. It is necessary that they … there with me (to go). 10. It … to the point to read this book (to be).

Exercise 4. Make up sentences according to the models to practise the use of the Subjunctive Mood.

Model A: *Было бы интересно побывать на этой конференции.*

It would be interesting to attend this conference.

1. Было бы полезно прочитать эту статью. 2. Было бы желательно выучить эти термины. 3. Было бы трудно решить эту проблему. 4. Было бы полезно обработать эти данные. 5. Было бы кстати посетить этот музей.

Model B: *Хотелось бы, чтобы этот автомобиль понравился вам.*

I wish you liked this motor car.

1. Хотелось бы, чтобы вы купили этот автомобиль. 2. Хотелось бы, чтобы вы определили этот термин. 3. Хотелось бы, чтобы вы приняли эту резолюцию. 4. Хотелось бы, чтобы вы использовали это оборудование. 5. Хотелось бы, чтобы вы поехали в автобусе.

KEY VOCABULARY DEVELOPMENT

Exercise 1. Match the adjectives in column A with the nouns in column B to form meaningful phrases and then identify them at the sentence level in the text. It will help you understand the text in detail.

A	B	
1)	agricultural	a) classification
2)	numerous	b) equipment

3)	following	c) Union
4)	special	d) tools
5)	mobile	e) tractors
6)	European	f) body
7)	bulky	g) types
8)	internal	h) machinery
9)	flexible	i) suspension
10)	certain	j) combustion

Exercise 2. Decide which of the verbs on the left collocate with the nouns on the right and then identify the word combinations at the sentence level in the text. It will help you understand the text precisely.

1)	to adopt	a) categories
2)	to perform	b) classification
3)	to tow	c) functions
4)	to involve	d) resolution
5)	to define	e) trailers
6)	to be devoted to	f) tools
7)	to actuate	g) goods
8)	to carry	h) vehicles
9)	to board	i) engines
10)	to install	j) coaches

Exercise 3. Try to enrich your vocabulary:

a) find words in the text which have the same meanings as the following words:

design, kinds, motor car, omnibus, aim, to embrace, big, truck, very much, to fulfil, application, motor, different, some;

b) find words in the text whose meanings are opposite to the meanings of the following words:

heavy, reconstruction, industrial, small, to pull, stationary, with, external, off the road, closed;

c) replace the words in italics with the words with similar meanings:

1. There are different *kinds* of vehicles. 2. *A truck* is a vehicle with mass over 3.5 tonnes. 3. Category ‘M’ includes *motor cars*. 4. The

2. trucks vary in size *very much.* 5. They *fulfil* different functions.

Exercise 4. Complete the sentences: change the word in capitals at the end of each sentence to form a word that fits suitably in the blank space.

1. 'A large goods vehicle' is the … Union term for any truck EUROPE.
2. This vehicle has special body … ARRANGE.
3. It depends on the … of the vehicle CONSTRUCT.
4. The LGV is for the … of goods TRANSPORT.
5. This vehicle is for the carriage of the special … EQUIP.

Exercise 5. Insert the words at the sentence level: fill in the blanks with the missing words (the first letter of each word is given).

1. V… categories are defined according to the classification. 2. There is a classification of power-driven vehicles and t… . 3. Passenger vehicles may be classified according to the types of e… . 4. Pickups are usually used for b… equipment. 5. Trucks v… in power and configuration. 6. Special purpose vehicles include armoured vehicles, a…, etc. 7. Agricultural tractors pull and p… trailers. 8. The internal c… engine is installed in the motor car. 9. The off-road vehicle has a f… s… . 10. Off-road vehicles have a v… application.

TEST 10

1. Choose the proper words and fill in the blanks.

1. The resolution on the construction of ... was adopted.

A. vehicles B. categories C. goods D. units

2. Category 'M' includes motor vehicles for the ... of passengers.

A. construction C. goods
B. carriage D. classification

3. Motor cars may be classified according to the chassis ... .

A. engine B. fuel C. frame D. vehicle

4. Pickups are used for the transportation of ... equipment.

A. bulky B. desirable C. light D. wheeled

5. Trucks ... in size.

A. adopt B. power C. vary D. perform

6. Tractors may have ... tracks.

A. vehicles B. caterpillar C. tools D. trailers

7. Tractors ... certain tools.

A. perform B. embrace C. intend D. actuate

8. Scrapers are powerful ... machines.

A. rotating B. wheeled C. flat D. ground

9. 'HGV' should be used for motor vehicles which carry ... goods.

A. flat B. tracked C. wheeled D. heavy

10. 'HGV' stands for 'heavy ... vehicle'.

A. good B. goods C. great D. greatly

2. The text contains different mistakes: 4 - in spelling, 3 - in grammar. Correct the mistakes and rewrite the text.

An automobile, motor car or car are a wheeled motor vehicle used for transporting rather pasengers than goods, which also cary its own engine or motor. Most definitions of the term specifies that automobiles been desighed to run primarily on roads, to have seats for one to eight people, and to have typicaly four wheels.

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