

Министерство сельского хозяйства РФ
Федеральное государственное бюджетное образовательное
учреждение высшего образования
«Брянский государственный аграрный университет»

Кафедра иностранных языков

АНГЛИЙСКИЙ ЯЗЫК

**Учебное пособие
для аудиторных занятий и самостоятельной работы
студентов**

*по направлению подготовки 35.04.06 «Агроинженерия»,
магистерская программа
Технические системы и технологии в агробизнесе*

Квалификация магистр

Брянская область
2018

УДК 811.111 (07)

ББК 81.2 Англ

П 64

Поцепай, С. Н. **Английский язык:** учебное пособие для аудиторных занятий и самостоятельной работы студентов направления подготовки 35.04.06. Агроинженерия, магистерская программа Технические системы и технологии в агробизнесе / С. Н. Поцепай, Е. В. Андрющенко, М. В. Семьшев. - Брянск: Изд-во Брянского ГАУ, 2018. - 218 с.

Предлагаемое учебное пособие предназначено для студентов, обучающихся по направлению подготовки магистратуры: 35.04.06 «Агроинженерия», магистерская программа Технические системы и технологии в агробизнесе, и направлено на формирование ОПК-1 - готовности к коммуникации в устной и письменной формах на русском и иностранном языках для решения задач профессиональной деятельности.

Учебное пособие составлено в соответствии с требованиями Федерального государственного образовательного стандарта высшего образования (ФГОС ВО) по направлению подготовки 35.04.06 Агроинженерия (уровень магистратуры) утвержденного приказом Министерства образования и науки РФ от 23 сентября 2015г. № 1047.

Рецензенты:

к. п. н., доцент кафедры иностранных языков Брянского ГАУ
Голуб Л.Н.;

директор ИТИ, д.т.н., профессор Брянского ГАУ Купреенко А.И.

Рекомендовано к изданию методической комиссией инженерно-технологического института от 21 марта 2018 год, протокол №8.

© Брянский ГАУ, 2018

© Коллектив авторов , 2018

ПРЕДИСЛОВИЕ

Современный мир, общество стремительно меняются, и в соответствии с требованиями ФГОС ВО третьего поколения актуальной задачей высшего профессионального образования становится поиск инновационных средств и методов формирования творческой поликультурной личности.

Целью дисциплины «Иностранный язык» в аграрном вузе является формирование способности и готовности студентов осуществлять в реальной действительности иноязычное межличностное и межкультурное общение с носителями языка с целью обмена профессионально значимой информацией, т.е. формирование иноязычной информационно-коммуникативной компетенции, которая включает языковую (лингвистическую), тематическую (неязыковую), социокультурную, компенсаторную и информационную

Учебное пособие составлено в соответствии с требованиями Федерального государственного образовательного стандарта высшего образования (ФГОС ВО) по направлению подготовки 35.04.06 Агроинженерия (уровень магистратуры) магистерская программа Технические системы и технологии в агробизнесе, утвержденного приказом Министерства образования и науки РФ от 23 сентября 2015г. № 1047 и Примерной программой «Иностранный язык», утверждённой Министерством образования РФ (2009).

Пособие состоит из 6 разделов, включающих задания для аудиторной и самостоятельной работы и самопроверки. Большинство заданий содержит дополнительный познавательный материал из различных оригинальных источников в сокращенном, но не адаптированном варианте без нарушения особенностей стиля языка научно-технической статьи. Грамматический материал, который необходимо проработать, представлен в кратком грамматическом справочнике и тезаурусе.

Чёткая последовательность выполнения заданий позволит студентам овладеть терминологией направления подготовки, приобрести навыки ведения беседы и переговоров, составления резюме, аннотаций. Пособие предназначено для аудиторной работы и может быть использовано для самостоятельной подготовки студентов.

В процессе достижения цели обучения иностранному языку решаются воспитательные и общеобразовательные задачи, которые расширяют общий и филологический кругозор обучаемых, развивают их мышление и способность делать логические выводы и умозаключения.

Данное пособие будет способствовать формированию ОПК-1: готовности к коммуникации в устной и письменной формах на русском и иностранном языках для решения задач профессиональной деятельности.

РАЗДЕЛ I

Unit 1

Automobile Production

I study at the Bryansk State Agrarian University, at the Engineering Institute. When I graduate from the university 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 в инженерном институте, 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 разогнаться (приёмистость), подвергаться жестким дорожным испытаниям.

9. Translate into Russian.

1. After graduating from the university 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 в инженерном институте БГАУ.

2. После окончания университета 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 приемистым, 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 university, at the Engineering Institute.

2. The engineering institute 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 institute.

A.: Whom does the institute 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 Active 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.

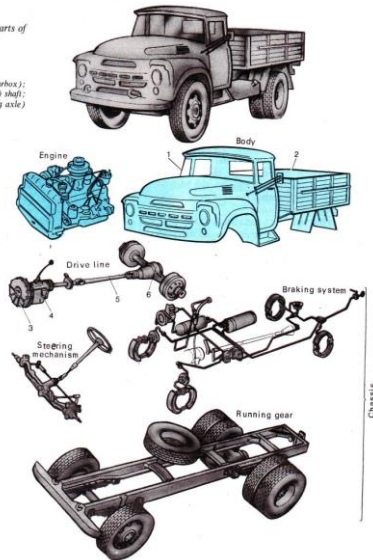
The body has a hood, fenders and accessories: the heater, stereo tape recorder, windshield wipers, conditioner, speedometer and so on.

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 Active Voice.

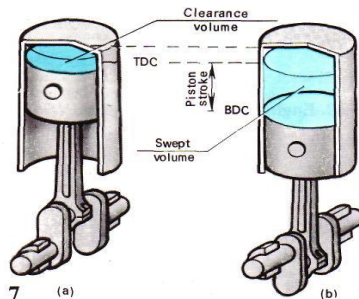
1. In Britain, and also over much Europe, the first long-distance paved roads were made by Romans.
2. The first Russian locomotive was invented and built by Cherepanovs, father and son, both skilful mechanics and serfs.
3. The rapid development of the internal combustion engine let to use them in the 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

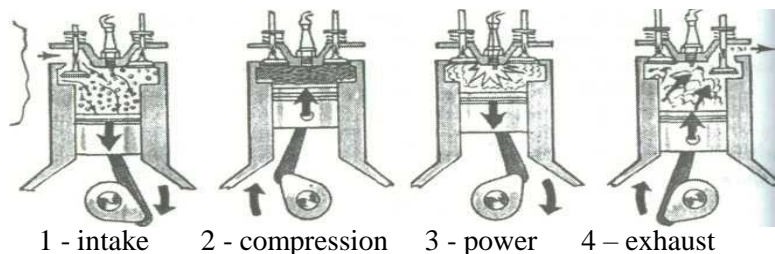
- (a) piston at TDC;
(b) piston at BDC

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.

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

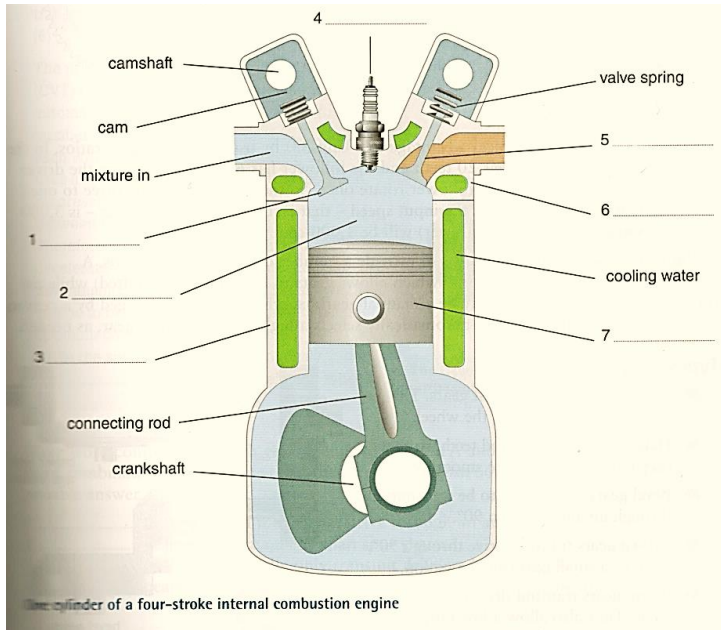
7. Suggest the Russian equivalents.

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. Look at the cross-section of an engine, and label it using words and word expressions from the text:



10. 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.

11. 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

12. 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.

13. 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.

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

15. Translate the text from English into Russian.

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

17. Read the dialogue and act it out.

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.

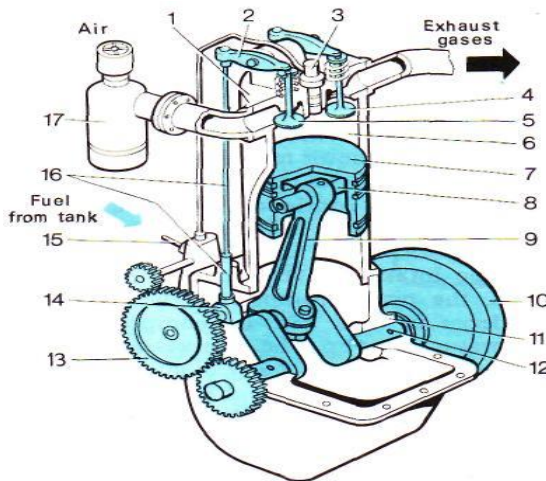
M.: Just a moment. Don't worry! We shall check up all units and how they work together.

(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!



6

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

**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 Active 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

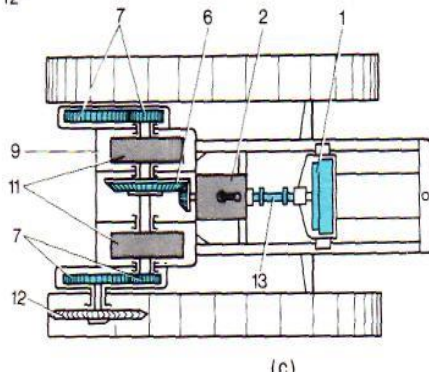
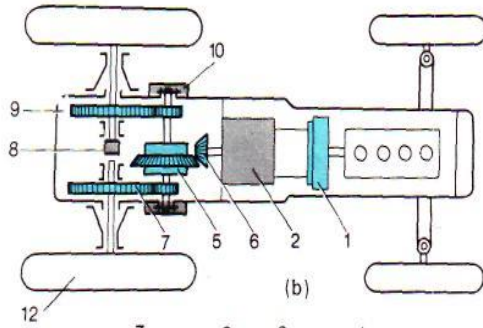
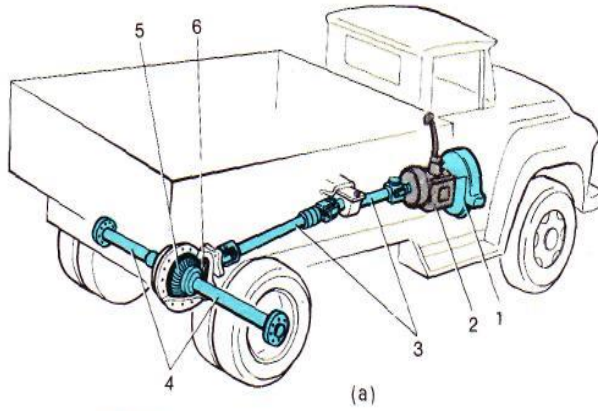
Fig.1 Schematic diagrams of drive-line arrangements:

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.

вилка 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.

