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English

Учебное пособие для студентов 2-го курса
инженерно-технологического факультета

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Предлагаемое учебное пособие предназначено для студентов 2 курса инженерно-технологического факультета, обучающихся по специальностям: 110301 –Механизация сельского хозяйства; 110303 – Механизация переработки сельскохозяйственной продукции; 110304 – Технология обслуживания и ремонта машин в АПК, и направлено на развитие основ письменной и устной речи, овладение грамматическими формами и оборотами, формирование навыков чтения и перевода оригинальной литературы по специальности на английском языке.

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Рекомендовано к изданию методической комиссией инженерно – технологического факультета Брянской государственной сельскохозяйственной академии, протокол № 26 от 21.05.2010 года.

ВВЕДЕНИЕ

Учебно-методическое пособие разработано в соответствии с требованиями Государственных образовательных стандартов высшего профессионального образования, утверждённых Министерством образования РФ, рабочими учебными планами, утверждёнными Учёным советом инженерно-технологического факультета.

Данное пособие предназначено для студентов 2 курса инженерно-технологического факультета, обучающихся по специальностям: 110301 – Механизация сельского хозяйства; 110303 – Механизация переработки сельскохозяйственной продукции; 110304 – Технология обслуживания и ремонта машин в АПК.

Основной целью пособия является формирование навыков чтения, понимания, извлечения, обработки и воспроизведения информации из англоязычных специальных текстов, а также расширение словарного запаса общеупотребительной лексики и освоение специальной научной лексики.

В данное пособие включены материалы из различных источников в сокращенном, но не адаптированном варианте без нарушения особенностей стиля языка научно-технической статьи.

Пособие включает 10 уроков (Units). Тематика текстов включает:

— историю автомобилестроения в России и за рубежом;

— описание некоторых систем отечественных и зарубежных автомобилей;

— неисправности в автомобильных механизмах и системах, а также способы их устранения;

— автомобили и окружающую среду;

— вопросы безопасности на дорогах.

Чёткая последовательность выполнения заданий позволит студентам овладеть терминологией изучаемой тематики, приобрести навыки ведения беседы и переговоров, составления аннотаций. Пособие рассчитано на один семестр аудиторной работы и может быть использовано для самостоятельной внеаудиторной работы.

Unit 1

Automobile Production

I study at the academy, at the engineering department. When I graduate from the academy I shall become an engineer. All specialists in automobile industry dealing with manufacturing automobiles (cars or trucks) must know that the production of the automobile comprises the following phases: designing; working out the technology of manufacturing processes; laboratory tests; road tests; mass manufacturing (production).

Why is it necessary to know all these facts? It is important to know them, as before the automobile is put into mass production it should be properly designed and the car must meet up-to-date requirements. What are these requirements?

The automobile must have high efficiency, long service life, driving safety, ease of handling and maintenance, pleasant appearance. Also it must be comfortable and ecological. In order to obtain these qualities the specialists should develop up-to-date methods of designing cars using new types of resistant to corrosion light materials. Also it is important to know computer sciences because computers offer quick and optimal solutions of the problems. Besides they are used for better operation of mechanisms in cars.

Before the car is put into mass production the units of the car are subjected to tests in the Works laboratory and then the car undergoes a rigid quality control in road tests. Why are these tests required? What qualities are required of the automobile? They are needed because the modern automobile must be rapid in acceleration, have smooth acting clutch, silent gearbox, dependable braking and steering systems, dependable ignition system, low fuel consumption and be stable on the road.

1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

2. Find predicates in all sentences and define their tense and voice.

3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones.

Specialist, automobile, industry, production, phase, technology, process, test, mass, fact, service, comfortable, ecological, method, type, corrosion, material, optimal, problem, mechanism, control, system

4. Give derivatives.

To construct, to produce, to design, to develop, to manufacture, to require, to maintain, to consume

5. Give synonyms.

A great deal, to promote, to replace, earth, to suppose, boat, to solve, to design, to supply, invention

6. Give antonyms.

Complicated, to remain, to destroy, huge, shallow, gradually, repair, the same, wide, strength

7. Suggest the Russian equivalents.

Low fuel consumption, to deal with designing cars, mass production, long service life, driving safety, to work out, ease of maintenance, the technology of manufacturing processes, to put into mass production, to subject to tests, a rigid quality control, to meet up-to-date demands, rapid acceleration, smooth-acting clutch, silent gearbox, dependable brakes, steering system, ignition system

8. Find in the text English equivalents close in meaning to the following.

Учусь на инженерном факультете, инженер, люблю работать с машинами, современный автомобиль, надежные тормоза, плавное сцепление, приятный внешний вид, массовое производство автомобилей, стендовые испытания, отвечать современным требованиям, долгий срок службы, легкость техобслуживания, надежность, быстро разгоняться (приёмистость), подвергаться жестким дорожным испытаниям.

9. Translate into Russian.

1. After graduating from the academy I shall become a engineer.
2. I shall deal with repairing cars but I must know how cars are produced.
3. The production of the automobile comprises five phases, such as: designing, working out the technology of manufacturing processes, laboratory tests, road tests, mass production.
4. The automobile of today must have high efficiency, long service life, driving safety, ease of maintenance and be stable on the road.
5. The automobile must meet up-to-date demands, that is, it must have rapid acceleration, smooth-acting clutch, silent gearbox, dependable braking and steering systems, dependable ignition system.
6. Before the car is put into mass-production it must be subjected to laboratory and road tests.
7. Technicians should know the technology of manufacturing processes.

10. Complete the sentences using the words and expressions from the text.

1. An automobile specialist deals with ....
2. The production of the automobile comprises ....
3. The cars are subjected to tests in order ....
4. The qualities required of the automobile are ....
5. The car must have the following units:....
6. It is necessary to know these facts because the automobile of today must meet.....

11. Translate into English.

1. Я учусь на инженерном факультете БГСХА.
2. После окончания академии я стану инженером.
3. По моему мнению, каждый специалист должен знать, что автомобиль должен пройти стендовые и дорожные испытания.
4. Эти испытания необходимы, чтобы автомобиль отвечал современным требованиям.
5. Современный автомобиль должен обладать следующими качествами: быть приёмистым, иметь плавное сцепление, бесшумную коробку передач, надежные тормозную и рулевую системы, быть легким в управлении.
6. Двигатель автомобиля также должен иметь небольшой расход топлива и быть экологически чистым.

12. Are these statements true or false?

1. I study at the academy, at the economics department.
2. The engineering department trains specialists for the agriculture.
3. The production of the automobile comprises three phases.
4. The automobile must have rapid acceleration.
5. Technicians shouldn't know the technology of manufacturing processes.
6. The car undergoes a rigid quality control only in laboratory tests.
7. To meet up-to-date demands a car must have high efficiency, long service life, driving safety, ease of maintenance and so on.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Anton: Hi, how are you?

Boris: Fine, thanks. And you?

A: I'm O.K., thank you. Where do you study?

B: I study at the engineering faculty.

A.: Whom does the faculty train?

B.: It trains specialists for the agriculture.

A.: Why did you decide to become an engineer?

B.: I enjoy working with machines. I enjoy learning about a car. I understand every part of it.

A.: What can you tell me about the car?

B.: Well, the car of today must be rapid in acceleration, it must have dependable clutch, brakes, and steering system, be stable on the road and have pleasant appearance.

A.: Do you enjoy the course?

B.: Yes, very much. I have learned a lot of things. For example, I know that the production of the car comprises five phases.

A.: What are they?

B.: They are designing, working out the technology, laboratory tests, road tests, mass production.

A.: And why are laboratory and road tests needed?

B.: The cars are subjected to tests in order to meet up-to-date demands.

A.: And what are these demands?

B.: They are high efficiency, long service life, driving safety, ease of maintenance and so on.

A.: I think you will become an expert in automobile engineering.

B.: I'll try. The cooperative plan of an academic program with practice at a plant will help me to become a good specialist. But I'm sorry, I must hurry. See you later. Bye.

A.: Bye-bye.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. Complete the following table.

construction	
	расход топлива
design	
	удовлетворять требования
clutch	
	вводить в производство
ignition	
	срок службы

2. Complete the sentences.

1. The production of the car comprises … .
2. The car of today must be … .
3. The cars are subjected to tests in order to … .
4. The up-to-date demands are … .
5. Before the automobile is put into mass production … .
6. All specialists in automobile industry deal with … .

3. Write down the sentences in Passive Voice.

1. The first practical international combustion engine was introduced in the form of a gas engine by the German engineer N.Otto in 1876.
2. Motor transport began to spread in Europe very rapidly.
3. The American manufacturer who introduced the first cheap motor car was Henry Ford.
4. Motor cycles were well suited for competition races and sporting events.

4. Write down the sentences in Acive Voice.

1. In the West the first steam engine carriage was invented in France.
2. A locomotive could run eighteen kilometres an hour and carry passengers cheaper than horses did.
3. At the very time when foreign engineers were submitting their plans, in the Urals a steam locomotive was actually in use.
4. Light two-wheel carriages were widely used in the ancient world.

Unit 2

Components of the Automobile

The automobile is made up of three basic parts: the power plant, or the engine, the chassis and the body.

The engine is the source of power that makes the wheels rotate and the car move. It includes fuel, cooling, lubricating and electric systems. Most automobile engines have six or eight cylinders.

The chassis includes a power train (power transmission), a running gear, steering and braking systems as well.

The power train carries the power from the engine to the car wheels.

The power transmission, in turn, contains the clutch, gearbox, propeller or cardan shaft, final drive, differential, rear axle and axle shafts. The running gear consists of a frame with axles, wheels and springs.

The body has a hood, fenders and accessories: the heater, stereo tape recorder, windshield wipers, conditioner, speedometer and so on.

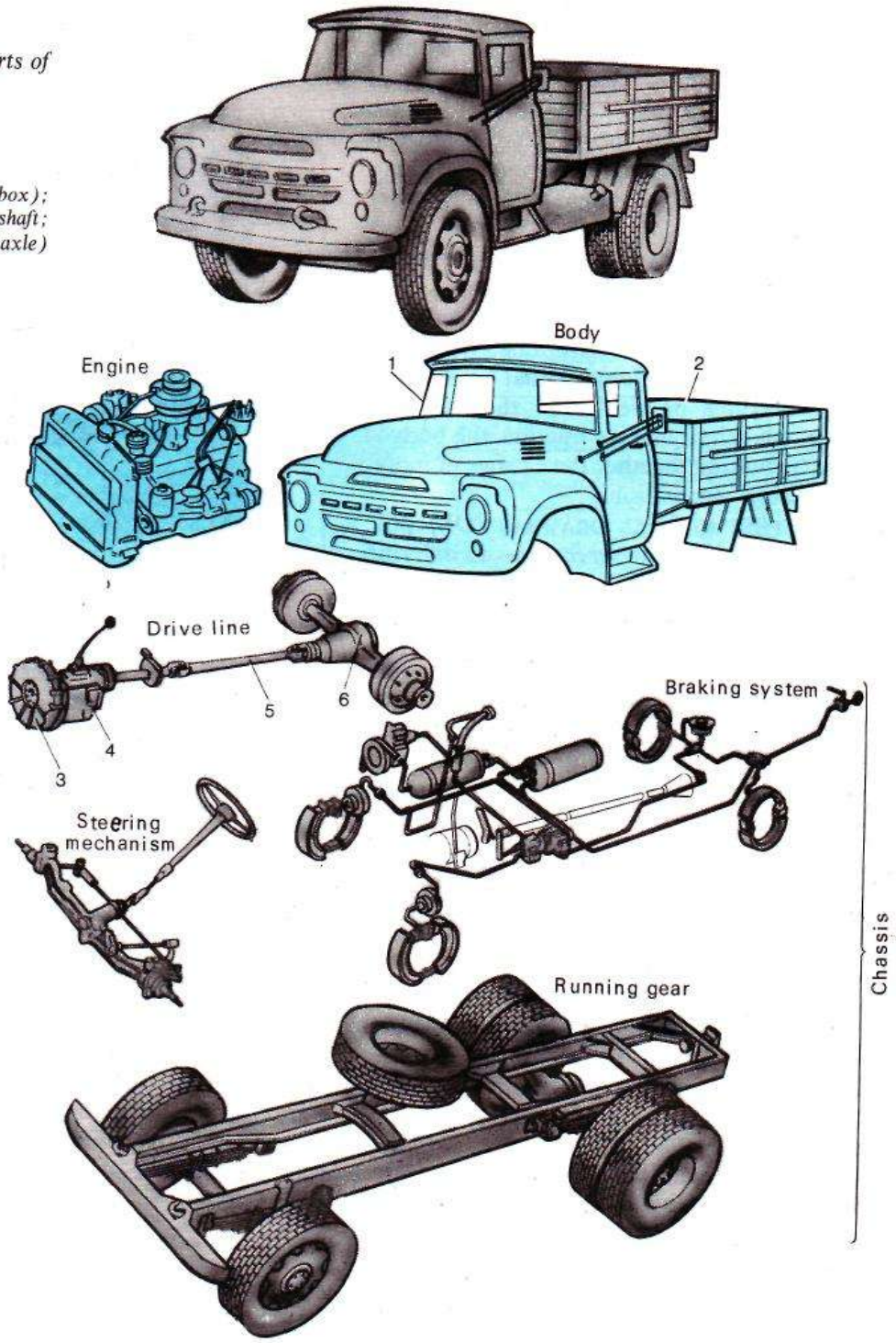
1. **Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.**

2. **Find predicates in all sentences and define their tense and voice.**

3

Main component parts of the automobile

1 – driver's cab;
2 – cargo body;
3 – clutch;
4 – transmission (gearbox);
5 – propeller (cardan) shaft;
6 – final drive (driving axle)



3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones.

Automobile, chassis, electric, system, control, differential, ventilator, cylinder, conditioner, speedometer.

4. **Give derivatives.**

To cool, to lubricate, to drive, to heat, to place, to fly, to build, to protect

5. **Give synonyms.**

To complete, to take an examination, to attend a lecture, important, to receive, to return, usually, to consist of, to leave, way

6. **Give antonyms.**

To repair, to load, simple, gradually, narrow, shortage, weakness, slowly, small, the same

7. **Suggest the Russian equivalents.**

Fuel system, axle shaft, accessories, cooling system, frame with axles, running gear, lubricating system, steering system, heater, propeller shaft, power transmission, final drive, windshield wiper, clutch, wheels and axle shafts, gearbox, electric system, differential.