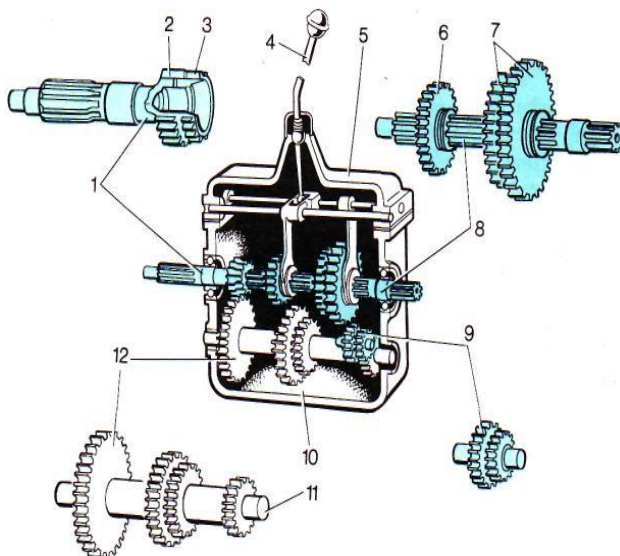
1. The chassis includes the running gear, the power transmission and the steering mechanism.
2. The power transmission consists of the clutch, gearbox, cardan shaft, rear axle, final drive, differential and axle shafts.
3. The clutch connects the engine with the driving wheels.
4. The gearbox changes 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.



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.

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)

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.

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.

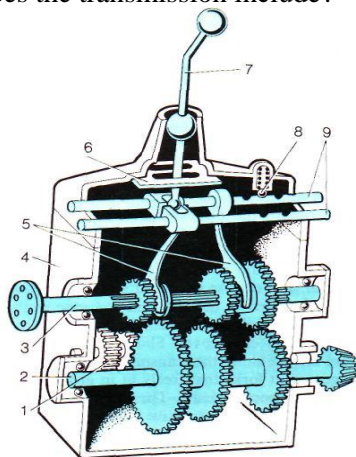
15. Write an essay of the text and render it in English.

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?



82

Schematic diagram of a transmission

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

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 Active 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 Active 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

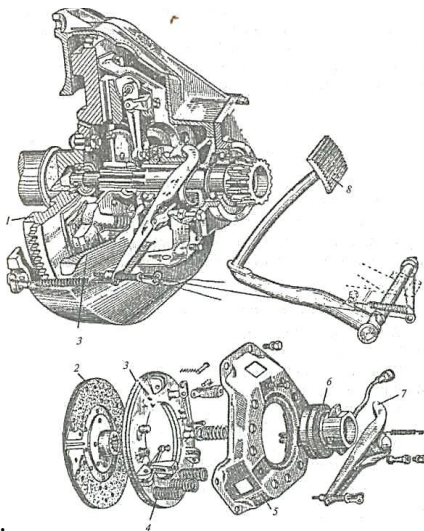
1. flywheel
2. friction disc
3. pressure disc
4. spring

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 отсоединяется 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?

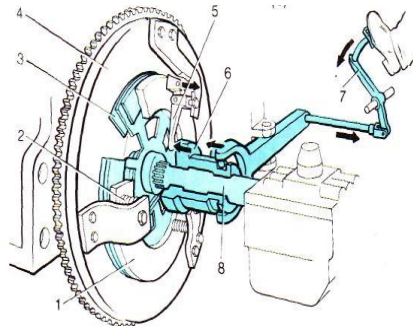
B.: The friction disc (driven disc) and the pressure disc.

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.



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.

Fig.1 Schematic diagram of a clutch:

1) 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

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 Active 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 Active 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 in 1828.

Unit 8

Brakes

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

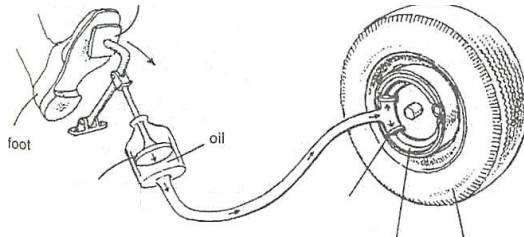


Fig.1. Brake System

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.

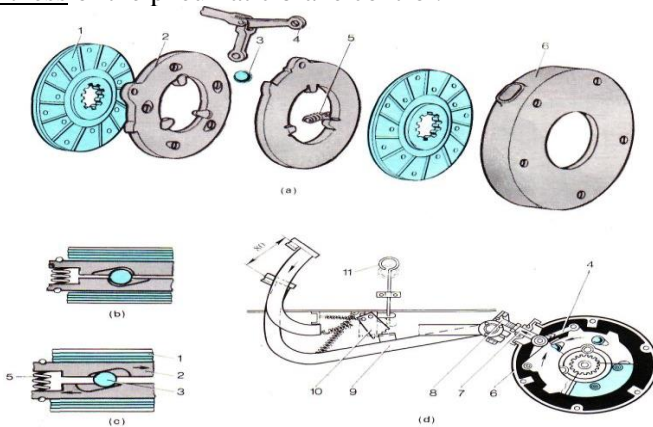
Most braking systems in use today are hydraulic. This system consists of a master cylinder mounted on the car frame and wheel cylinders. When the driver pushes down on the brake pedal, it forces the piston to move in the master cylinder and brake fluid is delivered from it to the wheel cylinders. The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



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.

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

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.

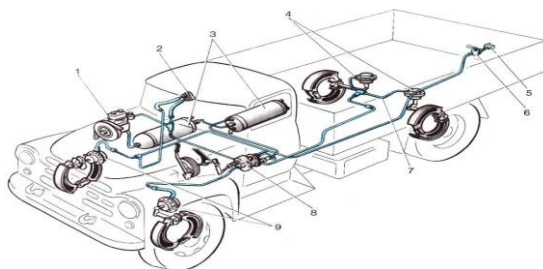
Performance, the safety of passengers, to depend upon, drum brakes, disc brakes, brakes are applied, hydraulic assisted brakes, power assisted brakes, to press down on the brake pedal, under pressure, braking effort, push down on the brake pedal, brake shoes, force the fluid, master cylinder, band brake

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.



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.

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

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 hydraulic 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.

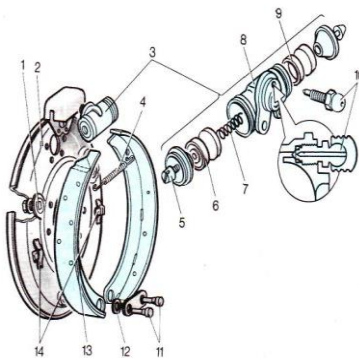
A.: Well, it is one of the most important mechanisms of the car, isn't it?

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

134

Drum-type hydraulic wheel brake (FAZ-53A 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	
drum brakes	стойкость
sticking	дисковые тормоза
tightness	тормозная педаль
	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 Active 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

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.

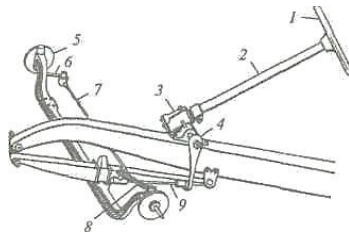


Fig. 1. Steering System

- 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

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.

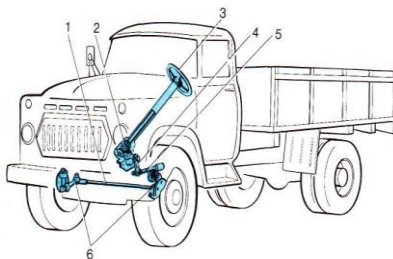
1. Read the text, write down the underlined words, transcribe and pronounce them correctly. Study the words.

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

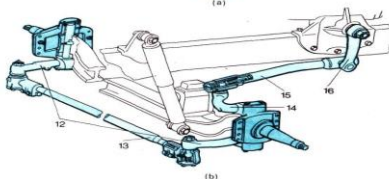
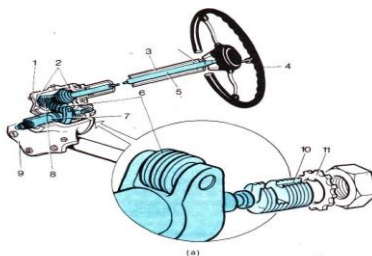
steering gear performance.

126

(a) Steering linkage 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 Active 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 than 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, воспламенить 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 Random 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 than 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 Random 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 Active 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.

РАЗДЕЛ II

ТЕКСТЫ ДЛЯ САМОСТОЯТЕЛЬНОГО ИЗУЧЕНИЯ

History of Tractors

The first powered farm implements in the early 19th century were portable engines – steam engines on wheels that could be used to drive mechanical farm machinery by way of a flexible belt. Around 1850, the first traction engines were developed from these, and were widely adopted for agricultural use. The first tractors were steam-powered plowing engines. They were used in pairs, placed on either side of a field to haul a plow back and forth between them using a wire cable. Where soil conditions permitted (as in the United States), steam tractors were used to direct-haul plows, but in the UK and elsewhere, plowing engines were used for cable-hauled plowing, instead. Steam-powered agricultural engines remained in use well into the 20th century until reliable internal combustion engines had been developed.



Model T Tractor

In 1892, John Froelich invented and built the first gasoline/petrol-powered tractor in Clayton County, Iowa, USA. A Van Duzen single-cylinder gasoline engine was mounted on a Robinson engine chassis, which could be controlled and propelled by Froelich's gear box. After receiving a patent, Froelich started up the Waterloo Gasoline Engine Company, investing all of his assets, which by 1895, all would be lost and his business resigned to become a failure.



A very early, hand-built gasoline powered tractor

After graduating from the University of Wisconsin, Charles W. Hart and Charles H. Parr developed a two-cylinder gasoline engine and set up their business in Charles City, Iowa. In 1903, the firm built 15 "tractors", a term with Latin roots coined by Hart and Parr, and a combination of the words traction and power. Their 14,000-pound tractor is the oldest surviving internal combustion engine tractor in the United States, and is on display at the Smithsonian National Museum of American History in Washington D.C. The two-cylinder engine has a unique hit-and-miss firing cycle that produced 30 horsepower at the belt and 18 at the drawbar.



Harrison Machine Works 1882 tractor

In Britain, the first recorded tractor sale was the oil-burning Hornsby-Ackroyd Patent Safety Oil traction engine, in 1897. However, the first commercially successful design was Dan Albone's three-wheel Ivel tractor of 1902. In 1908, the Saunderson Tractor and Implement Co. of Bedford introduced a four-wheel design, and went

on to become the largest tractor manufacturer outside the U.S. at that time.

While unpopular at first, these gasoline-powered machines began to catch on in the 1910s, when they became smaller and more affordable. Henry Ford introduced the Fordson, the first mass-produced tractor, in 1917. They were built in the U.S., Ireland, England and Russia, and by 1923, Fordson had 77% of the U.S. market. The Fordson dispensed with a frame, using the strength of the engine block to hold the machine together. By the 1920s, tractors with gasoline-powered internal combustion engines had become the norm.

Tractor configurations

Tractors can be generally classified as two-wheel drive, two-wheel drive with front wheel assist, four-wheel drive (often with articulated steering), or track tractors (with either two or four powered rubber tracks).



Volvo T25, 1956, gasoline tractor

The classic farm tractor is a simple open vehicle, with two very large driving wheels on an axle below and slightly behind a single seat (the seat and steering wheel consequently are in the center), and the engine in front of the driver, with two steerable wheels below the engine compartment. This basic design has remained unchanged for a number of years, but enclosed cabs are fitted on almost all modern models, for reasons of operator safety and comfort. In some localities with heavy or wet soils, notably in the Central Valley of California, the "Caterpillar" or "crawler" type of tracked tractor became popular in the 1930s, due to superior traction and flotation. These were usually maneuvered through the use of turning brake pedals and separate track clutches operated by

levers rather than a steering wheel.



A modern 4-wheel drive farm tractor

Four-wheel drive tractors began to appear in the 1960s. Some four-wheel drive tractors have the standard "two large, two small" configuration typical of smaller tractors, while some have four large, powered wheels. The larger tractors are typically an articulated, center-hinged design steered by hydraulic cylinders that move the forward power unit while the trailing unit is not steered separately.

In the early 21st century, articulated or nonarticulated, steerable multitrack tractors have largely supplanted the Caterpillar type for farm use. Larger types of modern farm tractors include articulated four-wheel or eight-wheel drive units with one or two power units which are hinged in the middle and steered by hydraulic clutches or pumps. A relatively recent development is the replacement of wheels or steel crawler-type tracks with flexible, steel-reinforced rubber tracks, usually powered by hydrostatic or completely hydraulic driving mechanisms. The configuration of these tractors bears little resemblance to the classic farm tractor design.

Engine and fuels

The predecessors of modern tractors, traction engines, used steam engines for power. Since the turn of the 20th century, internal combustion engines have been the power source of choice. Between 1900 and 1960, gasoline was the predominant fuel, with kerosene (the Rumely Oil Pull was the most notable of this kind) and ethanol being common alternatives. Generally, one engine

could burn any of those, although cold starting was easiest on gasoline. Often, a small auxiliary fuel tank was available to hold gasoline for cold starting and warm-up, while the main fuel tank held whatever fuel was most convenient or least expensive for the particular farmer. Dieselization gained momentum starting in the 1960s, and modern farm tractors usually employ diesel engines, which range in power output from 18 to 575 horsepower (15 to 480 kW). Size and output are dependent on application, with smaller tractors used for lawn mowing, landscaping, orchard work, and truck farming, and larger tractors for vast fields of wheat, maize, soy, and other bulk crops. Liquefied petroleum gas (LPG) or propane also have been used as tractor fuels, but require special pressurized fuel tanks and filling equipment, so are less prevalent in most markets. In some countries such as Germany, biodiesel is often used. Some other biofuels such as straight vegetable oil are also being used by some farmers.

Transmission

Most older farm tractors use a manual transmission. They have several gear ratios, typically three to six, sometimes multiplied into two or three ranges. This arrangement provides a set of discrete ratios that, combined with the varying of the throttle, allow final-drive speeds from less than one up to about 25 miles per hour (40 km/h), with the lower speeds used for working the land and the highest speed used on the road.

Slow, controllable speeds are necessary for most of the operations performed with a tractor. They help give the farmer a larger degree of control in certain situations, such as field work. However, when travelling on public roads, the slow operating speeds can cause problems, such as long queues or tailbacks, which can delay or annoy motorists in cars and trucks. These motorists are responsible for being duly careful around farm tractors and sharing the road with them, but many shirk this responsibility, so various ways to minimize the interaction or minimize the speed differential are employed where feasible. Some countries (for example the Netherlands) employ a road sign on some roads that means "no farm tractors". Some modern tractors, such as the JCBF Astra, are now capable of much higher road speeds of around 50 mph (80 km/h).



*An older model European farm tractor,
of the type still common in Eastern Europe*

Older tractors usually have unsynchronized transmission designs, which often require the operator stop the tractor to shift between gears. This mode of use is inherently unsuited to some of the work tractors do, and has been circumvented in various ways over the years. For existing unsynchronized tractors, the methods of circumvention are double clutching or power-shifting, both of which require the operator to rely on skill to speed-match the gears while shifting, and are undesirable from a risk-mitigation standpoint because of what can go wrong if the operator makes a mistake – transmission damage is possible, and loss of vehicle control can occur if the tractor is towing a heavy load either uphill or downhill – something that tractors often do. Therefore, operator's manuals for most of these tractors state one must always stop the tractor before shifting, and they do not even mention the alternatives. As already said, that mode of use is inherently unsuited to some of the work tractors do, so better options were pursued for newer tractor designs.



John Deere 3350 tractor cut

In these, unsynchronized transmission designs were replaced with synchronization or with continuously variable transmissions (CVTs). Either a synchronized manual transmission with enough available gear ratios (often achieved with dual ranges, high and low) or a CVT allow the engine speed to be matched to the desired final-drive speed, while keeping engine speed within the appropriate speed (as measured in rotations per minute or rpm) range for power generation (the working range) (whereas throttling back to achieve the desired final-drive speed is a trade-off that leaves the working range). The problems, solutions, and developments described here also describe the history of transmission evolution in semi-trailer trucks. The biggest difference is fleet turnover; whereas most of the old road tractors have long since been scrapped, many of the old farm tractors are still in use. Therefore, old transmission design and operation is primarily just of historical interest in trucking, whereas in farming it still often affects daily life.

Implement or Equipment

The power produced by the engine must be transmitted to the implement or equipment to do the actual work intended for the equipment. This may be accomplished via a drawbar or hitch system if the implement is to be towed or otherwise pulled through the tractive power of the engine, or via a pulley or power takeoff system if the implement is stationary, or a combination of the two.

Drawbars

Until the 1950s, plows and other tillage equipment usually were connected to the tractor via a drawbar, or a proprietary connecting system. The classic drawbar is simply a steel bar attached to the tractor (or in some cases, as in the early Fordsons, cast as part of the rear transmission housing) to which the hitch of the implement was attached with a pin or by a loop and clevis. The implement could be readily attached and removed, allowing the tractor to be used for other purposes on a daily basis. If the tractor was equipped with a swinging drawbar, then it could be set at the center or offset from center to allow the tractor to run outside the path of the implement.



A large, modern John Deere model 9400 four-wheel drive tractor with tripled wheels and a drawbar-towed tool chain, including one-pass tillage equipment, planter and fertilizer applicator with tanks

The drawbar system necessitated the implement having its own running gear (usually wheels) and in the case of a plow, chisel cultivator or harrow, some sort of lift mechanism to raise it out of the ground at turns or for transport. Drawbars necessarily posed a rollover risk depending on how the tractive torque was applied. The Fordson tractors (of which more units were produced and placed in service than any other farm tractor) was extremely prone to roll over backwards due to an excessively short wheelbase. The linkage between the implement and the tractor usually had some slack which could lead to jerky starts and greater wear and tear on the tractor and the equipment.

Drawbars were appropriate to the dawn of mechanization, because they were very simple in concept and because as the tractor replaced the horse, existing horse-drawn implements usually already had running gear. As the history of mechanization progressed, however, the advantages of other hitching systems became apparent, leading to new developments. Depending on the function for which a tractor is used, though, the drawbar is still one of the usual means of attaching an implement to a tractor.

Fixed mounts

Some tractor manufacturers produced matching equipment that could be directly mounted on the tractor. Examples included front-end loaders, belly mowers, row crop cultivators, corn pickers and corn planters. In most cases, these fixed mounts were proprietary and unique to each make of tractor, so an implement produced by John Deere, for example, could not be attached to a Minneapolis Moline tractor. Another disadvantage was mounting usually required

some time and labor, resulting in the implement being semipermanently attached with bolts or other mounting hardware. Usually, it was impractical to remove the implement and reinstall it on a day-to-day basis. As a result, the tractor was unavailable for other uses and dedicated to a single use for an appreciable period of time. An implement generally would be mounted at the beginning of its season of use (such as tillage, planting or harvesting) and removed only when the likely use season had ended.

Three-point hitches and quick hitches

The drawbar system was virtually the exclusive method of attaching implements (other than direct attachment to the tractor) before Harry Ferguson developed the three-point hitch. Equipment attached to the three-point hitch can be raised or lowered hydraulically with a control lever. The equipment attached to the three-point hitch is usually completely supported by the tractor. Another way to attach an implement is via a quick hitch, which is attached to the three-point hitch. This enables a single person to attach an implement quicker and put the person in less danger when attaching the implement.



A modern three-point hitch

The three-point hitch revolutionized farm tractors and their implements. Almost every tractor today features Ferguson's three-point linkage or a derivative of it. This hitch allows for easy attachment and detachment of implements while allowing the implement to function as a part of the tractor, almost as if it were attached by a fixed mount. Previously, when the implement hit an obstacle, the towing link would break or the tractor could flip over. Ferguson's genius was to combine a connection via two lower and one upper lift arms that were connected to a hydraulic lifting ram.

The ram was, in turn, connected to the upper of the three links so the increased drag (as when a plough hits a rock) caused the hydraulics to lift the implement until the obstacle was passed.

Other manufacturers copied Ferguson's invention, or developed variations of it. For example, International Harvester's Farmall tractors had a two-point "Fast Hitch" and John Deere had a power lift that was similar to, but not as flexible as the Ferguson invention. Recently, Bobcat's patent on its front loader connection (inspired by these earlier systems) has expired, and compact tractors are now being outfitted with quick-connect attachments for their front-end loaders.

Power take-off systems and hydraulics

In addition to towing an implement or supplying tractive power through the wheels, most tractors have a means to transfer power to another machine such as a baler, swather, or mower. Unless it functions solely by pulling it through or over the ground, a towed implement needs its own power source (such as a baler or combine with a separate engine) or else a means of transmitting power from the tractor to the mechanical operations of the equipment.

Early tractors used belts or cables wrapped around the flywheel or a separate belt pulley to power stationary equipment, such as a threshing machine, buzz saw, silage blower, or stationary baler. In most cases, it was not practical for the tractor and equipment to move with a flexible belt or cable between them, so this system required the tractor to remain in one location, with the work brought to the equipment, or the tractor to be relocated at each turn and the power set-up reapplied (as in cable-drawn plowing systems used in early steam tractor operations).



A PTO shaft connected to a tractor

Modern tractors use a power take-off (PTO) shaft to provide

rotary power to machinery that may be stationary or pulled. The PTO shaft generally is at the rear of the tractor, and can be connected to an implement that is either towed by a drawbar or a three-point hitch. This eliminates the need for a separate, implement-mounted power source, which is almost never seen in modern farm equipment.

Virtually all modern tractors can also provide external hydraulic fluid and electrical power to the equipment they are towing, either by hoses or wires.

Modern tractors have many electrical switches and levers in the cab for controlling the multitude of different functions available on the tractor.

Pedals

Modern farm tractors usually have four or five foot-pedals for the operator on the floor of the tractor.

The pedal on the left is the clutch. The operator presses on this pedal to disengage the transmission for either shifting gears or stopping the tractor. Some modern tractors have (or as optional equipment) a button on the gear stick for controlling the clutch, in addition to the standard pedal.

Two of the pedals on the right are the brakes. The left brake pedal stops the left rear wheel and the right brake pedal does the same with the right side. This independent left and right wheel-braking augments the steering of the tractor when only the two rear wheels are driven. This is usually done when it is necessary to make a sharp turn. The split brake pedal is also used in mud or soft soil to control a tire spinning due to loss of traction. The operator presses both pedals together to stop the tractor. For tractors with additional front-wheel drive, this operation often engages the 4-wheel locking differential (diff-lock) to help stop the tractor when traveling at road speeds.

The pedal furthest to the right is the foot throttle. Unlike in automobiles, it can also be controlled from a hand-operated lever ("hand throttle"). This helps provide a constant speed in field work. It also helps provide continuous power for stationary tractors that are operating an implement by shaft or belt. The foot throttle gives the operator more automobile-like control over the speed of the tractor for road work. This is a feature of more recent tractors; older tractors often did not have it. In the UK, foot pedal use to control engine speed while travelling on the road is mandatory. Some tractors, especially those designed for row-crop work, have a 'de-accelerator' pedal, which operates in the reverse fashion to an automobile

throttle, in that the pedal is pushed down to slow the engine. This allows fine control over the speed of the tractor when maneuvering at the end of crop rows in fields- the operating speed of the engine is set using the hand throttle, and to slow the tractor to turn, the operator simply has to press the pedal, and turn and release it once the turn is completed, rather than having to alter the setting of the hand throttle twice during the maneuver.

A fifth pedal is traditionally included just in front of the driver's seat to operate the rear differential lock (diff-lock), which prevents wheel slip. The differential normally allows the outside wheel to travel faster than the inside wheel during a turn. However, in low-traction conditions on a soft surface, the same mechanism could allow one wheel to slip, further reducing traction. The diff-lock overrides this, forcing both wheels to turn at the same speed, reducing wheel slip and improving traction. Care must be taken to unlock the differential before turning, usually by hitting the pedal a second time, since the tractor with good traction cannot perform a turn with the diff-lock engaged. In modern tractors, this pedal is replaced with an electrical switch.

Levers and switches

Many functions once controlled with levers have been replaced with some model of electrical switch with the rise of indirect computer controlling of functions in modern tractors.