8. **Find in the text English equivalents close in meaning to the following.**

Сделан из; шасси; кузов; включать в себя; топливная, охлаждающая, смазывающая и электрическая системы; трансмиссия; ходовая часть; рулевая и тормозная системы; карданный вал; главная передача; дифференциал; задний мост; полуоси; капот; крылья; вспомогательные устройства; стеклоочистители.

9. **Translate into Russian.**

1. The automobile is made up of three basic parts.
2. The engine is the source of power that makes the wheels rotate and the car move.
3. Most automobile engines have six or eight cylinders.

4. The body has a hood, fenders and accessories.

5. The power transmission contains the clutch, gearbox, propeller or cardan shaft, final drive, differential, rear axle and axle shafts.

6. The power train carries the power from the engine to the car wheels.

7. The engine includes fuel, cooling, lubricating and electric systems.

10. Complete the sentences using the words and expressions from the text.

1. Mechanism which is used to stop the car … .

2. Mechanism which is used to guide the car … .

3. Mechanism which engages or disengages the engine and the car wheels … .

4. Mechanism which is used to change the speed of the car … .

5. Mechanism which is used to guide the car in one or the other directions … .

6. Device which is designed to measure the speed of the car … .

11. Translate into English.

1. Автомобиль состоит из трех основных частей: двигателя, шасси и кузова.

2. Двигатель — это источник энергии.

3. Двигатель включает в себя топливную, охлаждающую, смазывающую и электрическую системы.

4. Шасси включает в себя силовую передачу, ходовую часть, рулевую и тормозную системы.

5. Силовая передача (трансмиссия), в свою очередь, состоит из сцепления, коробки передач, карданного вала, главной передачи, дифференциала, заднего моста и полуосей.

6. Ходовая часть включает в себя раму с осями, колеса и рессоры.

12. Are these statements true or false?

1. The automobile is made up of four basic parts.

2. The engine is the source of power that makes the wheels rotate and the car move.

3. The power transmission contains the clutch and gearbox.

4. The power train carries the power from the engine to the car wheels.

5. Most automobile engines have three or five cylinders.

6. The chassis includes power transmission, a running gear and doesn't include steering and braking systems.

7. The heater, stereo tape recorder, windshield wipers, conditioner, speedometer are accessories.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Anton: Hi, how are you?

Boris: Fine, thanks. And you?

A: I'm O.K., thank you. Where do you study?

B: I study at the engineering faculty.

A.: Whom does the faculty train?

B.: It trains specialists for the agriculture.

A.: Why did you decide to become an engineer?

B.: I enjoy working with machines.

A.: Do you know what parts the automobile is made up of?

B.: Certainly. It is made up of the engine, the chassis and the body.

A.: What is the source of power?

B.: The source of power is the engine. It includes fuel, cooling, lubricating and electric systems.

A.: And what does the chassis consist of?

B.: It consists of a power transmission, running gear, steering and braking systems. By the way, the power transmission, in turn, comprises the clutch, gearbox, propeller shaft, final drive, differential, rear axle and axle shafts.

A.: And what parts does the body include?

B.: The body has a hood, fenders and accessories, such as: the heater, stereo tape recorder, windshield wipers, conditioner and so on.

A.: Thank you very much for your information.

B.: Don't mention it. I am glad to help you.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. Complete the following table.

engine	
	сцепление
fender	
	задний мост
heater	
	полуось
body	
	коробка передач

2. Complete the sentences.

1. The body has … .
2. The engine includes … .
3. The chassis consist of … .
4. The power train carries … .
5. The automobile is made up … .
6. The engine is … .

3. Write down the sentences in Passive Voice.

1. The word *transport* means to carry people or goods from place to place.
2. The history of transport is divided into two stages.
3. The bundles or baskets were carried by the animals on their backs.
4. The trusts borrowed money for repairing and improving the roads.

4. Write down the sentences in Acive Voice.

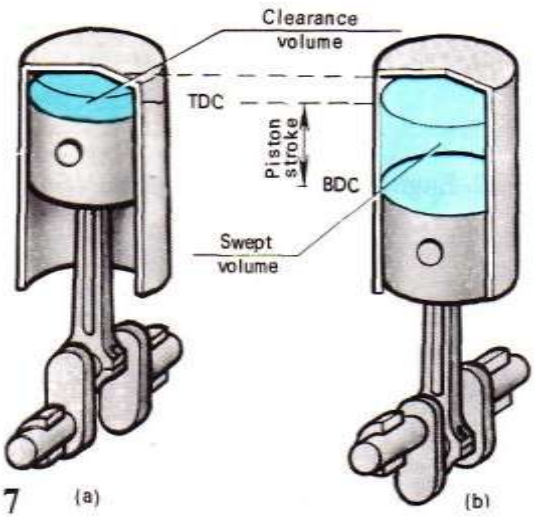
1. In Britain, and also over much Europe, the first long-distance paved roads were made by Romans.
2. The first Russian locomotive was invented and built by Cherepanovs, father and son, both skilful mechanics and serfs.
3. The rapid development of the internal combustion engine let to use them in the farm tractors, thereby creating a revolution in agriculture.
4. The motor cycle steadily increased in popularity and tyres became more reliable and roads improved.

Unit 3

Principle of Operation of the Four-Stroke Petrol Engine

The internal combustion engine is called so because fuel is burned directly inside the engine itself. Most automobile engines work on a 4-stroke cycle. A cycle is one complete sequence of 4 strokes of the piston in the cylinder. The operating cycle of the four-stroke petrol engine includes: inlet stroke (intake valve opens), compression stroke (both valves closed), power stroke (both valves closed), exhaust stroke (exhaust valve is opened).

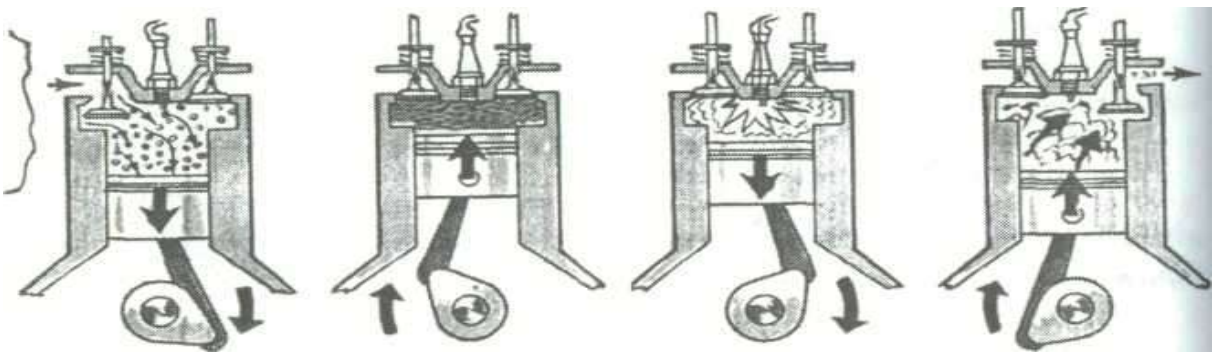
To describe the complete cycle, let's assume that the piston is at the top of the stroke (top dead center) and the inlet and the exhaust valves are closed.



Piston positions at dead centers
(a) piston at TDC;
(b) piston at BDC

When the piston moves down the inlet valve opens to intake a charge of fuel into the cylinder. This is called the inlet (intake) stroke. On reaching the lowest position (bottom dead center) the piston begins to move upward into the closed upper part on the cylinder, the inlet valve is closed and the mixture is compressed by the rising piston. This is called the compression stroke. As the piston again reaches the top dead center the spark plugs ignite the mixture, both valves being closed during its combustion. As a result of burning mixtures the gases expand and great pressure makes the piston move back down the cylinder. This stroke is called the power stroke. When the piston reaches the bottom of its stroke, the exhaust valve is opened, pressure is released, and the piston again rises. It lets the burnt gas flow through the exhaust valve into the atmosphere. This is called the exhaust stroke which completes the cycle. So the piston moves in the cylinder down (intake stroke), up (compression stroke), down (power stroke), up (exhaust stroke).

The heat released by the fuel is transformed into work so that the reciprocating movement of the pistons is converted into rotary movement of a crankshaft by means of connecting rods.



1 - intake 2 - compression 3 - power 4 – exhaust

Fig. 2. Principle of Operation of the Four-Stroke Petrol Engine

1. **Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.**

2. **Find predicates in all sentences and define their tense and voice.**

3. **Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones.**

Principle, cycle, piston, center, cylinder, atmosphere, operation, petrol, compression, position, mixture, tank, absolutely

4. **Give derivatives.**

To ignite, to begin, to rotate, to compress, to move, to reciprocate, to describe

5. **Give synonyms.**

To wish, to grow, to need, each, to make, hard, to build, state, land, to pass an exam

6. **Give antonyms.**

Always, early, free, hard, to fail, possible, to send, to return, after, to graduate

7. **Suggest the Russian equivalents.**

Bottom dead center, charge of fuel, connecting rod, combustion, compression stroke, crankshaft, diesel engine, combustion chamber, exhaust stroke, four-stroke cycle, ignition, pressure, internal combustion engine, fuel injection, intake (inlet) stroke, reciprocating movement, recharge, burn

8. **Find in the text English equivalents close in meaning to the following.**

Клапан, топливный бак, закончилось топливо, свеча зажигания, верхняя мертвая точка, сесть (об аккумуляторах), вращательное движение, достигать, рабочий ход, подзарядить (аккумулятор), бензиновый двигатель,

рабочий цикл, цилиндр, нижняя мертвая точка, подниматься, давление, преобразовывать, гореть, искать (проследить) неисправность

9. Translate into Russian.

1. During the inlet (intake) stroke the inlet valve opens and a charge of fuel (mixture) flows into the cylinder.
2. During the compression stroke the inlet valve is closed and the fuel is compressed by the rising piston.
3. During the power stroke both valves are closed, pressure rises in the combustion chamber, and the spark ignites the mixture.
4. During the exhaust stroke the exhaust valve is opened, pressure is released and the residual gases flow into the atmosphere through the exhaust valve.
5. Fuel is burned directly inside the engine itself.
6. A cycle is one complete sequence of 4 strokes of the piston in the cylinder.
7. The heat released by the fuel is transformed into work so that the reciprocating movement of the pistons is converted into rotary movement of a crankshaft by means of connecting rods.

10. Complete the sentences using the words and expressions from the text.

1. The internal combustion engine is called so because … .
2. The inlet stroke is called so because … .
3. The operating cycle of the four-stroke petrol engine includes …
4. When the piston reaches the bottom of its stroke … .
5. The piston moves in the cylinder … .
6. When the piston moves down … .
7. The heat released by the fuel … .

11. Translate into English.

1. Большинство автомобилей работает в четыре такта.
2. Различают следующие такты: впуск, сжатие, рабочий ход и выпуск.
3. Достигнув нижней мёртвой точки, поршень начинает двигаться вверх, и смесь сжимается (уплотняется).
4. Возвратно-поступательное движение поршня через шатун превращается во вращательное движение коленчатого вала.
5. Когда поршень вновь достигает верхней мёртвой точки, искра воспламеняет топливную смесь.
6. Поршень движется вниз, и через впускной клапан в цилиндр впрыскивается топливо.

12. Are these statements true or false?

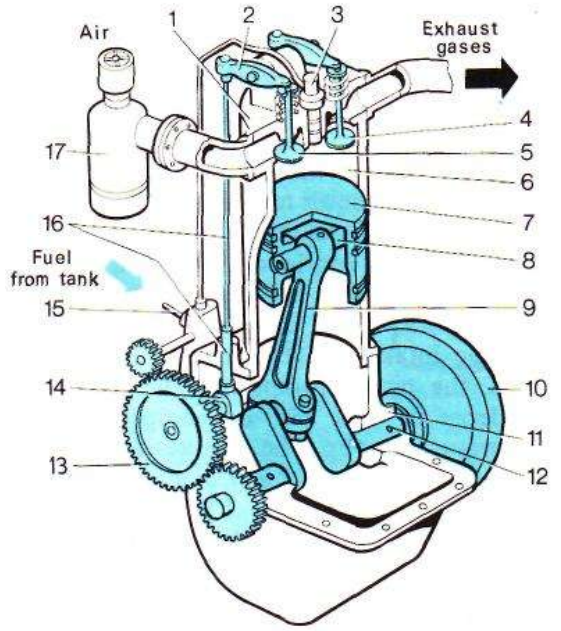
1. During the inlet stroke the inlet valve closes and a charge of fuel exhaust from the cylinder.
2. Fuel is burned directly outside the engine itself.
3. During the power stroke the spark ignites the mixture.
4. A cycle is one complete sequence of three strokes of the piston in the cylinder.
5. The heat released by the fuel is transformed into work.
6. Great pressure makes the piston move back down the cylinder.
7. The exhaust stroke completes the cycle.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.



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Schematic diagram of a single-cylinder diesel engine

1 – cylinder head;
2 – rocker arm;
3 – fuel injector;
4 – exhaust valve;
5 – intake valve;
6 – cylinder;
7 – piston;
8 – piston pin;
9 – connecting rod;
10 – flywheel;
11 – crankcase;
12 – crankshaft;
13 – camshaft timing gear;
14 – camshaft;
15 – fuel injection pump;
16 – valve lifter (tappet) and push-rod;
17 – air cleaner

At the Repairing Shop

Client: Good afternoon! Can you help me? There is something wrong with the engine.

Master: Hi! What is wrong with it?

C.: I don't know. It wouldn't start. Maybe the pistons and valves are in disorder.

M.: Let's have a look! Well, they are quite right.

C.: And what about the crankshaft, or electric spark plugs. I know absolutely nothing about the operating cycle of the engine.

M.: Just a moment. Don't worry! We shall check up all units and how they work together.

(Some time later)

M.: My God! There is no petrol in the tank. How can you move drive?

C: Really? Oh, I have forgotten to fill in the tank! I beg your pardon to trouble you!

M.: No trouble, at all. You are welcome!

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. Complete the following table.

crankshaft	
	ВМТ
spark plug	
	ДВС
piston	
	шатун
inlet stroke	
	выпускной клапан

2. Complete the sentences.

1. Most automobile engines work … .
2. When the piston is at the top of the stroke … .
3. The inlet valve is closed and … .
4. The inlet valve opens to intake … .
5. As the piston again reaches the top dead center … .
6. A cycle is … .

3. Write down the sentences in Passive Voice.

1. In Russia the tsar's government showed little interest in railway transporting.
2. At first only kings and queens had the privilege of driving in a four-wheeled vehicle.
3. Two-wheeled carts and four-wheeled wagons and carriages could be used for carrying goods for long distances.
4. The road was paved with brick.

4. Write down the sentences in Acive Voice.

1. The taximeter is a mechanical device measuring the distance travelled.
2. Lorries were used to transport sand to the site.
3. Combustion of petrol produces more heat than the combustion of coal.
4. A new safety device has been introduced to regulate traffic.

Unit 4

Chassis

The main units of the chassis are: the power transmission, the running gear and the steering mechanism. The power transmission includes the whole mechanism between the engine and the rear wheels. This entire mechanism consists of the clutch, gearbox, propeller (cardan) shaft, rear axle, final drive, differential and axle shafts.

At the front end of the car is the engine. On the back of it is the flywheel. Behind the flywheel is the clutch. The clutch is a friction device connecting the engine with the gears of the gearbox. The main function of the gearbox is to change the speed of the car.

The power is always transmitted by the cardan shaft to the back axle. The final drive reduces the high speed of the engine to the low speed of the driving wheels. The differential enables the driving wheels to turn at different speeds which is necessary when turning the car. The foundation of the automobile is the frame to which different chassis units are attached.

The rear axle is capable of moving up and down about the frame. The rear axle is an important part of the transmission. It carries the greater portion of the weight of the car.

The steering mechanism is designed for changing the direction of the car. The brakes are used for stopping the car, for decreasing its speed and for holding the car position.

Basic Troubles of Transmission Mechanism

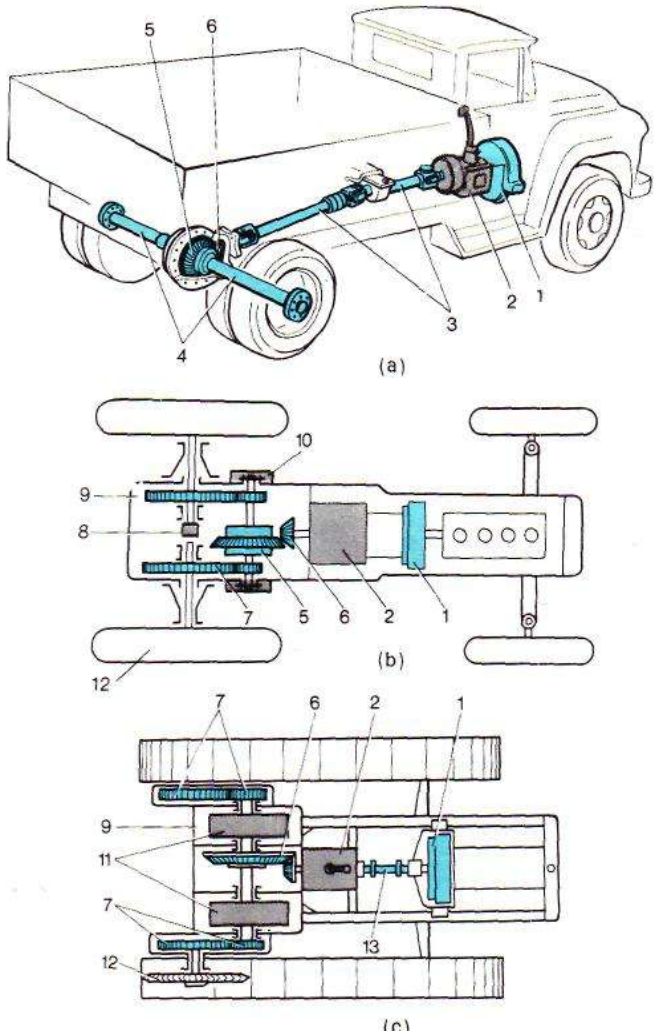


Fig.1 Schematic diagrams of drive-line arrangements:
a) of an automobile b) of a wheeled tractor
c) of a crawler tractor
1) clutch 2) transmission (gearbox) 3) cardan drive (propeller shaft) 4) half axles
5) differential 6) main drive 7) final drive 8) differential lock 9) rear axle
10) brake 11) steering mechanism 12) driving wheel (sprocket) 13) intermediate drive (shaft)

The transmission of the engine torque to the driving wheels of the automobile must be smooth. There should be no vibration in the operation of transmission mechanism within the range of travelling speeds.

The indications of malfunctions in the transmission mechanism components are as follows:

1. incomplete disengagement of the clutch;
2. difficult engagement or self-demising of gears;
3. run out and vibration of the cardan-drive shaft.

What to do in these cases:

1. Check the free travel of the clutch pedal and adjust it.
2. Check the oil level in the gearbox housing and wash breather channel.
3. Check to see that all the fastening bolts are securely tightened and that the turn-on crosses fit properly the bearings, and the bearings, in turn, the universe joint forks.

1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

2. Find predicates in all sentences and define their tense and voice.

3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones:

Transmission, system, mechanism, radiator, friction, automobile, cardan, portion, final, accelerator, pedal, position

4. Give derivatives.

To adjust, to fasten, to travel, to drive, to house, to move, to attach, to run

5. Give synonyms.

Plenty of, to occur, to make, to believe, to care, to come back, too, to decide, land, two times

6. Give antonyms.

To complete, after, to leave, to pass an examination, to ask, much, here, tomorrow, to graduate, evening

7. Suggest the Russian equivalents.

Be capable, check, decrease the speed, engine crankshaft, driving wheels, fastening bolts, flywheel, frame, hold the car position, free travel, in turn, move up and down, level, to mount, springs, breather channel, running gear, effort, to tighten, to support, within the range, universal-joint forks, incomplete disengagement, steering system, trouble

8. Find in the text English equivalents close in meaning to the following.

вилки кардана, рулевая система, неисправность, крутящий момент, саморазъединение шестерен (саморасцепление), скорость езды, рулевое колесо (руль), силовая передача, рычаг коробки передач, картер, корпус, неполное отключение (сцепления), большая часть веса автомобиля, задние колеса, неполадки, (неисправная работа).

9. Translate into Russian.

1. The chassis includes the running gear, the power transmission and the steering mechanism.
2. The power transmission consists of the clutch, gearbox, cardan shaft, rear axle, final drive, differential and axle shafts.
3. The clutch connects the engine with the driving wheels.
4. The gearbox changes the speed of the car movement.
5. The steering mechanism changes the direction of the car.
6. At the front end of the car is the engine.
7. The rear axle is an important part of the transmission.

10. Complete the sentences using the words and expressions from the text.

1. The power transmission includes … .
2. This entire mechanism consists of … .
3. The power is always transmitted … .
4. The foundation of the automobile is … .
5. The steering mechanism is designed for … .
6. The differential enables … .
7. The final drive reduces … .

11. Translate into English.

1. Основными узлами шасси являются: трансмиссия, ходовая часть и рулевой механизм.

2. Радиатор расположен в передней части автомобиля.

3. Маховик крепится на задней части двигателя.

4. Сцепление соединяет двигатель с коробкой передач.

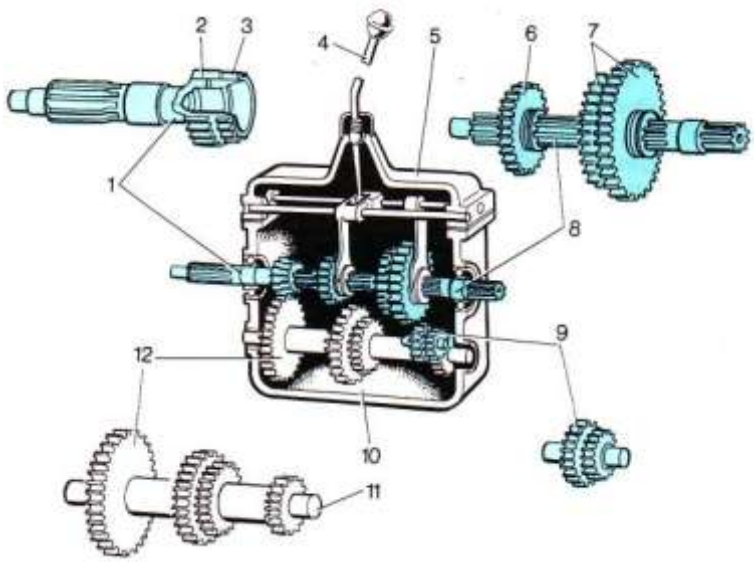


Fig. 2 Automobile transmission:

1) drive gear shaft 2) drive gear (clutch gear) 3) tooth rim 4) gear shift lever 5) case cover 6) third-and-fourth-speed gear 7) first-and-second-speed cluster gear 8) main shaft 9) reverse idler cluster gear 10) case 11) countershaft 12) countershaft driven gear (constant-mesh gear)

5. Коробка передач предназначена для изменения скорости движения автомобиля.

6. Главная передача снижает высокие обороты двигателя до невысоких оборотов ведущих колес.

7. Дифференциал позволяет ведущим колесам вращаться с разной скоростью при повороте автомобиля.

8. Рулевой механизм предназначен для изменения направления движения автомобиля.

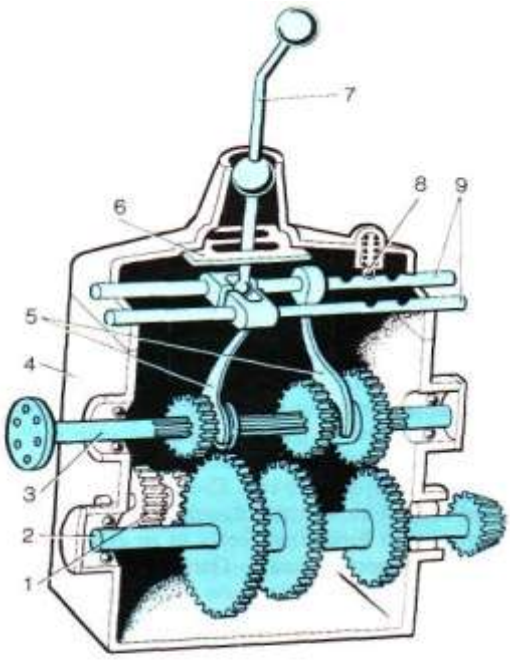
12. Are these statements true or false?

1. The rear axle isn’t an important part of the transmission.

2. The gearbox changes the speed of the car movement.

3. The driving wheels are connected with the engine by the clutch.

4. There should be some vibration in the operation of transmission mechanism within the range of travelling speeds.



82

Schematic diagram of a transmission

1 – reverse idler cluster gear;
2 – output (main) shaft;
3 – input (drive) shaft;
4 – case;
5 – gear shift forks;
6 – gear shift gate (quadrant);
7 – gear shift lever;
8 – gear shifter shaft lock;
9 – gear shifter shafts (selector bars)

5. The foundation of the automobile is the frame.

6. On the back of the car is the engine.

7. The power is always transmitted by the cardan shaft to the live back axle.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Transmission Mechanism

Teacher: Let's speak about the transmission mechanism. What main units does the transmission include?

Student: The transmission is the entire mechanism between the engine and the rear wheels. It includes the clutch, gearbox, cardan shaft, rear axle, final drive and differential.

T.: What does the clutch connect?

S.: The clutch connects the engine with the gearbox.

T.: And what does the gearbox do?

S.: The gearbox changes the speed of the car.

T.: What does the differential enable?

S.: The differential enables the driving wheels to move at different speeds when turning the car.

T.: For what purpose is the steering system used?

S.: The steering system is used for changing the direction of the car movement.

T.: And what is the function of the brakes?

S.: Brakes are used to slow or stop the car.

T.: That's right. You know the subject very well.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. Complete the following table.

	задние колеса
malfunction	
engine crankshaft	
	маховик
driving wheels	
	картер, корпус
breather channel	
	рычаг коробки передач

2. Complete the sentences.

1. The steering system is used for … .
2. The transmission is the entire mechanism … .
3. Brakes are used … .
4. The transmission of the engine torque must be … .
5. The differential enables … .
6. The rear axle is capable … .

3. Write down the sentences in Passive Voice.

1. The clutch connects the engine with the gearbox.
2. The steering system is used for changing the direction of the car movement.
3. There should be no vibration in the operation of transmission mechanism within the range of travelling speeds.
4. Different chassis units are attached to the frame.

4. Write down the sentences in Acive Voice.

1. The transmission includes the clutch, gearbox, cardan shaft, rear axle, final drive and differential.
2. The steering system is used for changing the direction of the car movement.
3. The clutch connects the engine with the gearbox.
4. All the fastening bolts must be securely tightened.

Unit 5

Frame

The foundation of the automobile chassis is the frame which provides support for the engine, body and power-train members. Cross members reinforce the frame. The frame is rigid and strong so that it can withstand the shocks, vibrations, twists and other strains to which it is put on the road.

The frame provides a firm structure for the body, as well as a good point for the suspension system. There are two types of frames, namely: conventional frames and integral (unibody) frames (frameless constructions).

Conventional frames are usually made of heavy steel channel sections welded or riveted together. All other parts of the car are attached to the frame.

In order to prevent noise and vibrations from passing to the frame and from there to the passengers of the car, the frame is insulated from these parts by rubber pads.

It is also important to insulate the frame in order to prevent metal-to-metal contacts.

Frameless (unibody) constructions are called so because they are made integral with the body. The body parts are used to structurally strengthen the entire car. Some unibody frames have partial front and rear frames for attaching the engine and suspension members.

1. **Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.**

2. **Find predicates in all sentences and define their tense and voice.**

3. **Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones:**

Chassis, structure, system, integral, construction, steel, vibration, passenger, metal, contact.

4. **Give derivatives.**

To think, to decide, to accept, to insist, to resist, to signify, to differ

5. **Give synonyms.**

Many, total, to happen, essential, usual, although, everywhere, to get, to store, strong

6. **Give antonyms.**

To receive, south, to open, good, black, successful, exact, easy, to manage, loud

7. **Suggest the Russian equivalents.**

Rigid, conventional frame, to insulate, suspension, rubber pad, channel section, longitudinal members, unibody construction, to get into trouble, to find out the damage, alignment, suspension system, to fasten, to strengthen, power-train members, to prevent vibration, to provide support, to reinforce.

8. Find in the text English equivalents close in meaning to the following.

Лонжероны, поперечины, жесткий, прочный, выдерживать нагрузки, подвеска, обычная (общепринятая) рама, безрамная конструкция, полые секции, сваренные или заклепанные, прикреплять к раме, резиновые прокладки, укреплять.