Until the beginning of the 1960s, tractors had a single register of gears, hence one gear stick, often with three to five forward gears and 1 reverse. Then, group gears were introduced, and another gear stick was added. Later, control of the forward-reverse direction was moved to a special stick attached at the side of the steering wheel, which allowed forward or reverse travel in any gear. Nowadays, with CVTs or other clutch-free gear types, fewer sticks control the transmission, and some are replaced with electrical switches or are totally computer-controlled.

The three-point hitch was controlled with a lever for adjusting the position, or as with the earliest ones, just the function for raising or lowering the hitch. With modern electrical systems, it is often replaced with a potentiometer for the lower bound position and another one for the upper bound, and a switch allowing automatic adjustment of the hitch between these settings.

The external hydraulics also originally had levers, but now are often replaced with some form of electrical switch; the same is true for the power take-off shaft.

Safety

Agriculture in the United States is one of the most hazardous industries, only surpassed by mining and construction. No other farm machine is so identified with the hazards of production agriculture as the tractor. Tractor-related injuries account for approximately 32% of the fatalities and 6% of the nonfatal injuries in agriculture. Over 50% is attributed to tractor overturns.

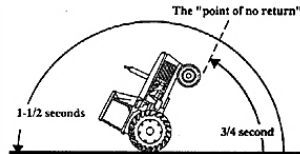


Figure 3. The "point of no return" during a rear turnover may be reached in 3/4 of a second.
(Source: Agricultural Safety, Deere and Company, Inc.)

The roll-over protection structure (ROPS) and seat belt, when worn, are the most important safety devices to protect operators from death during tractor overturns.

Modern tractors have a ROPS to prevent an operator from being crushed if the tractor turns over. The ROPS does not prevent tractor overturns; rather, it prevents the operator from being crushed during an overturn. This is especially important in open-air tractors, where the ROPS is a steel beam that extends above the operator's seat. For tractors with operator cabs, the ROPS is part of the frame of the cab. A ROPS with enclosed cab further reduces the likelihood of serious injury because the operator is protected by the sides and windows of the cab.

These structures were first required by legislation in Sweden in 1959. Before they were required, some farmers died when their tractors rolled on top of them. Row-crop tractors, before ROPS, were particularly dangerous because of their 'tricycle' design with the two front wheels spaced close together and angled inward toward the ground. Some farmers were killed by rollovers while operating tractors along steep slopes. Others have been killed while attempting to tow or pull an excessive load from above axle height, or when cold weather caused the tires to freeze to the ground, in both cases causing the tractor to pivot around the rear axle.

For the ROPS to work as designed, the operator must stay within its protective frame. This means the operator must wear the seat belt; not wearing it may defeat the primary purpose of the ROPS.

Farm tractor applications



A modern John Deere 8110 Farm Tractor plowing a field using a chisel plow



A tractor with mounted rototiller

The most common use of the term "tractor" is for the vehicles used on farms. The farm tractor is used for pulling or pushing agricultural machinery or trailers, for plowing, tilling, disking, harrowing, planting, and similar tasks.



A farm tractor used to power a pump for irrigating a plot of land

A variety of specialty farm tractors have been developed for particular uses. These include "row crop" tractors with adjustable tread width to allow the tractor to pass down rows of corn, tomatoes or other crops without crushing the plants, "wheat land" or "standard" tractors with fixed wheels and a lower center of gravity for plowing and other heavy field work for broadcast crops, and "high crop" tractors with adjustable tread and increased ground clearance, often used in the cultivation of cotton and other high-growing row crop plant operations, and "utility tractors", typically smaller tractors with a low center of gravity and short turning radius, used for general purposes around the farmstead. Many utility tractors are used for nonfarm grading, landscape maintenance and excavation purposes, particularly with loaders, backhoes, pallet forks and similar devices. Small garden or lawn tractors designed for suburban and semirural gardening and landscape maintenance also exist in a variety of configurations.



A tractor with a chaser bin

Some farm-type tractors are found elsewhere than on farms: with large universities' gardening departments, in public parks, or for highway workman use with blow torch cylinders strapped to the sides and a pneumatic drill air compressor permanently fastened over the power take-off. These are often fitted with grass (turf) tyres which are less damaging to soft surfaces than agricultural tires.

Precision agriculture

Space technology has been incorporated into agriculture in the form of GPS devices, and robust on-board computers installed as optional features on farm tractors. These technologies are used in modern, precision farming techniques. The spin-offs from the space race have actually facilitated automation in plowing and the use of auto steer systems (drone on tractors that are manned but only steered at the end of a row), the idea being to neither overlap and use more fuel nor leave streaks when performing jobs such as cultivating. Several tractor companies have also been working on producing a driverless tractor.

Engineering tractors



Ebro farm tractor

The durability and engine power of tractors made them very suitable for engineering tasks. Tractors can be fitted with engineering tools such as dozer blades, buckets, hoes, rippers, etc. The most common attachments for the front of a tractor are dozer blades or buckets. When attached to engineering tools, the tractor is called an engineering vehicle.

A bulldozer is a track-type tractor with a blade attached in the front and a rope-winch behind. Bulldozers are very powerful tractors and have excellent ground-hold, as their main tasks are to push or drag.

Bulldozers have been further modified over time to evolve into new machines which are capable of working in ways that the original bulldozer can not. One example is that loader tractors were created by removing the blade and substituting a large volume bucket and hydraulic arms which can raise and lower the bucket, thus making it useful for scooping up earth, rock and similar loose material to load it into trucks.

A front-loader or loader is a tractor with an engineering tool which consists of two hydraulic powered arms on either side of the front engine compartment and a tilting implement. This is usually a wide-open box called a bucket, but other common attachments are a pallet fork and a bale grapppler.

Other modifications to the original bulldozer include making the machine smaller to let it operate in small work areas where movement is limited. Also, tiny wheeled loaders, officially called skid-steer loaders, but nicknamed "Bobcat" after the original manufacturer, are particularly suited for small excavation projects in confined areas.

Backhoe loader



A common backhoe-loader - the backhoe is on the left, the bucket/blade on the right.

The most common variation of the classic farm tractor is the hoe, also called a hoe-loader. As the name implies, it has a loader assembly on the front and a backhoe on the back. Backhoes attach to

a three-point hitch on farm or industrial tractors. Industrial tractors are often heavier in construction, particularly with regards to the use of steel grill for protection from rocks and the use of construction tires. When the backhoe is permanently attached, the machine usually has a seat that can swivel to the rear to face the hoe controls. Removable backhoe attachments almost always have a separate seat on the attachment.

Backhoe-loaders are very common and can be used for a wide variety of tasks: construction, small demolitions, light transportation of building materials, powering building equipment, digging holes, loading trucks, breaking asphalt and paving roads. Some buckets have retractable bottoms, enabling them to empty their loads more quickly and efficiently. Buckets with retractable bottoms are also often used for grading and scratching off sand. The front assembly may be a removable attachment or permanently mounted. Often the bucket can be replaced with other devices or tools.

Their relatively small frames and precise controls make backhoe-loaders very useful and common in urban engineering projects, such as construction and repairs in areas too small for larger equipment. Their versatility and compact size makes them one of the most popular urban construction vehicles.

In the UK, the word "JCB" is sometimes used colloquially as a generalized trademark for any such type of engineering vehicle. The term JCB now appears in the Oxford English Dictionary, although it is still legally a trademark of J. C. Bamford Ltd. The term "digger" is also commonly used.

Compact utility tractor



In the middle is a 24 hp (18 kW) diesel CUT illustrating the size difference between a small 40 hp farm tractor and a garden tractor

A compact utility tractor (CUT) is a smaller version of an agricultural tractor, but designed primarily for landscaping and estate management tasks rather than for planting and harvesting on a commercial scale. Typical CUTs range from 20 to 50 horsepower (15-37 kW) with available power take-off (PTO) horsepower ranging from 15 to 45 hp (11-34 kW). CUTs are often equipped with both a mid-mounted and a standard rear PTO, especially those below 40 horsepower (30 kW). The mid-mount PTO shaft typically rotates at/near 2000 rpm and is typically used to power mid-mount finish mowers, front-mounted snow blowers or front-mounted rotary brooms. The rear PTO is standardized at 540 rpms for the North American markets, but in some parts of the world, a dual 540/1000 rpm PTO is standard, and implements are available for either standard in those markets.



Howse brand modular subsoiler mounted to a tractor

One of the most common attachment for a CUT is the front-end loader or FEL. Like the larger agricultural tractors, a CUT will have an adjustable, hydraulically controlled three-point hitch. Typically, a CUT will have four-wheel drive, or more correctly four-wheel assist. Modern CUTs often feature hydrostatic transmissions, but many variants of gear-drive transmissions are also offered from low priced, simple gear transmissions to synchronized transmissions to advanced glide-shift transmissions. All modern CUTs feature government-mandated roll over protection structures just like agricultural tractors. The most well-known brands in North America include Kubota, John Deere Tractor, New Holland Ag, Case-Farmall and Massey-Ferguson. Although less common, compact backhoes are often attached to compact utility tractors.



JD 71 Flexi Planter for tractors 20 to 35 horsepower

Compact utility tractors require special, smaller implements than full-sized agricultural tractors. Very common implements include the box blade, the grader blade, the landscape rake, the post hole digger (or post hole auger), the rotary cutter (slasher or a brush hog), a mid- or rear-mount finish mower, a broadcast seeder, a subsoiler and the rototiller (rotary tiller). In northern climates, a rear-mounted snow blower is very common; some smaller CUT models are available with front-mounted snow blowers powered by mid-PTO shafts. Implement brands outnumber tractor brands, so CUT owners have a wide selection of implements.



Broadcast seeder mounted to a Kubota CUT

For small-scale farming or large-scale gardening, some planting and harvesting implements are sized for CUTs. One- and two-row planting units are commonly available, as are cultivators, sprayers and different types of seeders (slit, rotary and drop). One of the first CUTs offered for small farms of three to 30 acres and for small jobs on larger farms was a three-wheeled unit, with the rear wheel being the drive wheel, offered by Sears & Roebuck in 1954 and priced at \$598 for the basic model.

Row-crop tractor



An Oliver Row Crop 60 tractor

A row-crop tractor is tailored specifically to the growing of crops grown in rows, as in truck farming, and most especially to cultivating. Cultivating can take place anytime from soon after the crop plants have sprouted until soon before they are harvested. Several rounds of cultivating may be done over the season. A row-crop tractor essentially brings together a farm tractor and its cultivator into one machine, in the same way motive power has been combined into other machinery (for example, horseless carriages combined the motive power into transport vehicles; self-propelled guns combined the artillery tractor and its gun into one machine).

The earliest win from introducing tractors to mechanize agriculture was in reducing the heavy efforts of plowing and harrowing before planting, which could often be (almost literally) backbreaking tasks for humans and draft animals. Early tractors were used mainly to alleviate this drudgery, but they tended to be very big and heavy, so were not well-suited to getting

into a field of already-planted row crops to do weed control. Row-crop tractors—light, affordable, and reliable—corrected this flaw.

Row-crop tractor history



A Farmall "Regular"

The row-crop tractor category evolved rather than appearing overnight, but the International Harvester (IH) Farmall is often considered the "first" tractor of the category. Some earlier tractors of the 1910s and 1920s approached the form factor from the heavier side, as did motorized cultivators from the lighter side, but the Farmall brought all of the salient features together into one package, with a capable distribution network to ensure its commercial success. In the new form factor that the Farmall popularized, the cultivator was mounted in the front so it was easily visible. Additionally, the tractor had a narrow front end; the front tires were spaced very closely and angled in towards the bottom. The back wheels straddled two rows, and the unit could cultivate four rows at once.

From 1924 until 1963, Farmalls were the largest selling row-crop tractors.

To compete, John Deere designed the Model C, which had a wide front and could cultivate three rows at once. Only 112 prototypes were made, as Deere realized sales would be lost to Farmall if their model did less. In 1928, Deere released the Model C anyway, only as the Model GP (General Purpose) to avoid confusion with the Model D when ordered over the then unclear telephone.

Oliver refined its "Row Crop" model early in 1930. Until 1935, the 18-27 was Oliver–Hart–Parr's only row-crop tractor. Many

Oliver row-crop models are referred to as "Oliver Row Crop 77", "Oliver Row Crop 88", etc.