9. Translate into Russian.

1. The frame is a structural centre of any car as it provides support for the engine, body, wheels and power-train members.
2. Cross members reinforce the frame and provide support for the engine and wheels.
3. The frame is extremely rigid and strong.
4. The engine is attached to the frame in three or four points and insulated in these points by some rubber pads to prevent vibration and noise from passing to the frame and thus to the passengers.
5. There are two types of frames: conventional construction and unibody one.
6. The foundation of the automobile chassis is the frame which provides support for the engine, body and power-train members.
7. Conventional frames are usually made of heavy steel channel sections welded or riveted together.

10. Complete the sentences using the words and expressions from the text.

1. The frame provides support for ....
2. Conventional frames are made of ... .
3. Frameless constructions are made ... .
4. The frame is insulated from other parts in order to ... .
5. The frame is reinforced by ... .

6. Frameless constructions are called so … .

7. The frame is insulated from some parts by rubber pads … .

11. Translate into English.

1. Рама обеспечивает опору для кузова, двигателя и узлов силовой передачи.

2. Она состоит из лонжеронов и поперечин, которые усиливают раму.

3. Рама должна выдерживать вибрацию, кручения и другие нагрузки (напряжения).

4. Рамы бывают двух типов: обычные (стандартные) и выполненные воедино с кузовом.

5. Стандартные рамы изготовлены из стальных полых секций, сваренных или заклепанных вместе.

6. Безрамные конструкции выполнены воедино с кузовом.

7. Рама изолируется от кузова резиновыми прокладками, чтобы шумы и вибрации не проходили к пассажирам автомобиля.

12. Are these statements true or false?

1. In order to prevent noise and vibrations the frame is insulated by rubber pads.

2. The frame can’t withstand the shocks, vibrations, twists and other strains to which it is put on the road.

3. The engine is attached to the frame in five or six points.

4. The frame provides a firm structure for the body and a good point for the suspension system.

5. Cross members reinforce the frame.

6. The frame mustn’t be rigid and strong.

7. Conventional frames are usually made of heavy steel channel sections.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Stas: Hi! Haven't seen you for ages! How are you?

Vlad: Hi! I'm perfectly well! I am working at a repairing shop. Very interesting indeed, I can tell you.

S.: What are you doing there?

V.: Now, we are testing the frame. You see, the driver has got into trouble. Something is wrong with his car. He thinks it is the frame.

S.: Has the car a conventional frame or a unibody frame?

V.: Unibody frame.

S.: I think you have to do a lot of work as body parts strengthen the entire car.

V.: Sure. We are testing all parts in order to find out the damage.

S.: I think you will cope with the problem.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. **Complete the following table.**

frameless constructions	
	лонжероны
cross members	
	резиновые прокладки
suspension members	
	узлы силовой передачи
to prevent noise	
	вибрация

2. **Complete the sentences.**

1. It is also important to insulate the frame … .
2. Conventional frames are usually made of … .
3. The frame provides … .

4. The frame can withstand … .

5. There are two types of frames, namely: … .

6. All other parts of the car … .

3. Write down the sentences in Passive Voice.

1. Frameless constructions are made integral with the body.

2. Body parts strengthen the entire car.

3. I am working at a repairing shop.

4. All other parts of the car are attached to the frame.

4. Write down the sentences in Acive Voice.

1. The driver has got into trouble.

2. We are testing the frame.

3. Heavy steel channel sections are usually welded or riveted together.

4. Support for the engine, body and power-train members is provided with the frame.

Unit 6

Clutch

The clutch is a friction device. It connects the engine to the gears in the gearbox. It is used for disconnecting the engine from the gearbox, for starting the car and for releasing the engine from the car wheels.

The clutch is fixed between the flywheel of the engine and the gearbox and consists of two plates (discs): the friction disc and the pressure disc. The friction disc is situated between the flywheel and the pressure plate and has a hard-wearing material on each side.

The basic principal operation of the clutch is a frictional force acting between two discs. The clutch is controlled by the clutch pedal. When the pedal is at rest the clutch is engaged and the running engine is connected to the gearbox. When the pedal is pressed down the clutch is disengaged and the engine runs idle.

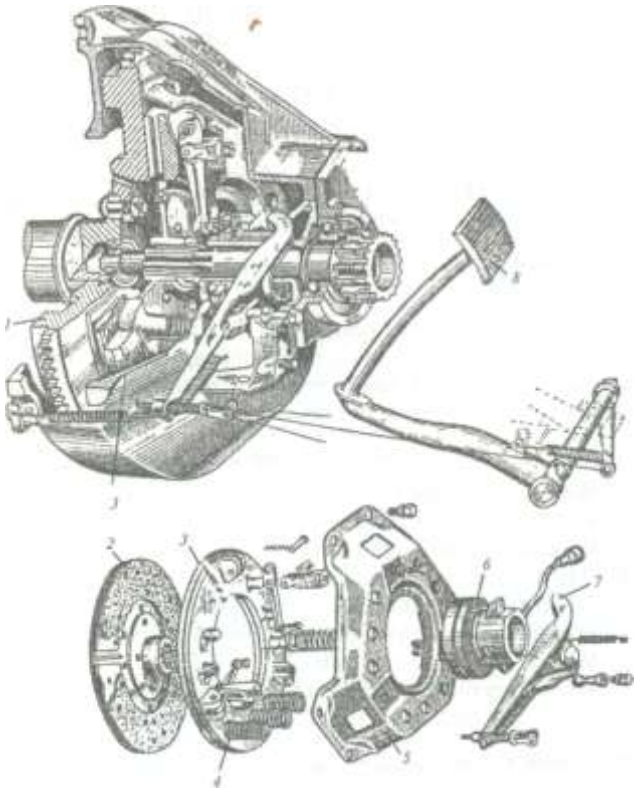


Fig. 1 Clutch

1. flywheel 2. friction disc
3. pressure disc 4. spring
5. cover 6. thrust bearing
7. lever 8. pedal

1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

2. Find predicates in all sentences and define their tense and voice.

3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones:

Start, disc, friction, frictional, material, base, principal, control, pedal, accumulation, technology, group, locomotive, automatic, transport, signal, constant, element, problem, experiment, apparatus, industry

4. Give derivatives.

To connect, to press, to operate, to fix, to rotate, to generate, to contribute, to cool

5. Give synonyms.

Wood, stone, earth, invention, to provide, to construct, quantity, to change, ship, to solve

6. Give antonyms.

Seldom, excellent, never, useless, full, easy, never, to come back, poor, to close

7. Suggest the Russian equivalents.

Friction device, clutch, gearbox, to free, to start, to release, flywheel, pressure plate, basic principle of operation, to fix, hard-wearing material, to consist of, to be controlled by, running engine, to run idly, to engage, to disengage, to press down, to be at rest

8. Find in the text English equivalents close in meaning to the following.

Функция сцепления, для отключения двигателя от коробки передач, крепится между маховиком и коробкой передач, фрикционный (ведомый) диск, нажимной диск, фрикционная сила, сцепление включено, педаль в исходном положении, педаль сцепления нажата

9. Translate into Russian.

1. The clutch connects the engine to the gears in the gearbox.
2. The clutch is fixed between the flywheel of the engine and the gearbox.
3. The friction disc is situated between the flywheel and the pressure plate.
4. The clutch is controlled by the clutch pedal.
5. The clutch is used for freeing the engine from the gearbox, for starting the car and for freeing the engine from car wheels.
6. The clutch usually consists of two discs: the friction disc (driven disc) and the pressure disc.
7. When the clutch is fully engaged the frictional force makes discs rotate at the same speed.

10. Complete the sentences using the words and expressions from the text.

1. The clutch is a device … .
2. The clutch is situated … .
3. The clutch is controlled by ... .
4. The clutch is engaged ... .

5. The clutch is disengaged .. ..

6. The clutch is used for ... .

11. Translate into English.

1. Сцепление — это фрикционное устройство.

2. Сцепление соединяет двигатель и коробку передач.

3. Сцепление расположено между маховиком двигателя и коробкой передач.

4. Как правило, сцепление состоит из двух дисков: ведомого и нажимного.

5. Сцепление управляется педалью сцепления.

6. Когда педаль сцепления находится в покое, диски сцепления соединены и работающий двигатель соединен с коробкой передач и колесами.

7. Когда водитель нажимает на педаль сцепления, диски отходят, сцепление отсоединятся и двигатель работает вхолостую.

12. Are these statements true or false?

1. The clutch connects the engine to the gears in the gearbox.

2. The clutch mustn’t be fixed between the flywheel of the engine and the gearbox.

3. The pressure disc is situated between the flywheel and the pressure plate.

4. The clutch is controlled by the clutch pedal.

5. When the pedal is at rest the clutch is disengaged and the engine runs idly.

6. When the pedal is pressed down the clutch is engaged and the running engine is connected to the gearbox.

7. The clutch usually consists of two discs: the friction disc and the pressure disc.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Anton: Hi, how are you?

Boris: Fine, thanks. And you?

A: I'm O.K., thank you. Where do you study?

B: I study at the engineering faculty.

A.: Whom does the faculty train?

B.: It trains specialists for the agriculture.

A.: Why did you decide to become an engineer?

B.: I enjoy working with machines.

Why did you decide to become an engineer?

B.: I enjoy working with machines. I enjoy learning about a car. I understand every part of it.

A.: What is the function of the clutch?

B.: You see, it serves three functions. It is used for freeing the engine from the gearbox, for starting the car and for freeing the engine from car wheels.

A.: Is it a friction device?

B.: Yes, of course. It is fixed between the flywheel of the engine and the gearbox and usually consists of two discs.

A.: What discs?

B.: The friction disc (driven disc) and the pressure disc.

A.: I suppose the principle of operation of clutches is a frictional force between discs. Am I right?

B.: Yes, you are. When the clutch is fully engaged the frictional force makes discs rotate at the same speed.

A.: And by what is the clutch controlled?

B.: By the clutch pedal. When it is at rest the clutch is engaged and when it is pressed down the clutch is disengaged and the engine is disconnected from the car wheels.

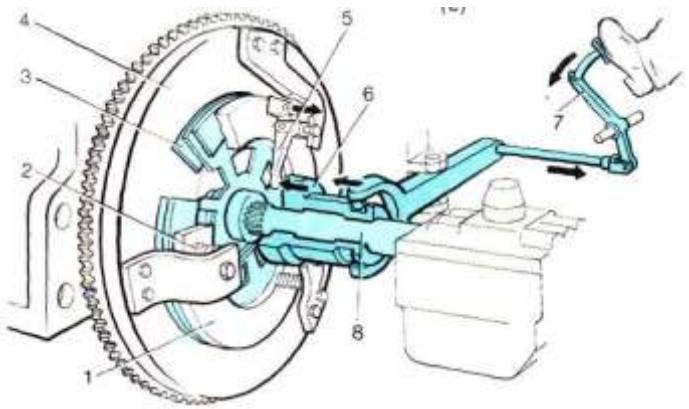


Fig.1 Schematic diagram of a clutch:

10 driving disc (pressure plate) 2) pressure spring 3) driven disc 4) flywheel 5) release lever 6) release bearing 7) clutch pedal 8) transmission clutch (input) shaft

A.: Thank you. And what types of clutches do you know?

B.: Positive clutches and gradual engagement clutches.

A.: Thank you very much for your information.

B.: Not at all. Glad to help you.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. **Complete the following table.**

a friction device

маховик

hard-wearing material

фрикционный диск

to release the engine

педаль сцепления

to be at rest

отсоединить двигатель

2. **Complete the sentences.**

1. When the clutch pedal is at rest … .
2. When the clutch pedal is pressed down … .
3. When the clutch is fully engaged … .

4. The principle of operation of clutches is … .

5. There are three functions of clutch. They are … .

6. The clutch connects the engine … .

3. Write down the sentences in Passive Voice.

1. The frictional force makes discs rotate at the same speed.

2. The clutch is used for disconnecting the engine from the gear box.

3. A frictional force is acting between two discs.

4. The clutch is controlled by the clutch pedal.

4. Write down the sentences in Acive Voice.

1. The friction disc is situated between the flywheel and the pressure plate.

2. The INA Bearing Co.,Inc. has introduced a maintenance-free spherical plain bearing.

3. Many physical phenomena could never be explained without the Theory of Relativity.

4. The Theory of Relativity brought Einstein fame on five continents.

Unit 7

Gearbox

The gearbox is placed between the clutch and the propeller shaft. The principal function of the gearbox is to vary the speed of the car movement to meet the road conditions. The gearbox provides four forward speeds and one reverse, as follows:

1) first or low gear; 2) second gear; 3) third gear; 4) fourth or top gear; 5) reverse gear.

There are many constructional arrangements of gearboxes, which can be classified as follows: 1) sliding-mesh type; 2) constant-mesh type; 3) epicyclic (planetary) type.

The sliding-mesh type is the simplest one and is the oldest historically. The

constant-mesh type is the most widely used type. They are termed "ordinary" gearing, the characteristic feature of which is that the axes of the various gears are fixed axes. The gears simply rotate about their own axes.

The characteristic feature of epicyclic (planetary) gearing is that one gear rotates about its own axis and also rotates bodily about some other axis.

To secure the several speeds of the car the clutch shaft is mounted in direct line with the gearbox shaft. The gearbox shaft carries on it the sliding gears which are used for shifting to secure the forward speeds and the reverse drive.

1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

2. Find predicates in all sentences and define their tense and voice.

3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones:

Principal, function, construction, constructional, class, classify, type, planet, planetary, history, historical

4. Give derivatives.

To construct, to classify, to repair, to work, to lubricate, to drain, to use, to rotate

5. Give synonyms.

Much, to return, also, to do, ground, powerful, twice, numerous, to determine, to take place

6. Give antonyms.

Empty, shallow, to destroy, huge, complicated, to assemble, to remain, strength, always

7. Suggest the Russian equivalents.

Ordinary gearing, road conditions, gearbox, top gear, sliding-mesh gearbox, reverse drive, epicyclic (planetary) gearbox, forward speed, characteristic feature, rotate bodily, fixed axes, gearing, low gear, secure, shifting, gear, axle, constant-mesh gearbox

8. Find in the text English equivalents close in meaning to the following.

Шестерня (передача), коробка передач, зубчатое соединение, дорожные условия, передняя скорость, обратный (задний) ход, первая передача, четвертая (прямая) передача, коробка передач со скользящими шестернями, коробка передач с постоянным зацеплением шестерен, эпициклическая (планетарная) коробка передач, стандартное зубчатое соединение, зафиксированные (неподвижные) оси

9. Translate into Russian.

1. Gearboxes are assembled and disassembled on special stands using special mechanisms.
2. In case of trouble in change-speed gearbox it can be repaired only in the workshop.
3. But in order not to get into trouble you should check the oil level in the gearbox casing.
4. In order not to get into trouble you should wash the breather channel.
5. One must change the oil in accordance with the lubrication schedule.
6. The driver has to wash the gearbox with a thin mineral oil.
7. One has to drain the used oil through the drain hole.

10. Complete the sentences using the words and expressions from the text.

1. The principal function of the gearbox is ... .
2. The gearbox provides ... .

3. Gearbox can be ... .

4. The sliding-mesh gearbox is … .

5. The constant-mesh gearbox is ... .

11. Translate into English.

1. Коробка передач предназначена для изменения скорости движения автомобиля.

2. Коробка передач обеспечивает четыре передние скорости и задний ход.

3. Коробки передач могут быть: со скользящими шестернями, с постоянным зацеплением шестерен и планетарного типа.

4. Самыми простыми являются коробки передач со скользящими шестернями.

5. Коробки передач с постоянным зацеплением шестерен используются наиболее часто.

6. Скользящие шестерни на валу коробки передач используются для обеспечения передних скоростей и обратного хода.

12. Are these statements true or false?

1. In order to get into trouble you should check the oil level in the gearbox casing.

2. One must change the oil in accordance with the lubrication schedule.

3. In case of trouble in change-speed gearbox it can be repaired by the driver himself.

4. The gears are used for shifting to secure the forward speeds and the reverse drive.

5. The gearbox provides four reverse speeds and one forward.

6. The characteristic feature of planetary gearing is that one gear rotates about its own axis and also rotates bodily about some other axis.

7. There are four constructional arrangements of gearboxes.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Mike: Peter, do you remember what our teacher told us last time? What do you know about gearboxes?

Peter: I know that the gearbox is used to change the speed of the car.

M.: And how many speeds does the gearbox provide?

P.: It can provide four forward speeds and one reverse.

M.: Into what types are the gearboxes divided according to their arrangements?

P.: They are divided into sliding-mesh type, constant-mesh type and epicyclic type.

M.: What type is the simplest?

P.: The sliding-mesh one.

M.: Thank you very much for you help.

P.: You are welcome. Glad to help you.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. **Complete the following table.**

repairing shop	
	сливное отверстие
sliding-mesh gearbox	
	канал сапуна
gearbox casing	
	зубчатое соединение
constant-mesh gearbox	
	переключение

2. Complete the sentences.

1. The characteristic feature of epicyclic gearing is … .
2. The sliding gears are used for … .
3. The gearbox is placed … .
4. The gearbox is used … .
5. The gearboxes are divided into … .
6. The gearbox provides … .

3. Write down the sentences in Passive Voice.

1. Constructional arrangements of gearboxes can be classified into three types.
2. Epicyclic gearing rotates about its own axis.
3. The clutch shaft is mounted in direct line with the gearbox shaft.
4. The gearbox can provide four forward speeds and one reverse.

4. Write down the sentences in Acive Voice.

1. Everything that probably could be invented had been invented.
2. In the 20th century reliable petrol engines became available.
3. Buses were started in Paris in 1820.
4. The French military engineer Cugnot built a steam-driven engine in1828.

Unit 8

Brakes

Brakes are used to slow or stop the car where it is necessary.

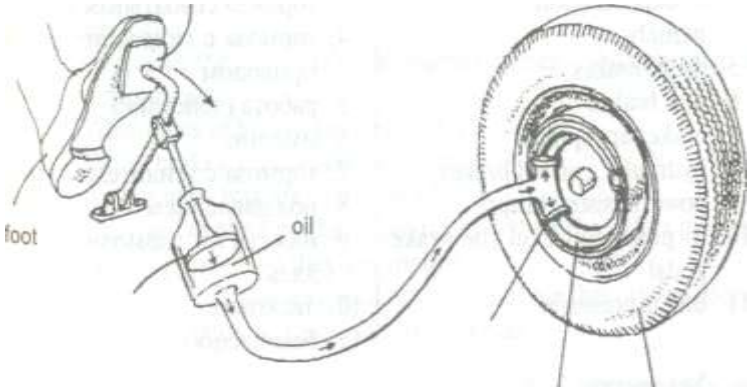


Fig.1. Brake System

a) piston A
b) piston B
c) brake shoe
d) wheel

It is one of the most important mechanisms of the car as upon its proper performance the safety of passengers depends. Car brakes can be divided into two types, namely: drum brakes and disc brakes. The drum type may be either a band brake or a shoe brake. Depending on their functions, the automobile has foot brakes and hand brakes (parking brakes). According to their mode of operation, the brakes are classified as: mechanical brakes, hydraulic brakes, air brakes, electric brakes. Brakes are controlled by the brake pedal.

Most braking systems in use today are hydraulic. This system consists of a master cylinder mounted on the car frame and wheel cylinders. When the driver pushes down on the brake pedal, it forces the piston to move in the master cylinder and brake fluid is delivered from it to the wheel cylinders. The piston movement causes brake shoes to move and the brakes are applied (the brake shoes are pressed against the brake drums).

The air brake uses compressed air to apply the braking force to the brake shoes. Electric brakes use electromagnets to provide the braking effort against the brake shoes.

Formerly brakes were applied only to the two rear wheels, but now all cars are equipped with all-wheels brakes. Today many improvements are being made in brakes.

The basic troubles of the braking system are as follows: 1) poor braking action; 2) sticking brake shoes which would not return to the initial position after a brake pedal is released; 3) non-uniform braking of the left and the right wheels on a common axle; 4) leakage of brake fluid and air leakage in the hydraulic brake; 5) poor air tightness of the pneumatic brake control.

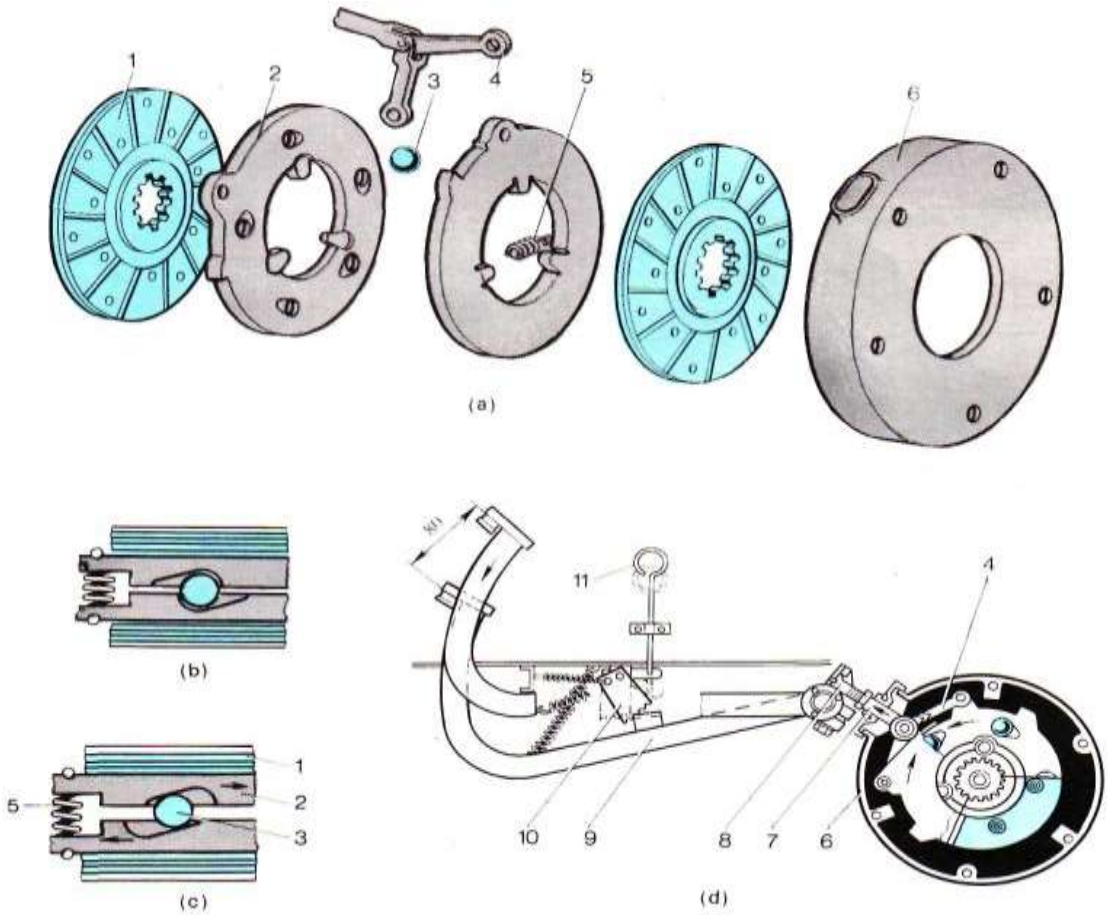


Fig.2 Brake:

a) construction b) brake released c) brake applied d) brake control

1) brake disc 2) pressure disc 3) ball 4) brake link 5) spring 6) housing 7) brake rod yoke

8) brake rod 9) brake pedal 10) brake latch 11) brake latch rod

If you have such troubles you must: 1) check the action of the foot and hand brakes and leak proofness of the brake hoses connections, components of the hydraulic and pneumatic controls of the brakes, as well as of the vacuum-power system. 2) inspect the friction linings, wheel-brake springs, master and wheel cylinders of the hydraulic brake and the air compressor of the pneumatic brake using a test manometer to check it.

1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

2. Find predicates in all sentences and define their tense and voice.

3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones:

Mechanism, passenger, type, hydraulic, cylinder, vacuum, function, classify, classification, mechanical, electric, electromagnet.

4. Give derivatives.

To press, to safe, to develop, to depend, to differ, to equip, to improve, to contribute

5. Give synonyms.

To have an examination, to come to the lecture, to finish, country, road, to require, difficult, essential, to construct, to get

6. Give antonyms.

Damage, different, expensive, narrow, weakness, simple, to lend, to restore, at once, to sell

7. Suggest the Russian equivalents.

Performance, the safety of passengers, to depend upon, drum brakes, disc brakes, brakes are applied, hydraulic assisted brakes, power assisted brakes, to press down on the brake pedal, under pressure, braking effort, push down on the brake pedal, brake shoes, force the fluid, master cylinder, band brake

8. Find in the text English equivalents close in meaning to the following.

Тормоза, безопасность пассажиров зависит от правильной работы тормозов, барабанные тормоза, дисковые тормоза, тормоза с усилителем, гидравлический привод тормозов, жидкость под давлением, тормоза срабатывают, тормозное усилие, нажать на тормозную педаль.

9. Translate into Russian.

1. Brakes are the most important mechanism of the car. They are used to slow or stop the car where it is necessary.

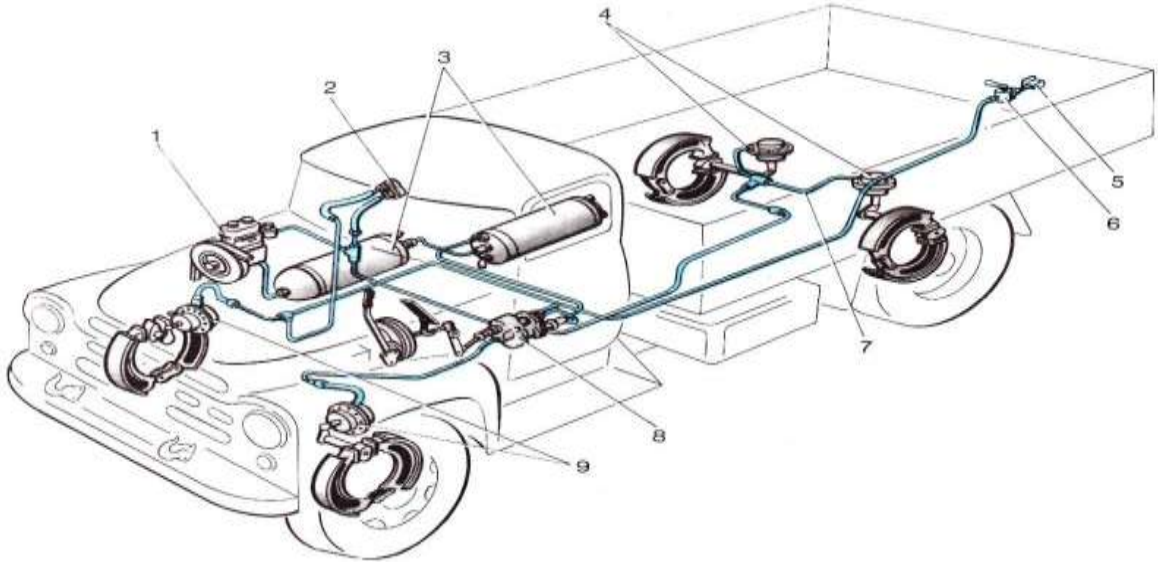


Fig. 3 Pneumatic brake system of an automobile:

1) brake (air) compressor 2) pressure gauge 3) brake reservoirs 4) rear wheel brake chambers 5) coupling head 6) disconnecting valve 7) air hose 8) brake valve 9) front wheel brake chambers

2. The clutch is a friction device. It connects the engine to the wheels in the gearbox. It is used for freeing the engine from the gearbox, for starting the car and for releasing the engine from the car wheels.

3. It is fixed between the flywheel of the engine and the gearbox.

4. They are divided into 2 types, namely: drum brakes and disc brakes.

5. Most cars of today use hydraulic or power assisted brakes.

6. They may be of 2 plates: friction disc and pressure disc. The friction disc is situated between the flywheel and the pressure disc.

10. Complete the sentences using the words and expressions from the text.

1. Brakes are used for … .

2. Brakes are one of ... .

3. Brakes may be of 2 types … .

4. Brakes are applied by ... .

5. Brakes are applied when … .

6. Car brakes can be divided into … .

11. Translate into English.

1. Тормоза являются наиболее важным механизмом автомобиля.

2. Они используются для замедления движения или остановки автомобиля.

3. Тормоза можно разделить на два типа, а именно: барабанные тормоза и дисковые тормоза.

4. На большинстве автомобилей используется гидравлический привод или пневматический привод.

5. Тормоза срабатывают, когда водитель нажимает на тормозную педаль.