Row-crop tractor safety

Many early row-crop tractors had a tricycle design with two closely spaced front tires, and some even had a single front tire. This made it dangerous to operate on the side of a steep hill; as a result, many farmers died from tractor rollovers. Also, early row-crop tractors had no rollover protection system (ROPS), meaning if the tractor flipped back, the operator could be crushed. Sweden was the first country which passed legislation requiring ROPS, in 1959.

Over 50% of tractor related injuries and deaths are attributed to tractor rollover.

Modern row-crop tractors

Canadian agricultural equipment manufacturer Versatile makes row-crop tractors that are 250 and 280 horsepower (190 and 210 kW); powered by an 8.3 liter Cummins Diesel engine.

Modern row crop tractors have rollover protection systems in the form of a reinforced cab or a roll bar.

Garden tractors

Garden tractors (mini tractors) are small, light tractors designed for use in domestic gardens and small estates. Garden tractors are designed for cutting grass, snow removal, and small property cultivation. In the U.S., the term riding lawn mower today often is used to refer to mid- or rear-engined machines.



Benin brown Tractor 600

Front-engined tractor layout machines designed primarily for cutting grass and light towing are called lawn tractors; heavier-duty tractors of similar size are garden tractors. Garden tractors are capable of mounting a wider array of attachments than lawn tractors. Unlike lawn tractors and rear-engined riding mowers, garden tractors are powered by horizontal-crankshaft engines with a belt-drive to transaxle-type transmissions (usually of four- or five-speeds, although some may also have two-speed reduction gearboxes, drive-shafts, or hydrostatic or hydraulic drives). Garden tractors from Wheel Horse, Cub Cadet, Economy (Power King), John Deere, Massey Ferguson and Case Ingersoll are built in this manner. The engines are generally a one- or two-cylinder petrol (gasoline) engines, although diesel engine models are also available, especially in Europe. Typically, diesel-powered garden tractors are larger and heavier-duty than gasoline-powered units and compare more similarly to compact utility tractors.

Visually, the distinction between a garden tractor and a lawn tractor is often hard to make - generally, garden tractors are more sturdily built, with stronger frames, 12-inch or larger wheels mounted with multiple lugs (most lawn tractors have a single bolt or clip on the hub), heavier transaxles, and ability to accommodate a wide range of front, belly, and rear mounted attachments.

Two-wheel tractors

Although most people think first of four-wheel vehicles when they think of tractors, a tractor may have one or more axles. The key benefit is the power itself, which only takes one axle to provide. Single-axle tractors, more often called two-wheel tractors or walk-behind tractors, have had many users since the beginning of internal combustion engine tractors. They tend to be small and affordable. This was especially true before the 1960s, when a walk-behind tractor could often be more affordable than a two-axle tractor of comparable power. Today's compact utility tractors and advanced garden tractors may negate most of that market advantage, but two-wheel tractors still enjoy a loyal following, especially where an already-paid-for two-wheel tractor is financially superior to a compact or garden tractor that would have to be purchased. Regions where two-wheel tractors are especially prevalent today include India, China, and Southeast Asia.

Two-wheel tractor or walking tractor are generic terms understood in the USA and in parts of Europe to represent a single-axle tractor, which is a tractor with one axle, self-powered and self-

propelled, which can pull and power various farm implements such as a trailer, cultivator or harrow, a plough, or various seeders and harvesters. The operator usually walks behind it or rides the implement being towed. Similar terms are mistakenly applied to the household rotary tiller or power tiller that may be wheeled and/or self-propelled but often is not. A further distinction is seen in the two-wheeled tractor's ability to operate disparate types of agricultural equipment, while rotary tillers are smaller and specialize in soil tillage.



Orchard tractors

Tractors tailored to use in fruit orchards typically have features suited to passing under tree branches with impunity. These include a lower overall profile; reduced tree-branch-snagging risk (via underslung exhaust pipes rather than smoke-stack-style exhaust, and large sheetmetal cowlings and fairings that allow branches to deflect and slide off rather than catch); spark arrestors on the exhaust tips; and often wire cages to protect the operator from snags.

Automobile-conversion tractors and other homemade versions



Plow and Pull
With That 4
Your **FORD** All That 4
Pullford \$155 F. O. S.
Quincy, Ill.

MAKES a practical tractor out of a Ford or most any other car. Easily attached to or removed from the car in thirty minutes. No holes to drill, no springs to remove. **Practical, Durable, Reliable.**

New FAN DEVICE Prevents Heating
Hundreds **WORKING NOW** for Satisfied and Enthusiastic Owners

Pulls plows, harrows, drills, mowers, binders, hay loaders, road graders, wagons, trucks, etc. Steel wheels with roller bearings and tires 18 inches wide, two pairs of hardened Vanadium steel pinions, one for plowing and one for hauling speeds. A tractor with the reliability and durability of the Ford car. Prompt shipment. Write for catalogue.

It was the Pullford attached to Ford cars pulling two 18-inch plows running up Keweenaw, equipped with agry fan device, that made a most successful demonstration at Fremont, Nebraska.

PULLFORD COMPANY, Box 318C
Telephone No. 54 **Walton Heights, QUINCY, ILLINOIS**

An advertisement for auto-to-tractor conversion kits, 1918.



A Ford rebuilt to an EPA tractor



A Volvo Duett rebuilt to an EPA tractor, obviously the intended use is no longer as a farm vehicle.

The ingenuity of farm mechanics, coupled in some cases with OEM or aftermarket assistance, has often resulted in the conversion of automobiles for use as farm tractors. In the United States, this trend was especially strong from the 1910s through 1950s. It began early in the development of vehicles powered by internal combustion engines, with blacksmiths and amateur mechanics tinkering in their shops. Especially during the interwar period, dozens of manufacturers (Montgomery Ward among them) marketed aftermarket kits for converting Ford Model Ts for use as tractors. (These were sometimes called 'Hoover wagons' during the Great Depression, although this term was usually reserved for automobiles converted to horse-drawn buggy use when gasoline was unavailable or unaffordable. During the same period, another common name was "Doodlebug"). Ford even considered producing an "official" optional kit. Many Model A Fords also were converted for this purpose. In later years, some farm mechanics have been known to convert more modern trucks or cars for use as tractors, more often as curiosities or for recreational purposes (rather than out of the earlier motives of pure necessity or frugality).



An "A tractor" based on Volvo 760 - notice the slow-vehicle triangle and the longer boot.

During World War II, a shortage of tractors in Sweden led to the development of the so-called "EPA" tractor (EPA was a chain of discount stores and it was often used to signify something lacking in quality). An EPA tractor was simply an automobile, truck or lorry, with the passenger space cut off behind the front seats, equipped with two gearboxes in a row. When done to an older car with a ladder frame, the result was not dissimilar to a tractor and could be used as one.

After the war it remained popular, now not as a farm vehicle, but as a way for young people without a driver's license to own something similar to a car. Since it was legally seen as a tractor, it could be driven from 16 years of age and only required a tractor license. Eventually, the legal loophole was closed and no new EPA tractors were allowed to be made, but the remaining ones were still legal, which led to inflated prices and many protests from people who preferred EPA tractors to ordinary cars.

In March 1975, a similar type of vehicle was introduced in Sweden, the *A tractor* [from *Arbeitstraktor* (work tractor)]; the main difference is an A tractor has a top speed of 30 km/h. This is usually done by fitting two gearboxes in a row and not using one of them. The Volvo Duett was, for a long time, the primary choice for conversion to an EPA or A tractor, but since supplies have dried up, other cars have been used, in most cases another Volvo.

Another type of homemade tractors are ones that are fabricated from scratch. The "from scratch" description is relative, as often individual components will be repurposed from earlier vehicles or machinery (e.g., engines, gearboxes, axle housings), but the tractor's overall chassis is essentially designed and built by the owner (e.g., a frame is welded from bar stock—channel stock, angle stock, flat stock, etc.). As with automobile conversions, the heyday of this type of tractor, at least in developed economies, lies in the past, when there were large populations of blue-collar workers for whom metal working and farming were prevalent parts of their lives. (For example, many 19th- and 20th-century New England and Midwestern machinists and factory workers had grown up on farms.) Backyard fabrication was a natural activity to them (whereas it might seem daunting to most people today).

Alternative machine types called tractors



Road tractor pulling a flatbed trailer

The term "tractor" (US and Canada) or "tractor unit" (UK) is also applied to:

- *Road tractors, tractor units* or traction heads, familiar as the front end of an articulated lorry / semi-trailer truck. They are heavy-duty vehicles with large engines and several axles.

The majority of these tractors are designed to pull long semi-trailers, most often to transport freight over a significant distance, and is connected to the trailer with a fifth wheel coupling. In England, this type of "tractor" is often called an "artic cab" (short for "articulated" cab).

A minority is the ballast tractor, whose load is hauled from a drawbar.

- *Pushback tractors* are used on airports to move aircraft on the ground, most commonly pushing aircraft away from their parking stands.

- *Locomotive tractors* (engines) or Rail car movers - the amalgamation of machines, electrical generators, controls and devices that comprise the traction component of railway vehicles

- *Artillery tractors* - vehicles used to tow artillery pieces of varying weights.

NASA and other space agencies use very large tractors to move large launch vehicles and space shuttles between their hangars and launch pads.

- *A pipe-tractor* is a device used for conveying advanced instruments into pipes for measurement and data logging, and the purging of well holes, sewer pipes and other inaccessible tubes.

The Combine Harvester

The combine harvester, or simply combine, is a machine that harvests grain crops. The name derives from its combining three separate operations comprising harvesting - reaping, threshing, and winnowing - into a single process. Among the crops harvested with a combine are wheat, oats, rye, barley, corn (maize), soybeans and flax (linseed). The waste straw left behind on the field is the remaining dried stems and leaves of the crop with limited nutrients which is either chopped and spread on the field or baled for feed and bedding for livestock.



Combine harvesters are one of the most economically important labor saving inventions, enabling a small fraction of the population to be engaged in agriculture.

The combine was invented in the United States by Hiram Moore in 1834, and early versions were pulled by horse or mule teams. In 1835, Moore built a full-scale version and by 1839, over 50 acres of crops were harvested. By 1860, combine harvesters with a cutting width of several metres were used on American farms. In 1882, the Australian Hugh Victor McKay had a similar idea and developed the first commercial combine harvester in 1885, the Sunshine Harvester.

Combines, some of them quite large, were drawn by mule or horse teams and used a bull wheel to provide power. Later, steam power was used, and George Stockton Berry integrated the combine with a steam engine using straw to heat the boiler. Tractor-drawn, combines became common after World War II as many farms began to use tractors. These combines used a shaker to separate the grain from the chaff and straw-walkers (grates with small teeth on an eccentric shaft) to eject the straw while retaining the grain. Early tractor-drawn combines were usually powered by a separate gasoline engine, while later models were PTO-powered. These machines either put the harvested crop into bags that were then loaded onto a wagon or truck, or had a small bin that stored the grain until it was transferred to a truck or wagon with an auger.

In the U.S., Allis-Chalmers led in market penetration of pull-type combines, with Massey-Harris, International Harvester, Gleaner Manufacturing Company, John Deere, and Minneapolis Moline being other major brands.

In 1911, the Holt Manufacturing Company of California produced a self-propelled harvester. In Australia in 1923, the patented Sunshine Auto Header was one of the first center-feeding

self-propelled harvesters. In 1923 in Kansas, the Curtis brothers and their Gleaner Manufacturing Company patented a self-propelled harvester which included several other modern improvements in grain handling. Both the Gleaner and the Sunshine used Fordson engines. In 1929 Alfredo Rotania of Argentina patented a self-propelled harvester. In 1937, the Australian-born Thomas Carroll, working for Massey-Harris in Canada, perfected a self-propelled model and in 1940 a lighter-weight model began to be marketed widely by the company. Lyle Yost invented an auger that would lift grain out of a combine in 1947, making unloading grain much easier.

In 1952 Claeys launched the first self-propelled combine harvester in Europe; in 1953, the European manufacturer CLAAS developed a self-propelled combine harvester named 'Herkules', it could harvest up to 5 tons of wheat a day. This newer kind of combine is still in use and is powered by diesel or gasoline engines. Until the self-cleaning rotary screen was invented in the mid-1960s combine engines suffered from overheating as the chaff spewed out when harvesting small grains would clog radiators, blocking the airflow needed for cooling.



A significant advance in the design of combines was the rotary design. The grain is initially stripped from the stalk by passing along a helical rotor instead of passing between rasp bars on the outside of a cylinder and a concave. Rotary combines were first introduced by Sperry-New Holland in 1975.

In about the 1980s on-board electronics were introduced to measure threshing efficiency. This new instrumentation allowed operators to get better grain yields by optimizing ground speed and other operating parameters.

Combines are equipped with removable heads that are designed for particular crops. The standard header, sometimes called a grain platform, is equipped with a reciprocating knife cutter bar, and features a revolving reel with metal or plastic teeth to cause the cut crop to fall into the auger once it is cut. A variation of the platform, a "flex" platform, is similar but has a cutter bar that can flex over contours and ridges to cut soybeans that have pods close to the ground. A flex head can cut soybeans as well as cereal crops, while a rigid platform is generally used only in cereal grains.

Some wheat headers, called "draper" headers, use a fabric or rubber apron instead of a cross auger. Draper headers allow faster feeding than cross augers, leading to higher throughputs due to lower power requirements. On many farms, platform headers are used to cut wheat, instead of separate wheat headers, so as to reduce overall costs.

Dummy heads or pick-up headers feature spring-tined pickups, usually attached to a heavy rubber belt. They are used for crops that have already been cut and placed in windrows or swaths. This is particularly useful in northern climates such as western Canada where swathing kills weeds resulting in a faster dry down.

While a grain platform can be used for corn, a specialized corn head is ordinarily used instead. The corn head is equipped with snap rolls that strip the stalk and leaf away from the ear, so that only the ear (and husk) enter the throat. This improves efficiency dramatically since so much less material must go through the cylinder. The corn head can be recognized by the presence of points between each row.

Occasionally row crop heads are seen that function like a grain platform, but have points between rows like a corn head. These are used to reduce the amount of weed seed picked up when harvesting small grains.

Self-propelled Gleaner combines could be fitted with special tracks instead of tires or tires with tread measuring almost 10in deep to assist in harvesting rice. Some combines, particularly pull type, have tires with a diamond tread which prevents sinking in mud. These tracks can fit other combines by having adapter plates made.

The cut crop is carried up the feeder throat (commonly called the "feederhouse") by a chain and flight elevator, then fed into the threshing mechanism of the combine, consisting of a rotating *threshing drum* (commonly called the "cylinder"), to which grooved steel bars (rasp bars) are bolted. The rasp bars thresh or separate the grains and chaff from the straw through the action of the cylinder

against the *concave*, a shaped "half drum", also fitted with steel bars and a meshed grill, through which grain, chaff and smaller debris may fall, whereas the straw, being too long, is carried through onto the *straw walkers*. This action is also allowed due to the fact that the grain is heavier than the straw, which causes it to fall rather than "float" across from the cylinder/concave to the walkers. The drum speed is variably adjustable on most machines, whilst the distance between the drum and concave is finely adjustable fore, aft and together, to achieve optimum separation and output. Manually engaged *disawning plates* are usually fitted to the concave. These provide extra friction to remove the awns from barley crops. After the primary separation at the cylinder, the clean grain falls through the concave and to the shoe, which contains the chaffer and sieves. The shoe is common to both conventional combines and rotary combines.

In the Palouse region of the Pacific Northwest of the United States the combine is retrofitted with a hydraulic hillside leveling system. This allows the combine to harvest the steep but fertile soil in the region. Hillsides can be as steep as a 50% slope. Gleaner, IH and Case IH, John Deere, and others all have made combines with this hillside leveling system, and local machine shops have fabricated them as an aftermarket add-on.

The first leveling technology was developed by Holt Co., a California firm, in 1891. Modern leveling came into being with the invention and patent of a level sensitive mercury switch system invented by Raymond Alvah Hanson in 1946. Raymond's son, Raymond, Jr., produced leveling systems exclusively for John Deere combines until 1995 as R. A. Hanson Company, Inc. In 1995, his son, Richard, purchased the company from his father and renamed it RAHCO International, Inc. In March 2011, the company was renamed Hanson Worldwide, LLC. Production continues to this day.



Hillside leveling has several advantages. Primary among them is an increased threshing efficiency on hillsides. Without leveling, grain and chaff slide to one side of separator and come through the machine in a large ball rather than being separated, dumping large amounts of grain on the ground. By keeping the machinery level, the straw-walker is able to operate more efficiently, making for more efficient threshing. IH produced the 453 combine which leveled both side-to-side and front-to-back, enabling efficient threshing whether on a hillside or climbing a hill head on.

Secondarily, leveling changes a combine's center of gravity relative to the hill and allows the combine to harvest along the contour of a hill without tipping, a very real danger on the steeper slopes of the region; it is not uncommon for combines to roll on extremely steep hills.

Newer leveling systems do not have as much tilt as the older ones. A John Deere 9600 combine equipped with a Rahco hillside conversion kit will level over to 44%, while the newer STS combines will only go to 35%. These modern combines use the rotary grain separator which makes leveling less critical. Most combines on the Palouse have dual drive wheels on each side to stabilize them.

A leveling system was developed in Europe by the Italian combine manufacturer Laverda which still produces it today.

Sidehill combines are very similar to hillside combines in that they level the combine to the ground so that the threshing can be efficiently conducted; however, they have some very distinct differences. Modern hillside combines level around 35% on average, older machines were closer to 50%. Sidehill combines only level to 18%. They are sparsely used in the Palouse region. Rather, they are used on the gentle rolling slopes of the mid-west. Sidehill combines

are much more mass-produced than their hillside counterparts. The height of a sidehill machine is the same height as a level-land combine. Hillside combines have added steel that sets them up approximately 2–5 feet higher than a level-land combine and provide a smooth ride

Another technology that is sometimes used on combines is a continuously variable transmission. This allows the ground speed of the machine to be varied while maintaining a constant engine and threshing speed. It is desirable to keep the threshing speed constant since the machine will typically have been adjusted to operate best at a certain speed.

Self-propelled combines started with standard manual transmissions that provided one speed based on input rpm. Deficiencies were noted and in the early 1950s combines were equipped with what John Deere called the "Variable Speed Drive". This was simply a variable width sheave controlled by spring and hydraulic pressures. This sheave was attached to the input shaft of the transmission. A standard 4 speed manual transmission was still used in this drive system. The operator would select a gear, typically 3rd. An extra control was provided to the operator to allow him to speed up and slow down the machine within the limits provided by the variable speed drive system. By decreasing the width of the sheave on the input shaft of the transmission, the belt would ride higher in the groove. This slowed the rotating speed on the input shaft of the transmission, thus slowing the ground speed for that gear. A clutch was still provided to allow the operator to stop the machine and change transmission gears.

Later, as hydraulic technology improved, hydrostatic transmissions were introduced by Versatile Mfg for use on swathers but later this technology was applied to combines as well. This drive retained the 4 speed manual transmission as before, but this time used a system of hydraulic pumps and motors to drive the input shaft of the transmission. This system is called a Hydrostatic drive system.



The engine turns the hydraulic pump capable of pressures up to 4,000 psi (30 MPa). This pressure is then directed to the hydraulic motor that is connected to the input shaft of the transmission. The operator is provided with a lever in the cab that allows for the control of the hydraulic motor's ability to use the energy provided by the pump. By adjusting the swash plate in the motor, the stroke of its pistons are changed. If the swash plate is set to neutral, the pistons do not move in their bores and no rotation is allowed, thus the machine does not move. By moving the lever, the swash plate moves its attached pistons forward, thus allowing them to move within the bore and causing the motor to turn. This provides an infinitely variable speed control from 0 ground speed to what ever the maximum speed is allowed by the gear selection of the transmission. The standard clutch was removed from this drive system as it was no longer needed.

Most if not all modern combines are equipped with hydrostatic drives. These are larger versions of the same system used in consumer and commercial lawn mowers that most are familiar with today. In fact, it was the downsizing of the combine drive system that placed these drive systems into mowers and other machines.

For some time, combine harvesters used the conventional design, which used a rotating cylinder at the front-end which knocked the seeds out of the heads, and then used the rest of the machine to separate the straw from the chaff, and the chaff from the grain. The TR70 from Sperry-New Holland was brought out in 1975 as the first rotary combine. Other manufacturers soon followed, IH with their 'Axial Flow' in 1977 and Gleaner with their N6 in 1979.

In the decades before the widespread adoption of the rotary combine in the late seventies, several inventors had pioneered

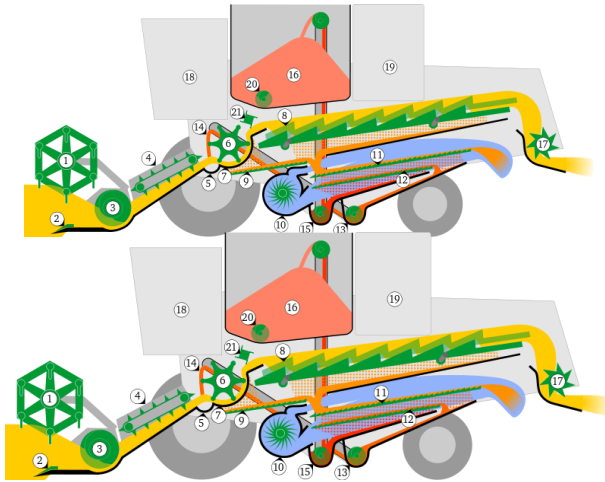
designs which relied more on centrifugal force for grain separation and less on gravity alone. By the early eighties, most major manufacturers had settled on a "walkerless" design with much larger threshing cylinders to do most of the work. Advantages were faster grain harvesting and gentler treatment of fragile seeds, which were often cracked by the faster rotational speeds of conventional combine threshing cylinders.

It was the disadvantages of the rotary combine (increased power requirements and over-pulverization of the straw by-product) which prompted a resurgence of conventional combines in the late nineties. Perhaps overlooked but nonetheless true, when the large engines that powered the rotary machines were employed in conventional machines, the two types of machines delivered similar production capacities. Also, research was beginning to show that incorporating above-ground crop residue (straw) into the soil is less useful for rebuilding soil fertility than previously believed. This meant that working pulverized straw into the soil became more of a hindrance than a benefit. An increase in feedlot beef production also created a higher demand for straw as fodder. Conventional combines, which use straw walkers, preserve the quality of straw and allow it to be baled and removed from the field.

Grain combine fires are responsible for millions of dollars of loss each year. Fires usually start near the engine where dust and dry crop debris accumulate. From 1984 to 2000, 695 major grain combine fires were reported to local fire departments. Dragging chains to reduce static electricity was one method of preventing harvester fires.

The Threshing Process

Despite great advances mechanically and in computer control, the basic operation of the combine harvester has remained unchanged almost since it was invented.



Conventional combine harvester (cut)

- | | |
|-------------------|-------------------------|
| 1) Reel | 11) Adjustable sieve |
| 2) Cutter bar | 12) Top sieve |
| 3) Header auger | 13) Ear conveyor |
| 4) Grain conveyor | 14) Recyklation of ears |
| 5) Stone trap | 15) Grain auger |
| 6) Threshing drum | 16) Grain tank |
| 7) Concave | 17) Chaffer |
| 8) Straw walker | 18) Driver's cab |
| 9) Grain pan | 19) Engine |
| 10) Fan | 20) Unloading auger |
| | 21) Impeller |

First, the header, described above, cuts the crop and feeds it into the threshing cylinder. This consists of a series of horizontal *rasp bars* fixed across the path of the crop and in the shape of a quarter cylinder. Moving rasp bars or rub bars pull the crop through concaved grates that separate the grain and chaff from the straw. The grain heads fall through the fixed concaves. What happens next is dependent on the type of combine in question. In most modern combines, the grain is transported to the shoe by a set of 2, 3, or 4 (possibly more on the largest machines) augers, set parallel or semi-parallel to the rotor on axial mounted rotors and perpendicular Flow" combines.) In older Gleaner machines, these augers were not present. These combines are unique in that the

cylinder and concave is set inside feederhouse instead of in the machine directly behind the feederhouse. Consequently, the material was moved by a "riddle chain" from underneath the concave to the walkers. The clean grain fell between the riddle and the walkers onto the shoe, while the straw, being longer and lighter, floated across onto the walkers to be expelled. On most other older machines, the cylinder was placed higher and farther back in the machine, and the grain moved to the shoe by falling down a "clean grain pan", and the straw "floated" across the concaves to the back of the walkers.