12. Are these statements true or false?

1. Formerly brakes were applied to all wheels.

2. Most cars of today use power assisted brakes.

3. Brakes are not very important mechanism of the car.

4. Brakes are used to slow or to stop the car where it is necessary.

5. The hydralic system consists of a master cylinder mounted on the car frame and wheel cylinders.

6. When the driver pushes down on the brake pedal, it forces the car to run faster.

7. The piston movement causes brake shoes to move.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Anton: Hi, how are you?

Boris: Fine, thanks. And you?

A: I'm O.K., thank you. Where do you study?

B: I study at the engineering faculty.

A.: What specialists does the faculty train?

B.: It trains specialists for the agriculture.

A.: Why did you decide to become an engineer?

B.: I enjoy working with machines. I enjoy learning about a car. I understand every part of it.

A: Why are brakes used?

B: They are used to stop or to slow the car.

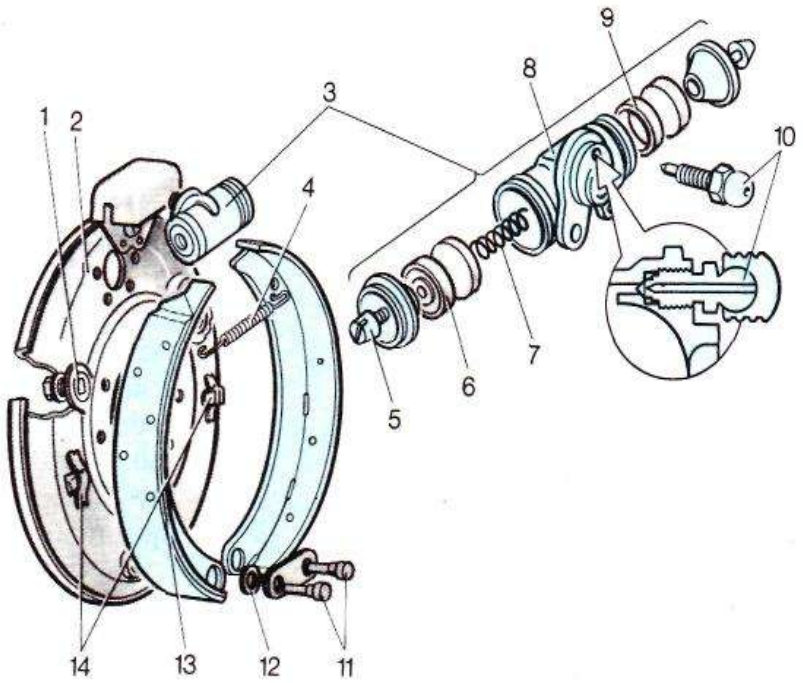
A.: Well, it is one of the most important mechanisms of the car, isn't it?

B.: Of course, the safety of the passengers depends upon their proper performance.

134

Drum-type hydraulic wheel brake (ГАЗ-53А Model truck)

1 – brake eccentric;
2 – brake anchor (backing) plate;
3 – wheel brake cylinder;
4 – brake spring;
5 – brake shoe actuating pin (link);
6 – wheel brake cylinder piston;
7 – expander spring;
8 – wheel brake cylinder body;
9 – piston cup;
10 – bleeder valve;
11 – brake shoe fulcrum pins;
12 – eccentric washer;
13 – brake shoe;
14 – brake shoe guide retainer anchor



A.: What types of brakes are used today?

B.: Drum brakes, disk brakes and others.

A.: And in what way are they applied?

B.: They are applied by the brake pedal. When the driver pushes down on the pedal they are applied.

A.: Thank you. It was very nice of you to tell me this information.

B.: Don't mention it. I was glad to serve you.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. **Complete the following table.**

leakage	
	стойкость
drum brakes	
	дисковые тормоза
sticking	
	тормозная педаль
tightness	
	пневматические тормоза

2. Complete the sentences.

1. When the driver pushes down on the pedal … .
2. The safety of the passengers depends upon … .
3. Electric brakes use electromagnets … .
4. All cars are equipped with … .
5. Brakes are one of … .
6. Formerly brakes were applied … .

3. Write down the sentences in Passive Voice.

1. The air brake uses compressed air to apply the braking force to the brake shoes.

2. Brakes are used to slow or stop the car.

3. Brakes are classified as: mechanical brakes, hydraulic brakes, air brakes, electric brakes.

4. One must inspect the friction linings, wheel-brake springs, master and wheel cylinders of the hydraulic brake.

4. Write down the sentences in Acive Voice.

1. Today many improvements are being made in brakes.

2. Most braking systems in use today are hydraulic.

3. The air compressor of the pneumatic brake using a test manometer should be checked.

4. This system consists of a master cylinder mounted on the car frame and wheel cylinders.

Unit 9

Steering System

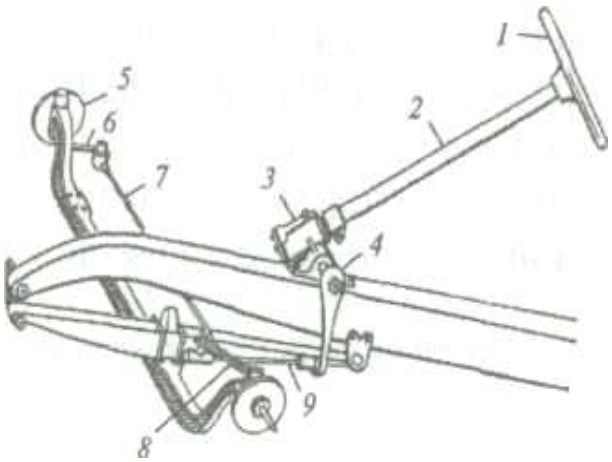


Fig. 1. Steering System
1) steering wheel 2) steering column, steering mast 3)steering gear
4) steering arm, steering lever, (steering) pitman arm 5) steering knuckle
6) steering knuckle lever, steering knuckle arm 7) single tie-rod
8) steering knuckle lever, steering knuckle arm
9) drag link, steering gear connecting rod, steering drag rod

To guide the car, it is necessary to have some means of turning the front wheels so that the car can be pointed in the direction the driver wants to go. The steering wheel in front of the driver is linked by gears and levers to the front wheels for this purpose. The front wheels are on pivots so they can be swung to the left or right. They are attached by steering knuckle arms to the rods. The tie-rods are, in turn, attached to the pitman arm.

When the steering wheel is turned, gearing in the steering gear assembly causes the pitman arm to turn to the left or right. This movement is carried by the tie-rods to the steering knuckle arms, and wheels, causing them to turn to the left or right.

The steering system incorporates: the steering wheel and column, steering gear, pitman arm, steering knuckle arm, front axle, steering knuckle pivot, tie-rods.

There are several different manual steering gears in current use, as the rack and pinion type and the recirculating ball type. The rack and pinion steering gear is widely used. Another manual steering gear which is popular in imported cars is the worm and sector type.

The steering wheel and column are the source of injury to the driver, air bags and other devices being developed now to safe the life of a driver.

Energy-absorbing columns must stop the steering wheel and column from being pushed to the rear as the front of the car is crushed in an impact.

Energy-absorbing columns must also provide the driver with a tolerable impact as he moves forward and strikes the wheel with his chest.

Steering gear and linkage may have the following basic troubles: excessive steering-wheel free play, bending of steering rod, oil leakage from the steering-gear case, disadjustment of steering gear. If there are some of them one must check the steering-wheel free play and steering gear performance while the car is running. Then you must check the steering-gear case for oil leakage by visual inspection and adjust the steering gear. Steering gear of the worm and roller type is adjusted by end playing in the steering worm shaft bearings.

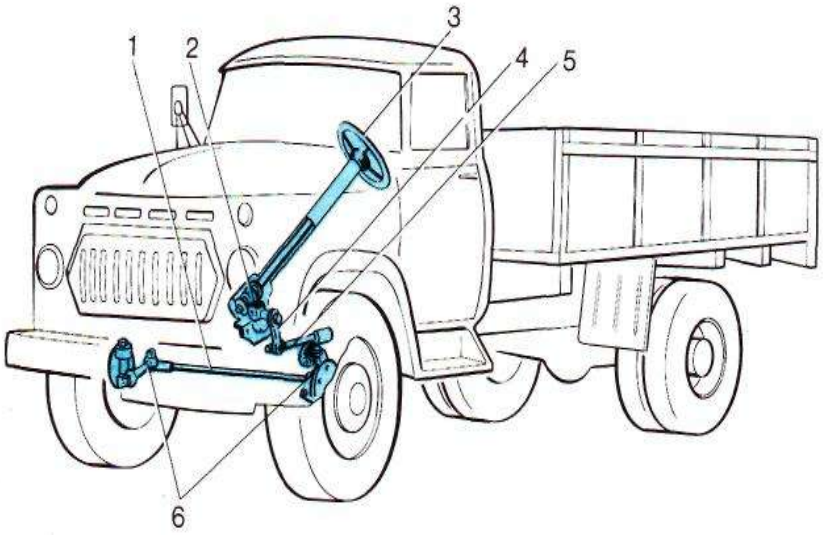
1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

2. Find predicates in all sentences and define their tense and voice.

125

Schematic diagram of a steering system

1 – steering knuckle tie rod;
2 – steering box;
3 – steering wheel;
4 – steering arm;
5 – steering gear connecting rod (steering drag rod);
6 – steering knuckle arms



3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones:

column, spindle, system, hydraulic, pump, reservoir, popular, type, effective, effectiveness, effectively, energy, function, to deform, deformation

4. Give derivatives.

To perform, to manufacture, to drive, to attach, to move, to safe, to steer, to leak

5. Give synonyms.

Much, to make, to consider, to care, to return, also, quantity, too, big, to come back

6. Give antonyms.

Free, similar, to offer, ordinary, strong, easy, empty, outside, early, always

7. Suggest the Russian equivalents.

To guide the car, steering wheel, steering column, steering mast, steering gear, steering arm, steering lever, (steering) pitman arm, steering knuckle, steering knuckle lever, steering knuckle arm, single tie-rod, drag link, steering gear connecting rod, steering drag rod, to turn to the left or right, energy-absorbing columns

8. Find in the text English equivalents close in meaning to the following.

Чрезмерный свободный ход, картер коробки передач, типы рулевых механизмов, система рулевого управления, реечно-шестеренчатый тип, механизм с шаровой гайкой, механизм с червяком и сектором, рулевая сошка, рулевое колесо, рулевая колонка, зубчатое соединение, рулевая сошка, рычаги поворотного кулака, шарнирные соединения, рычаги и поперечные тяги.

9. Translate into Russian.

1. To guide the car it is necessary to have some means of turning the front wheels.
2. The steering wheel in front of the driver is linked by gears and levers to the front wheels for turning the car in the direction the driver wants to go.
3. Without using the steering system the car moves only in the direct position.
4. Manufacturers can use rack and pinion type steering gear without choosing another type because "rack and pinion" type steering is very dependable.
5. Energy-absorbing columns must stop the steering wheel from being pushed to the rear when the front of the car is damaged in an impact.
6. To turn the car you must have some means of turning the front wheels.
7. For this purpose the steering wheel and steering column are linked to the front wheels.
8. The front wheels are on pivots and can be swung to the left or to the right.

9. When the driver turns the steering wheel and column the front wheels (being on pivots) attached by the steering knuckle arms to the tie-rods are also turned.

10. Complete the sentences using the words and expressions from the text.

1. The front wheels are on pivots so ... .
2. When the steering wheel is turned ... .
3. The steering wheel is linked ... .
4. Most manufacturers use ... .
5. Steering gear may be ... .
6. Steering knuckle arms and wheels are turned ... .

11. Translate into English.

1. Для управления автомобилем необходима система рулевого управления.
2. Рулевое управление включает в себя: рулевое колесо и рулевую колонку, зубчатое соединение, рулевую сошку, рычаги поворотного кулака и шарнирные соединения, рычаги и поперечные тяги.
3. Существуют различные типы рулевых механизмов, а именно: реечно-шестеренчатый тип, механизм с шаровой гайкой, механизм с червяком и сектором.
4. Когда водитель поворачивает руль влево или вправо, то рулевой механизм заставляет рулевую сошку поворачиваться влево или вправо.
5. Это движение передается поперечными тягами к рычагам поворотных кулаков и к колесам, заставляя их поворачиваться влево или вправо.

12. Are these statements true or false?

1. To guide the car it is necessary to have some means of turning the front wheels.
2. The steering wheel in front of the driver is linked by gears and levers to the front wheels for turning the car in the direction the driver wants to go.

3. With using the steering system the car moves only in the direct position.

4. Steering gear and linkage may not have any troubles.

5. Energy-absorbing columns don’t provide the driver with a tolerable impact.

6. The front wheels are on pivots and can be swung only to the right.

7. Another manual steering gear which is popular in imported cars is the worm and sector type.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Stas: Look here. I have some troubles with the steering system.

Vlad: What troubles?

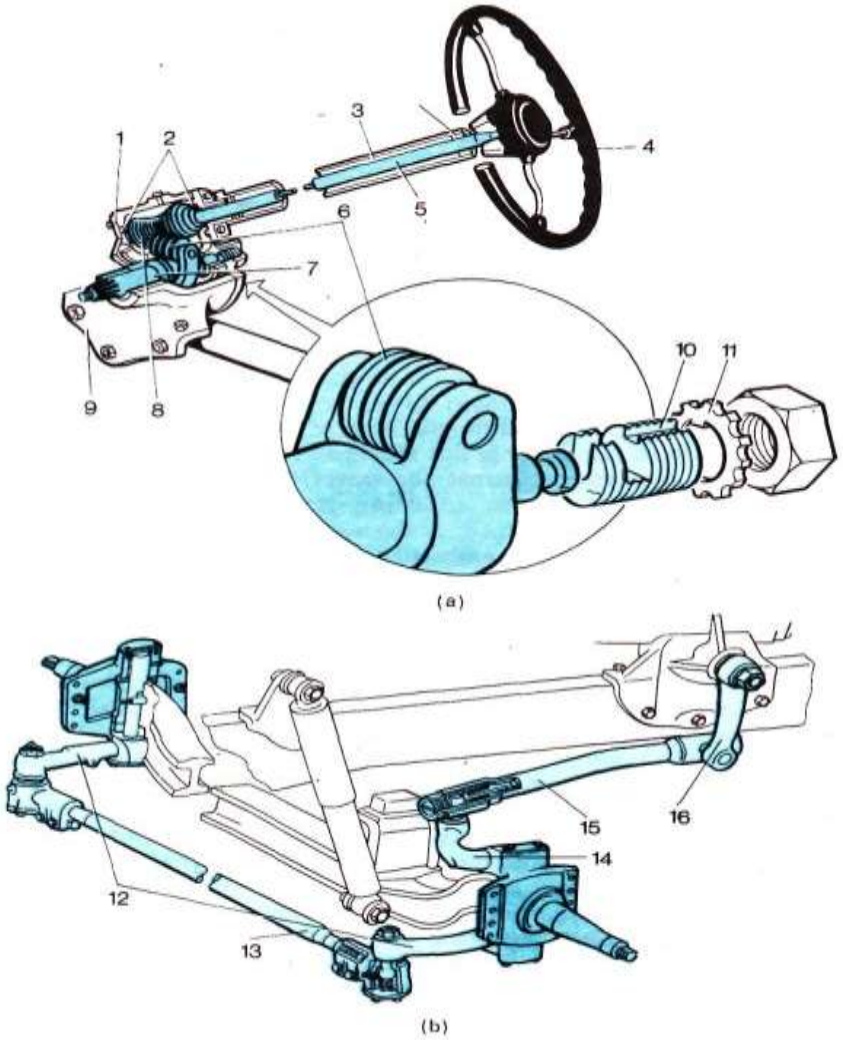
S.: The first is excessive free play of the steering wheel.

V.: You should check free play of the steering wheel and steering gear performance.

126

(a) Steering gear and (b) steering linkage

1 – steering box bottom cover;
2 – taper roller bearings;
3 – steering column;
4 – steering wheel;
5 – steering shaft;
6 – roller;
7 – steering arm shaft;
8 – steering worm;
9 – steering box;
10 – adjusting screw;
11 – tab washer;
12 – steering knuckle arms;
13 – steering knuckle tie rod;
14 – steering knuckle gear rod arm;
15 – steering gear connecting rod (steering drag rod);
16 – steering arm



S.: The second problem is oil leakage from the steering gear case.

V.: Check the steering gear case for oil leakage visually. Anything else?

S.: Sure. It is disadjustment of the steering gear. And I don't know what to do.

V.: You see, in this case it is better for you to go to a repairing shop. Good specialists should do this job.

S.: Thank you very much.

V.: Not at all.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. Complete the following table.

	рулевой механизм с шариковой гайкой
worm and sector	
	картер рулевого механизма
steering knuckle arm	
	шаровой шарнир
rack and pinion assembly	
	передние колеса
steering gear assembly	

2. Complete the sentences.

1. The steering wheel and column are … .
2. There are several different manual steering gears in current use, as … .
3. The steering wheel in front of the driver is linked … .
4. Steering gear and linkage may have the following basic troubles … .
5. Energy-absorbing columns must … .
6. When the steering wheel is turned … .

3. Write down the sentences in Passive Voice.

1. The steering wheel and column, air bags and other devices are the source to injury the driver.
2. Steering gear of the worm and roller type is adjusted by end playing in the steering worm shaft bearings.
3. Another manual steering gear which is popular in imported cars is the worm and sector type.
4. The steering wheel in front of the driver is linked by gears and levers to the front wheels for this purpose.

4. Write down the sentences in Acive Voice.

1. The steering system incorporates the steering wheel and column, steering gear, pitman arm, steering knuckle arm, front axle, steering knuckle pivot, tie-rods.
2. The front wheels on pivots can be swung to the left or right.
3. The rack and pinion steering gear is widely used.
4. Energy-absorbing columns must provide the driver with a tolerable impact.

Unit 10

Using Computer

Ever since the car was first invented, a breaker point ignition has been used to transform battery voltage into 20,000 volts to fire the spark plugs. With government intervention and regulation, more advanced system was needed. This system had to meet emission control levels, gas mileage, and provide a smooth and continuous operation. The answer was found in an on-board computer system. The computer mounted on modern cars has two components. One is the hardware and the other is the software.

The computer hardware on an automobile uses a Central Processing Unit (CPU), which, when made in an integrated circuit, is referred to as a microprocessor. The integrated circuit (IC) combines transistors, diodes, and capacitors, which are placed on a tiny chip of semiconductor material that is smaller and thinner that an eraser on a pencil. The material used most of the time is silicon. Silicon, like any semiconductor, does not conduct electricity until either voltage, a magnetic field, heat, or light is directed to the semiconductor. A program instructs the microprocessor what to do.

The computer software on a car carries a program. The program tells the computer what to do, and when to do it in a specific sequence. The program is stored in a permanent memory, which is referred to as Read Only Memory (ROM). The computer knows only what is placed in its memory. There is another variation, which is called the Programmable Read Only Memory (PROM), which

can be readily removed and replaced, while the ROM cannot. This makes it less expensive if the memory becomes defective. Only the PROM has to be replaced, not the entire microprocessor.

The microprocessor contains a ROM (or PROM) and a RAM. RAM stands for Randon Access Memory, which can be accessed without going through a specific sequence. The technician interfaces with the RAM whenever trouble codes are accessed. Not all computerized ignition systems have trouble codes, however. Some computers have the ability to learn. This is referred to as an adaptive memory. When a value falls outside of a specified limit, due to engine wear, the adaptive memory makes a slight adjustment in the program to compensate. The car must be driven from 20 to 30 miles, as it takes the computer this long to learn. Any time that power is disconnected from the computer, it will have to relearn everything.

1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

2. Find predicates in all sentences and define their tense and voice.

3. Find out the approximate meanings of the following English words by comparing them to the corresponding Russian ones:

Transform, battery, voltage, regulation, system, computer, microprocessor, transistor, diod, chip, material, electricity, magnetic, program, defective, limit, compensate, variation, code

4. Give derivatives.

To invent, to advance, to transform, to conduct, to regulate, to vary, to cool, to teach

5. Give synonyms.

Plenty of, to require, fast, land, to invent, amount, ship, to think, to supply, flat

6. Give antonyms.

Quickly, wide, shortage, to damage, different, strength, at once, huge, large, long

7. Suggest the Russian equivalents.

Gas mileage, semiconductor, smooth operation, permanent memory, PROM - programmable read only memory, trouble code, adaptive memory, a breaker point ignition, software, carry a program, a magnetic field, an integrated circuit, to meet emission control levels, on-board computer system, PROM - Programmable Read Only Memory, RAM - Random Access Memory, ROM - Read Only Memory

8. Find in the text English equivalents close in meaning to the following.

прерывистое зажигание, воспламенять свечой зажигания, отвечать требованиям по ограничению уровня вредных компонентов в выхлопных газах, центральный процессор, бортовой компьютер, аппаратная часть компьютера, интегральная схема, специальная последовательность, постоянная память, постоянное запоминающее устройство (ПЗУ), оперативная память, оперативное запоминающее устройство (ОЗУ).

9. Translate into Russian.

1. The computer hardware on an automobile uses a Central Processing Unit (CPU), which, when made in an integrated circuit, is referred to as a microprocessor.
2. Silicon, like any semiconductor, does not conduct electricity until either voltage, a magnetic field, heat, or light is directed to the semiconductor.
3. RAM stands for Randon Access Memory, which can be accessed without going through a specific sequence.
4. Only the PROM has to be replaced, not the entire microprocessor.

5. When a value falls outside of a specified limit, due to engine wear, the adaptive memory makes a slight adjustment in the program to compensate.
6. The car must be driven from 20 to 30 miles, as it takes the computer this long to learn.
7. The integrated circuit (IC) combines transistors, diodes, and capacitors, which are placed on a tiny chip of semiconductor material that is smaller and thinner that an eraser on a pencil.

10. Complete the sentences using the words and expressions from the text.

1. A breaker point ignition has been used … .
2. The computer software on a car … .
3. The computer mounted on modern cars has two components. They are … .
4. The microprocessor contains … .
5. A more advanced system had to meet … .
6. The computer hardware on an automobile uses … .
7. The integrated circuit (IC) combines … .

11. Translate into English.

1. Многие современные автомобили оборудованы бортовыми компьютерными системами для лучшей работы автомобиля.
2. Программа такого компьютера имеет только два запоминающих устройства: постоянную память (ПЗУ) и оперативную память (ОЗУ).
3. Компьютерная программа сообщает компьютеру, что надо делать и когда необходимо выполнить данное действие в соответствующей последовательности.
4. Программа хранится в постоянной памяти компьютера.
5. Микропроцессор содержит в себе постоянную и оперативную память.
6. Некоторые компьютеры обладают способностью запоминать (заучивать). Это относится к адаптивной памяти.

12. Are these statements true or false?

1. The microprocessor contains a ROM and a RAM.
2. The computer software on a car carries a program.
3. The program tells the computer what to do, and when to do it in a specific sequence.
4. The program is stored in memory, which is referred to as RAM or Randon Access Memory.
5. The integrated circuit (IC) consists only of transistors.
6. Silicon like any semiconductor conducts electricity very well.
7. If the memory becomes defective the entire microprocessor has to be replaced.

13. Read the text again and ask as many questions about it as you can. Let your group-mate(s) answer the questions.

14. Translate the text from English into Russian.

15. Write an essay of the text and render it in English.

16. Read the dialogue and act it out.

Anton: What is the purpose of using computers on board the car?

Vlad: You see. As I know, computer is used to advance the engine operation as well as the performance of other units.

A.: What components does the on-board computer consist of?

V.: It consists of two components. One is the hardware and the other is the software.

A.: What is hardware?

V.: The computer hardware uses a Central Processing Unit (CPU) which is referred to as a microprocessor.

A.: What is software?

V.: The computer software on a car carries a program. The program tells the computer what to do and when to do it.

A.: And where is the program stored?

V.: It is stored in a permanent memory which is called Read Only Memory (ROM).

A.: And what is Programmable Read Only Memory (PROM)? What is the difference between ROM and PROM?

V.: In case the memory becomes defective PROM can be readily removed and replaced, while ROM cannot.

A.: And what is RAM?

V.: RAM is Random Access Memory (main memory), which can be accessed without going through a specific sequence. The technician interfaces with RAM whenever trouble codes are accessed.

A.: Thanks a lot for your explanation.

V.: You are welcome. See you later.

A.: Goodbye.

17. Reproduce the dialogue in the reported speech.

Check up yourself

1. **Complete the following table.**

trouble codes	
	запальные свечи
ignition	
	центральный процессорный узел
the ability to learn	
	ПЗУ
on-board computer system	
	ППЗУ

2. Complete the sentences.

1. Computer is used to … .
2. RAM can be accessed without … .
3. In case the memory becomes defective … .
4. The program tells the computer … .
5. The program is stored … .
6. The on-board computer consists of … .

3. Write down the sentences in Passive Voice.

1. The adaptive memory makes a slight adjustment in the program to compensate.
2. The car must be driven from 20 to 30 miles.
3. PROM can be readily removed and replaced.
4. The microprocessor contains a ROM (or PROM) and a RAM.

4. Write down the sentences in Acive Voice.

1. The program is stored in a permanent memory, which is referred to as Read Only Memory (ROM).
2. The computer hardware on an automobile uses a Central Processing Unit (CPU).
3. A breaker point ignition has been used to transform battery voltage into 20,000 volts to fire the spark plugs.
4. This system had to meet emission control levels, gas mileage, and provide a smooth and continuous operation.

Краткий грамматический справочник

Личные местоимения

Число	***Лицо***	***Именительный падеж***		***Объектный падеж***		
		Подлежащее, именная часть сказуемого		**Дополнение**		
		кто? что?		Прямое кого? что?		Косвенное кому? чему?
Единственное	1-е	**I**	я	**me**	меня	мне
	2-е	**you**	ты	**you**	тебя	тебе
	3-е	**he, she, it**	он, она, оно	**him her it**	его, её	ему, ей
Множественное	1-е	**we**	мы	**us**	нас	нам
	2-е	**you**	вы	**you**	вас	вам
	3-е	**they**	они	**them**	их	им

Указательные местоимения

Этот – this; **эти** – these
Тот – that; **те** – those

Притяжательные местоимения

	Относительная форма	**Абсолютная форма**
мой	my	mine
твой	your	yours
его	his	his
её	her	hers
его	its	-
наш	our	ours
ваш	your	yours
их	their	theirs

Вопросительные местоимения и наречия

Кто?	**who?**
Кому?	**whom?**
Какой?	**what (+noun)?**
Какой, который из ..?	**which?**
Чей?	**whose?**
Что?	**what?**
Где?	**where?**
Когда?	**when?**
Почему?	**why?**
Как?	**how?**
Сколько?	**how many ..? (how much ..?)**

Степени сравнения прилагательных и наречий

Положительная	***Сравнительная***	***Превосходная***
Односложные и некоторые двусложные	-er	-est
long	longer	(the) longest
многосложные	more …	(the) most …
important	more important	the most important
исключения		
good, well	better	(the) best
bad, badly	worse	(the) worst
much, many	more	(the) most
little	less	(the) least

Таблица спряжения глагола to ask
Действительный залог (Active Voice)

	Simple	**Progressive**	**Perfect**	**Perfect Progressive**
Infinitive	to ask	to be asking	to have asked	to have been asking
Present	ask, asks	am (is, are) asking	have (has) asked	have (has) been asking
Past	asked	was (were) asking	had asked	had been asking
Future	shall (will) ask	shall (will) be asking	shall (will) have asked	shall (will) have been asking

Страдательный залог (Passive Voice)

	Simple	**Progressive**	**Perfect**	**Perfect Progressive**
Infinitive	to be asked	to be being asked	to have been asked	
Present	am (is, are) asked	am (is, are) being asked	have (has) been asked	
Past	was (were) asked	was (were) being asked	had been asked	
Future	shall (will) be asked		shall (will) have been asked	

Модальные глаголы и их эквиваленты

Can (to be able to…)	мочь, уметь
May (to be allowed to…)	мочь, иметь разрешение
Must (to have to…, to be to…)	долженствовать
Should	следовать, долженствовать
Need	нужно, надо
Ought to	следовало бы, следует
Would	хотеть, желать
Shall	долженствовать, быть обязанным
Will	желать, намереваться
Dare	сметь, отважиться

Причастия

	Active	**Passive**
Indefinite Participle (Participle I)	asking	being asked
Past Participle (Participle II)		asked
Perfect Participle	having asked	having been asked

Инфинитив

	Active	**Passive**
Indefinite (Simple)	to ask	to be asked
Continuous (Progressive)	to be asking	
Perfect	to have asked	to have been asked
Perfect Continuous	to have been asking	