Since the Sperry-New Holland TR70 Twin-Rotor Combine came out in 1975, most manufacturers have combines with rotors in place of conventional cylinders. However, makers have now returned to the market with conventional models alongside their rotary lineup. A rotor is a long, longitudinally mounted rotating cylinder with plates similar to rub bars (except for in the above mentioned Gleaner rotaries).

There are usually two sieves, one above the other. The sieves and basically a metal frame, which has many rows of "fingers" set reasonably close together. The angle of the fingers is adjustable as to change the clearance and control the size of material passing through. The top is set with more clearance than the bottom as to allow a gradual cleaning action. Setting the concave clearance, fan speed, and sieve size is critical to ensure that the crop is threshed properly, the grain is clean of debris, and that all of the grain entering the machine reaches the grain tank or 'hopper'. (Observe, for example, that when travelling uphill the fan speed must be reduced to account for the shallower gradient of the sieves.)

Heavy material, e.g., unthreshed heads, fall off the front of the sieves and are returned to the concave for re-threshing.

The straw walkers are located above the sieves, and also have holes in them. Any grain remaining attached to the straw is shaken off and falls onto the top sieve.

When the straw reaches the end of the walkers it falls out the rear of the combine. It can then be baled for cattle bedding or spread by two rotating straw spreaders with rubber arms. Most modern combines are equipped with a straw spreader.

Agricultural Machinery Manufacturer

Claas is an agricultural machinery manufacturer founded in 1913, now based in Harsewinkel, Germany, in the state of North Rhine Westphalia. The product range includes combine harvesters, forage harvesters, balers, mowers, rakes, tedders and

other harvesting machines. Claas is believed to be the top combine harvester manufacturer in the world, producing its 400,000th machine in 2003. Claas is the world leader in rubber tracked wheel technology for combine harvesters. Over 45% of all new combines are equipped with rubber tracks. Claas also has the largest selling self-propelled forage harvester in the world and manufactures a full line of tractors.

The start of the CLAAS group took place in 1913 when August Claas, developed the company in Clarholz, Germany. In 1919, the business was transferred to Harsewinkel, Germany, where the company focused on the production of reapers. Two years later the company obtained their first patent – for a knotter to efficiently bind straw. In 1930, the first Harvester was developed with the European market in mind with the first Pick-up Baler following in 1934. In 1936 CLAAS starts to market the first combine harvester built in Europe, as opposed to imported machines previously available. They then go on to off trailed combine harvester (reaper-binder) to the European market.

In 1946, following the war, CLAAS introduced self-propelled combine harvesters. By the mid 1950s they opened a new factory in Paderborn, Germany, and their first outside Germany – in Metz, France in 1961. CLAAS took over Josef Bautz, (agricultural machinery factory) in 1969 and expanded the product range to include green harvest machinery.

1971 Development of a pick-up sugar cane harvester.

1973 Presentation of the first self-propelled forage harvester.

1976 Introduction of the first CLAAS round baler Rollant.

1983 Introduction of Jaguar self-propelled forage harvesters.

1988 CLAAS presents Quadrant, the first CLAAS large-square baler.

1994 Start of development of Agrocom a computer based, satellite-assisted, agricultural information system.

1995 CLAAS, in a joint partnership with Caterpillar introduces the Lexion combine, the most powerful combine in the world (up to 40 tonnes of grain per hour).

2001 CLAAS Omaha/COL opened in 2001 and starts to produce the Lexion combine series. (Caterpillar, Inc./Caterpillar) sells its 50% stake in the venture to CLAAS. North American Lexion combines continue to be distributed by Caterpillar dealers.

2003 CLAAS acquires a majority stake in Renault Agriculture and expands its product range with tractors and the

400,000th combine harvester, a Lexion 480, is produced.

2004 The 20,000th Jaguar Forage Harvester commemorated with a special coat of paint and the 1000th tractor are produced.

2005 CLAAS open a new factory in Krasnodar in South Russia. Launch of Lexion 600 Combine.

2006 CLAAS manufactures the 80,000th Rollant baler, and launch of the Axion tractor.

2007 CLAAS launches Tucano combine, larger Jaguar from 630 hp - 830 hp, Arion Tractor 112 hp- 175 hp and larger Xerion 379 hp.

2008 CLAAS acquires the remaining stake of Renault Agriculture to make it 100% CLAAS owned. The AXOS tractor, up to 100HP, is unveiled.

2009 The AVERO, a compact-class combine harvester is introduced. The XERION 5000 is released which features more than 500HP.

2010 The 1000th XERION tractor rolls of the line and features a special coat of white paint. A new technology center opens up in Harsewinkel.

2011 The AXION 900 is presented at the SIMA show in Paris, France. The 30,000th Jaguar is produced and receives a special coat of paint. The Lexion 770, the world's only class 10 combine harvester at the time, sets a Guinness World Record with 675.84 tons of grain harvested in 8 hours.

2013 CLAAS produces its 450,000th combine, a Lexion 740 Terra Trac, at CLAAS of America's La Vista, Nebraska assembly plant

The CLAAS Museum is located in the CLAAS Technoparc in Harsewinkel, Germany, and features a display of history harvesting machines and agriculture equipment. Visitation is during working days only.

Deere & Company, the firm founded by John Deere, began to expand its range of equipment to include the tractor business in 1876. The Deere Company briefly experimented with building its own tractor models, the most successful of which was the Dain All-Wheel-Drive.

The predecessor of Waterloo Boy came about in 1892. It was made by thresherman John Froelich. It is called the Froelich tractor. Scale Models of Dyersville, Iowa made a 1/16 scale toy of this tractor. In March 1918 Deere & Company decided to continue its foray into the tractor business by purchasing the Waterloo Gasoline

Engine Company which manufactured the popular Waterloo Boy Tractor at its facilities in Waterloo, Iowa.



Deere & Company continued to sell tractors under the Waterloo Boy name until 1923.

Despite a rather severe farm economy depression at the time, Deere management decided to build a Model D prototype in 1923, designed by Muir L. Frey (father of Ford Mustang designer Donald N. Frey). The Deere Model D was produced from March 1, 1923 to July 3, 1953, the longest production span of all the two-cylinder John Deere tractors. Over 160,000 were made.



The first Model D was not the first tractor to bear the Deere name - as a number of Deere experimental tractors, and the John Deere Dain "All Wheel Drive" tractor (of which approximately 100 were produced during 1918 and 1919) had all carried the Deere name before the D.

By 1925, the company realized the standard Model D did not meet customers' needs for industrial applications. Steel wheels were

not suitable for hard surfaces, and the gearing was too slow for safe road speeds. Solid rubber tires were added, and engineers fitted a 28 tooth sprocket to the final drive, giving a road speed of 4 mph (6.4 km/h). The company replaced the 465 cu in (7.62 l) 2-cylinder engine with a 501 cu in (8.21 l). In 1926, Deere advertised the model the "John Deere Industrial Tractor" with 40 × b inch rear wheels and 24 in × 3.5 in (610 mm × 89 mm) fronts with solid tires. This would become known as the DI. Options also included wheel weights.

On June 20, 1928, the model designation was changed from "C" to "GP". "GP" stands for General Purpose. This new model GP had the same horsepower, engine displacement, weight and 3-speed transmission as the model C. In 1930, the GP was updated with a 25-horsepower, 339-cubic-inch engine.

The John Deere model GP continued in production, and was built in five distinct versions through the course of its production.

Deere made their first unstyled row crop tractor in 1929 to compete with the Farmall. It was a modified GP tractor with adjustable rear wheels and a narrow front end. In 1933 Deere started experimenting with what would come to be known as the model A.

The A launched Deere into the row crop farming market. The A was by far the most popular two-cylinder tractor that Deere produced. The next year the model B was introduced. It was one third smaller than the A which made it ideal for smaller farms. A few years later, the Model G was introduced in 1937. It remained unstyled for several more years than the A and B. The Unstyled tractors launched Deere into the row crop farming market which they are still a major part of today.

After years of testing, John Deere released its first proper diesel tractor in 1949, the Model R. The R was also the first Deere tractor with a 'live' independent PTO equipped with its own clutch. The R also incorporated live hydraulics. PowrTrol, as it was known, provided the operator the ability to lift equipment by the pull of a lever. A pump powered by the PTO clutch provided 1800 PSI of hydraulic pressure to a lever controlled valve.

After making more than 1 ¼ million Two-cylinder tractors, John Deere switched to four- and six-cylinder engines. Announcement of the change came after seven years of development and forty million dollars in retooling.

During the 1970s, John Deere introduced 36 new models. 1972 was the year in which John Deere introduced Generation II. Generation II was characterized by the option of the Sound Guard body and cab which was to be the first truly successful integrated cab.

John Deere introduced at least 38 new tractors during the 1980s during a time when at least 3 other competitors merged, were sold or went out of business altogether.



Eight new tractors were introduced in 1991 starting with the three 5000 Series tractors. 1994 was one of those red letter years in tractor development for John Deere because that year brought about the most revolutionary row crop tractors the industry had seen up to then. The new 8000 Series tractors were introduced with state-of-the-art 21st Century features. 1996 saw 13 new tractors debuted at a big dealer meeting in New Mexico. First all of the 7000 Series tractors were replaced the five 7000 TEN Series tractors. 1998 John Deere had a 360 hp prototype 9300T track tractor. Early in 2001 the 5020 Series utility tractors was introduced. Since 1996 John Deere has been the only company to offer row crop tractors in both wheel and rubber tracks. Tractors got features like Independent Link Suspension and Active Seat to give the farmer a more comfortable and productive day in the field. At the Ohio meeting in 2007 the dealers saw four new nursery and greenhouse tractors.

From the 2008 model range on the *Engine horsepower* will now be advertised in metric (ISO) per the International Organization for Standardization 97/68/EC standard for determining bare engine horsepower at rated engine power in the Model name.

- The First digit will determine size,
- The next Three will determine engine horsepower,
- A new letter will be added (currently D, E, or M) to determine spec level.
 - R being a high spec machine (like the Premium series in the 6000 and 7000 series) the
 - M to denote a mid spec and

- E/D to denote a low-spec ("value spec") (like the 03 and 05 series in the 6000 and 5000 respectively).
- A sixth digit describes special configurations (like "T" for Tracks on the 8RT series tractors)

In 2008, the first Tractors to get this scheme were the 5D, 5E, 5E Limited edition and the 6D Series tractors. The company introduced two new 3E Series tractors. This pair is for house owners who want a tractor that could take on everyday jobs, some features are: diesel engine, Twin Touch pedals, hydrostatic transmission, standard 4WD, optional cruise control, power steering, a power take-off that is electronically engaged.

The new models are 2011 year tractors with several improvements. These would be the 8R/8RT Series tractors. One of the major changes with these nine green-and-yellow tractors was the new PowerTech PSX 548-cubic-inch dual turbocharged diesel. This is an Interim Tier 4 (IT4) diesel engine. On January 1, 2011 EPA Tier 4 regulations will begin thus the new PowerTech diesel in these tractors. Despite their competitors going with SCR to counter this John Deere will be using EGR-Exhaust Gas Recirculation. These new 8R tractors apart from the 2010 tractors John Deere put new wrap-around lights up front. Also the model number has been moved close to the front just off the black grill on both sides. Another characteristic is the new large black muffler on the right corner of the cab.