Приложение 1

Сводная таблица нестандартных глаголов

Infinitive	Past Indefinite	Participle II	Перевод
to be	was, were	been	быть
to become	became	become	становиться
to begin	began	begun	начинаться
to break	broke	broken	ломать
to bring	brought	brought	приносить
to build	built	built	строить
to buy	bought	bought	покупать
to come	came	come	приходить
to cost	cost	cost	стоить
to do	did	done	делать
to eat	ate	eaten	кушать
to fall	fell	fallen	падать
to find	found	found	находить
to fly	flew	flown	летать
to forget	forgot	forgotten	забывать
to get	got	got	получать, доставать
to give	gave	given	давать
to go	went	gone	идти
to have	had	had	иметь
to hear	heard	heard	слышать
to keep	kept	kept	держать, хранить
to know	knew	known	знать
to leave	left	left	оставлять, покидать
to make	made	made	делать
to meet	met	met	встречать
to put	put	put	класть
to read	read	read	читать
to ring	rang	rung	звонить, звенеть
to run	ran	run	бежать
to say	said	said	говорить, сказать
to see	saw	seen	видеть, смотреть
to send	sent	sent	посылать
to sing	sang	sung	петь
to sit	sat	sat	сидеть
to speak	spoke	spoken	говорить
to spend	spent	spent	тратить
to stand	stood	stood	стоять
to swim	swam	swum	плавать

to take	took	taken	брать
to teach	taught	taught	учить
to tell	told	told	рассказывать
to think	thought	thought	думать
to write	wrote	written	писать

Приложение 2

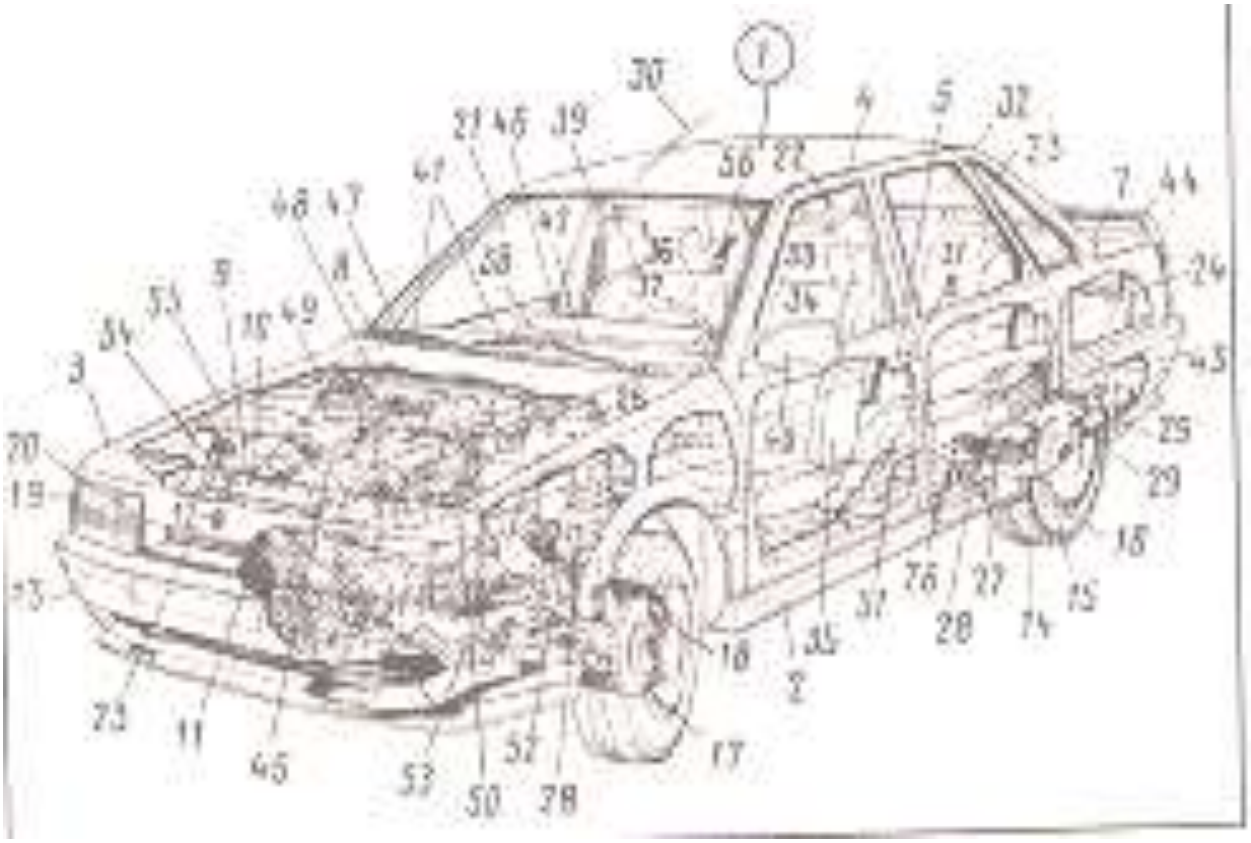
Словообразование. Аффиксы:

существительных	***прилагательных***	***глаголов***	***наречий***
-or/-er	-less	-fy	-ward(s)
-ian	-able/-ible	-ize/-ise	-wise
-ion (-ation| -sion)	-ful		
-ese	-ous		
-ist	-ive		
-ance/-ence	-al		
-ment	-ic		
-ness	-y		
-hood	-ish		
-ism			
-ure			
-ing			
-ship			
-dom			
-th			

Приложение 3

Fig. 1 Motor Car

1) body 2) chassis 3) front fender (front wing) 4) car door 5) door handle 6) door lock 7) boot lid (trunk lid) 8) hood (bonnet) 9) radiator 10) cooling water pipe 11) radiator grill 12) badging 13) rubber-covered front bumper 14) car wheel (a disk wheel) 15) car tyre (tire) 16) rim (wheel rim) 17-18) disk brake (braking disk) 19) front indicator light (front turn indicator light) 20) head light (headlamp) with main beam (high beam), dipped beam (low beam), sidelight (side lamp) 21) windscreen (windshield) 22) crank-operated car window 23) grill 24) boot (trunk) 25) spare wheel 26) damper (shock absorber) 27) trailing arm 28) coil spring 29) silencer (muffler) 30) antenna 31) rear seats 32) rear window 33) head restraint 34) driver's seat 35) reclining backrest 36) passenger seat 37) steering wheel 38) centre console containing speedometer (speedo), revolution counter (tachometer), clock, fuel gauge (gage), water temperature gauge, oil temperature gauge 39) inside rear-view mirror 40) left-hand wing mirror 41) windscreen wiper 42) defroster vents 43) rear bumper 44) rear spoiler 45) engine 46) door locking mechanism 47) inlet vent 48) blower fan 49) brake fluid reservoir 50) battery 51) exhaust pipe 52) front running gear with front wheel drive 53) engine mounting 54) intake silencer (intake muffler 55) air filter (air cleaner) 56) safety belt



WORD BANK

Aa

accelerate - ускорять, разгонять
accelerator pedal - педаль подачи топлива, педаль управления дроссельной заслонкой
access — доступ
accessory - вспомогательное устройство
achieve — достигать
adjustment — регулировка, наладка
all-wheel drive - полный привод
angle - угол
assembly - сборка; агрегат; комплект
axial thrust - осевая нагрузка
axle — ось; мост
axle shafts – полуоси

Bb

balance weight — противовес
ball bearing cams - кулачки шарикоподшипника
band brakes - ленточные тормоза
bearing — подшипник
blower - компрессор, нагнетатель
body — кузов
brakes are applied - тормоза срабатывают
brake free-wheel - тормозная муфта свободного хода, обгонная муфта
braking force - тормозное усилие, сила торможения
bring into contact – соединять
bring into operation - привести в действие
bring the shoe into contact – соединить колодку

Cc

caliper — измерять штангенциркулем или нутромером
car wheels - колеса автомобиля
centrifugal clutches - сцепление центробежного типа

chain - цепь
coasting - движение накатом, движение по инерции
coil spring live axle - ведущий мост с пружинными рессорами
conical shape - коническая форма
conventional splitter — раздаточная коробка, стандартный переключатель диапазона передач
couple - соединять, сцеплять
crane carrier - автокран
crankshaft - коленчатый вал

Dd

develop - разрабатывать, совершенствовать
device - устройство
diaphragm spring - пружина диафрагменного типа
differential - дифференциал
disc brakes - дисковые тормоза
disengagement - отключение
dog clutch — кулачковая муфта
drawback - недостаток
drive - привод
driven plate - ведомый диск
driving safety - безопасность вождения (движения)
drum brakes — барабанные тормоза
dumper — самосвал

Ee

ease of maintenance — легкость техобслуживания
emergency situation – аварийная ситуация
enable — делать годным, позволять
engage — соединять
engine – двигатель
engine output - выходная мощность двигателя
evaporative emissions — выхлоп газов испарения

Ff

fan belt - ремень вентилятора
fenders - крылья
final drive — главная передача
fine finish — чистовая обработка, доводка
finger - палец, штифт
fire crash tender - пожарная техника
flat position - плоское положение
flexibility - гибкость
foul the engine - загрязнять двигатель
four-wheel drive - полный привод
frame — рама
free (disconnect, disengage) — отсоединять, разъединять
friction clutch - фрикционное сцепление
friction pad — фрикционная накладка
front suspension - передняя подвеска
fuel consumption - расход топлива
fuel vapors — пары топлива
fulcrum — точка опоры, ось шарнира

Gg

gas (oil) mileage — пробег в милях на галлон израсходованного топлива
gas cap — крышка наливной горловины топливного бака
gearbox - коробка передач
gears - шестерни
generator — генератор
get rid of - избавиться (от чего-либо)

Hh

head lamp flasher — проблесковый прерыватель света фары
heat-dissipation - рассеяние (отвод) тепла
heater – отопительное устройство
hoist — подъемный механизм, подъемник
hood - капот
horn - сирена, звуковой сигнал
hydromantic converter - гидротрансформатор

Ii

ignition— зажигание
impeller — насосное колесо
indicator lever - рычаг индикатора, указателя
inhibitor — ингибитор, замедлитель
inner portion — внутренняя часть
inner shaft - ведущий (приводной) вал
input shaft - первичный вал
instrumental panel – приборный щиток, пульт управления
integral clutch and brake unit - объединенный блок из сцепления и тормоза
intend – предназначать
internal combustion engine – двигатель внутреннего сгорания

Кк

kick - удар, толчок
knob – кнопка

Ll

laboratory test - стендовые испытания
leading shoes — ведущие тормозные колодки
leaf spring - листовая рессора
level - уровень
lever - рукоятка (рычаг)
lights - фары
lining — накладки, обивка
link - соединять
load deflection — прогиб под действием нагрузки
loader - автопогрузчик
lock-up clutch — блокировочная муфта
lose of clamp load — потеря (ослабление) сжимающей нагрузки
lower gear - понижающая передача
lubricate — смазывать
lug - кронштейн, зажим, кулак

Mm

machine tool — станок
maintenance - техническое обслуживание и ремонт
manual override — ручное управление автоматически управляемой системой
manufacture - производить
meet up-to-date requirements — отвечать современным требованиям
multiple-speed gearbox — многоступенчатая коробка скоростей

Nn

natural bias - естественные смещения (сдвиги)

Oo

obtain — получать, добиться
octane rating — октановое число
off-road travel - езда по бездорожью
oil circuit - замкнутый поток масла
one-way free-wheel – однозаходная муфта
operating cylinders - рабочие цилиндры
outer shaft - выходной (вторичный) вал
overload safety valve - предохранительный клапан при перегрузке
overrun - превышение нормальной скорости

Pp

park brake - парковочный (стояночный) тормоз
performance - рабочая характеристика, КПД
permit — позволять, давать возможность
pivot - ось вращения, шарнир, поворотный шкворень
possess - обладать, иметь
power output - выходная мощность
power plant - силовой агрегат
power train — силовая передача (трансмиссия)
power-shift gearbox — коробка переключения передач
pre-determined engine speed -расчетные обороты двигателя
pressure plate — нажимной диск

prevent - предотвращать
propeller shaft — карданный вал
propulsion output - мощность силовой установки (двигателя)
provide — обеспечивать
push down on the pedal — нажимать на педаль

Qq

questionnaire — опрос
quiet-running power unit - бесшумный силовой агрегат

Rr

rack and pinion steering - рулевой механизм с рейкой и шестерней, реечное управление
rapid - быстрый
ratio — соотношение, передаточное число
reaction member — реактивный элемент
rear axle — задний мост
rear suspension - задняя подвеска
reduce - сокращать, понижать
release - разъединение, расцепление
release lever — рычаг отключения (отсоединения)
relief valve - предохранительный клапан
require — требовать
restrict — ограничивать
retaining ring - удерживающее (стопорное) кольцо
retard - замедлять, тормозить
reversing gearbox — коробка передач заднего хода, реверсивный механизм
rim - обод, зубчатый венец

Ss

separating clutch - разъединяющая муфта
shock absorber — амортизатор
shoes - колодки (тормозные)
single row engine — рядный двигатель (рядное расположение цилиндров)

skid-steer drive system — система управления, предусматривающая проскальзывание колес
slot — паз, канавка
smooth-acting cluth - плавное сцепление
smooth engagement - плавное включение
spare wheel - запасное колесо
spiral bevel differential - дифференциал с коническими шестернями
springs - рессоры, пружины
steering system - система рулевого управления
steering wheel - рулевое колесо
synchromesh gearbox - коробка передач с синхронизатором

Tt

tailpipe - хвостовая часть; выхлопная труба
thrust assembly - тяговый узел
torque - крутящий момент
torque capacity — несущая способность передачи по крутящему моменту
torque converter - преобразователь крутящего момента, гидротрансформатор
tracked - гусеничное транспортное средство
tractive effort — тяговое усилие, сила тяги
tractive unit - тяговый агрегат
traffic lights — светофор
trailing shoes - ведущие вторичные тормозные колодки
transfer gearbox - раздаточная коробка
transmatic torque converter - автоматический преобразователь крутящего момента
truck — грузовик
two-speed wipers - двухскоростные стеклоочистители

Uu

units and mechanisms - узлы (агрегаты) и механизмы

Vv

valve - клапан

vehicle - транспортное средство, автомобиль

V-type engine - V-образный двигатель

Ww

wear — износ, амортизация

wheeled vehicle - колесное транспортное средство

wheels - колеса

windshield wipers - стеклоочистители ветрового стекла

work out — разрабатывать

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