Other improvements engineered into these tractors are JDLink, ActiveCommand Steering (ACS), Infinitely Variable Transmission (IVT) AutoMode, GS3 CommandCenter and the StarFire 3000 Receiver.

РАЗДЕЛ III

ЗАДАНИЯ ДЛЯ КОНТРОЛЯ САМОСТОЯТЕЛЬНОЙ РАБОТЫ

Перед выполнением самостоятельной работы №1 рекомендуется проработать по грамматическому справочнику или учебнику английского языка следующий грамматический материал:

1. Имя существительное. Артикль (основные правила употребления);
2. Местоимения (личные, притяжательные, указательные, вопросительные, неопределённые, возвратные, отрицательные);
3. Структура простого предложения: повествовательного, вопросительного и повелительного;
- 4.оборот There is /There are;
5. Имя прилагательное. Степени сравнения;
6. Глагол. Основные формы глагола;
7. Инфинитив, его формы;
8. Причастие I, II;
9. Модальные глаголы и их эквиваленты;
10. Система времен английского глагола. Активный и пассивный залого;
11. Конструкции «сложное подлежащее» и «сложное дополнение»;
12. Словообразование. Аффиксация.

Перед выполнением самостоятельной работы №2 рекомендуется проработать по грамматическому справочнику или учебнику английского языка следующий грамматический материал:

1. Глагол. Основные формы глагола;
2. Инфинитив, его формы;
3. Причастие I;
4. Причастие II;
5. Модальные глаголы и их эквиваленты;
6. Система времен английского глагола.
7. Активный залог;
8. Пассивный (страдательный) залог;
9. Конструкция «сложное подлежащее»;
10. Конструкция «сложное дополнение».

САМОСТОЯТЕЛЬНАЯ РАБОТА №1

Вариант 1

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. She served ... cold meat and ... cheese.
2. ... meat we had for lunch last Sunday was very tough.
3. Where did ... student come from?
4. We have ... nice apartment in ... centre of St. Petersburg.
5. ... individual has every right to expect ... personal freedom.

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. It may be ... dictionaries.
2. ... composition is much more interesting than
3. ... is Sergeev? Is ... an engineer?
4. There is ... snow in the street.

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to attach, to include, to open, to work, to differ

Задание 4

Письменно поставьте 5 вопросов к предложению.

Ann plays volley-ball well.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

happy, comfortable, little, powerful, deep, bad

Задание 6

Составьте предложения с данными глаголами, употребив их в указанной временной форме.

to look for	Present Progressive
to leave	Past Simple
to wait for	Present Perfect

to send for
to write
to speak
to foresee
to research
to listen to

Present Simple
Past Progressive
Future Perfect
Past Perfect
Future Simple
Future Progressive

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. Vertical cylindrical vessels must be used for the mixing of liquids. 2. The workers can use this motor to drive compressors tomorrow. 3. We may carry out this process in different ways.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. She orders him to use my books. 2. I'd like you to come in time. 3. She saw him hurry to the bus stop. 4. We think him to be a good specialist. 5. The conference is reported to open on the 6th of June. 6. Tsiolkovsky is known to be one of the greatest minds of our century. 7. Large deposits of oil and gas are expected to be found in the north. 8. The man doesn't seem to be very happy.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. Karpinsky described the geological past of the European part of our country. 2. He has studied the past history of the earth. 3. The science of geology plays an important part in the discovery of coal deposits. 4. Man realized the heating quality of coal long ago. 5. Coal will yield large quantities of chemicals. 6. The students are studying the geological past of our district. 7. My brother visited us last week. 8. They will bring the magazines in a few days.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. Coal was used to set in motion mighty vessels and locomotives. 2. Crystals are grouped into six systems. 3. Minerals

have been divided into the rock-forming minerals and the ores. 4. Upward and downward movements of the land were recorded by modern history at various points. 5. All essential minerals have long been classified into groups by geologists. 6. This classification will be based on mineral composition. 7. Many guests were invited to my mother's party yesterday. 8. The doctor will be sent for immediately.

Задание 11

Перепишите и переведите следующий текст.

AGRICULTURAL MACHINERY AND IMPLEMENTS (I)

At the dawn of history we find man practicing the most elementary method of modifying soil conditions. He broke up the surface and prepared a seed-bed, using for this purpose the most primitive of all cultivating devices, a digging implement like a hoe. In early times the principal crops were cereals or pulse and a fibre crop — flax.

The greatest mechanical advance during these early days of agriculture was the evolution of the plough from the primitive hoe. The advent of the plough enabled man to supplement his labour by animal power and is one of the great landmarks of agricultural progress.

The plough is the most important tillage tool, and it has been brought to its present state of scientific perfection only after tireless experimentation.

During the Middle Ages the variety of implements had advanced but little, though the roller was known but was not employed generally in agriculture.

In the eighteenth century there was conscious and organized attempt to improve agricultural implements. New methods and inventions were being applied to most farming operations, and new conditions were being created favorable for the great advance which followed.

By the 19th century such a complexity of implements had been introduced as to justify the term "agricultural machinery". In agriculture, as in industry, the use first of water-power and then of steam had immensely stimulated the invention of machinery supplementing or replacing manual labour. A threshing-machine was invented late in the 18th century and was gradually coming into use early in the 19th. It was driven by water or wind, sometimes by horse labour, and later by steam.

Задание 12

Письменно ответьте на вопросы к тексту.

1. What elementary method of seed-bed preparation did man practice in the early days of agriculture? 2. What were the principal crops grown in early times? 3. What was one of the first great landmarks of agricultural progress? 4. What were the advantages of a plough compared with a hoe? 5. What were the improvements in agricultural implements during the eighteenth century? 6. When were a great number of various farm implements introduced into agriculture? 7. What had immensely stimulated the invention of farm machinery? 8. When was the threshing-machine invented? 9. What were the first threshing-machines driven by?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. Have you ever read the book entitled "The Picture of Dorian Grey" by Oscar Wilde? 2. The train leaving from platform 2 goes to Minsk. 3. Having lost the key, the boy couldn't get into the house. 4. Being translated into foreign languages, Tolstoy's books were read with great interest all over the world. 5. Having been asked about his life, he told us a lot of interesting things.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. To walk in the garden was very pleasant. 2. To be recognized gave her great joy. 3. I was sorry to have said it. 4. He pretended to be sleeping. 5. To have been opened in this town, new shops will be able to meet the demands for goods.

Вариант 2

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. I don't know much about ... life of ... Salvador Dali.
2. I've got ... appointment this afternoon.
3. I've got to go to ... doctor's.
4. We have seen what ... Earth looks like from ... Moon.
5. In many countries ... head of state is called ... President.

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. ... knowledge of the subject is not much superior to
2. There was ... water in the river, and they decided to cross it.
3. ... problem are you working at now?
4. ... likes to do everything

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to assess, to continue, to repair, to insist, to generate

Задание 4

Письменно поставьте 5 вопросов к предложению.

They worked at a large factory.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

Soon, interesting, fast, much, attentive, good

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to look at	Present Progressive
to take care of	Present Simple
to resist	Present Perfect
to go	Past Simple
to stay	Past Perfect
to hold	Future Simple
to find	Future Progressive
to include	Future Perfect
to press	Past Progressive

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. People can use heat, electricity and light for many purposes.
2. May chemists obtain coke by heating coal in special

forms of apparatus? 3. The workers must use this motor to drive compressors tomorrow.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. Ann is expected to complete her essay in a week. 2. The minister was supposed to visit a number of countries of Asia last week. 3. He was said to be working on some new problem. 4. The train was announced to be 20 minutes late. 5. The teacher asked me to prepare the report by Monday. 6. I'd like them to do it at once. 7. We noticed him speaking on the phone. 8. He saw him drawing the picture.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. In Alaska we can see at present the first process of coal formation. 2. Our coal industry must increase coal output. 3. Rivers can carry the mud to the sea. 4. We had to improve conventional methods of mining. 5. Aerial photography may play a very important part in prospecting virgin coal-fields. 6. The geological party will have to solve various problems. 7. By the beginning of the lecture the lab assistant had brought all the necessary diagrams. 8. I'll finish my diploma work in a month.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. The earth can be physically described as a ball of rock. 2. New mines must be put into operation this year. 3. An unexplored region could be photographed rapidly from the air. 4. Rocks can be divided into igneous and sedimentary deposits. 5. The soil had to be determined from an aerial photograph. 6. Attention will have to be directed by many countries to the considerable reserves of coal situated within 150 ft. or so of the surface. 7. In mechanics the study of kinematics is followed by the study of dynamics. 8. Gas may be viewed as the vapor of a liquid with very low boiling point or very great vapor pressure.

Задание 11

Перепишите и переведите следующий текст.

AGRICULTURAL MACHINERY AND IMPLEMENTS (II)

In still more recent times an important practical contribution to the mechanization of the farm came from the discovery of the internal-combustion engine. Used first of all to drive stationary machinery, as chaff-cutters, root-cutters and corn-mills in the barn, in the second decade of the 20th century the internal-combustion engine also made headway as a source of power for field operations. Steam engines, though widely used for traction on the road, suffered the disadvantage of being heavy for use on the land for the direct haulage of machinery and implements; and it was not until the internal-combustion engine had been perfected that agricultural tractors made their appearance.

But a still newer source of power on the farm is electricity. Although employed at first principally for lighting, electricity, when it is available at low cost relatively to other forms of power, is gradually coming into use on the farm.

Agricultural implements and machines are very numerous and very diversified and may be considered under five main groups, namely; 1) prime movers, i. e. engines of all kinds, tractors, etc.; 2) cultivating machinery, including ploughs of all kinds, harrows, rollers, cultivators, manure-distributors, drills, etc.; 3) harvesting machinery, including mowers, self-binders, threshing-machines, combines, elevators, potato-diggers, etc.; 4) stationary or barn machinery, including such food-preparing machines as chaff-cutters, grinding-mills, root-cutters, etc.; 5) dairy machinery, including milking-machines, separators, churns, sterilizing-machines, etc.

In addition there are a number of miscellaneous machines, including sprayers and sheep-shearing machines.

Задание 12

Письменно ответьте на вопросы к тексту.

1. What discovery contributed greatly to the further mechanization of farm work? 2. What was the internal-combustion engine first used for? 3. When did the internal-combustion engine come into use as a source of power for field operations? 4. What were steam engines widely used for? 5. Why were steam engines not used on the farm for haulage of farm implements? 6. When did agricultural tractors first make their appearance? 7. Name another source of power used on the farm. 8. What was electricity principally

employed for? 9. What is the newest and very important source of heat and power?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. When asked to do something, she always does it readily.
2. Being a light metal, aluminium is widely used for curing people.
3. Having graduated from the University, he decided to go to the Far East.
4. Having been shown the way he could find our house easily.
5. Being built in a new way modern houses have better facilities.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните их.

1. He is hard to please.
2. I'm sorry to have taken so much of your time.
3. A celebration such as this was a chance not to be missed.
4. He must have been very tired to come and fall asleep like that.
5. To be playing very softly, he didn't want to disturb anyone.

Вариант 3

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. I think ... red dress will suit you best.
2. ... watches have become very cheap and very attractive.
3. This is ... front room. ... ceiling and ... walls need decorating.
4. This is ... wonderful small computer.
5. My eldest son joined ... Navy and now my youngest wants to join ... Army.

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. Will you help ... to sort out the things?
2. I cannot tell which are ... and which are
3. The children had ... tea.
4. ... is absent today?.

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to move, to produce, to break, to cool, to depend

Задание 4

Письменно поставьте 5 вопросов к предложению.

My sister stayed at her friend's over the week-end.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

hot, hospitable, many, badly, long, handsome

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to look after	Present Perfect
to profit	Past Perfect
to refer to	Present Simple
to feel	Past Simple
to eat	Present Progressive
to drive	Past Progressive
to cut	Future Progressive
to sleep	Future Simple
to keep	Future Perfect

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. We must repair the broken parts of the car. 2. Geologists can find oxides of many elements in the earth's crust. 3. May I bring my sister to a party?

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. Oil is known to be lighter than water. 2. She was said to live in the north. 3. He is expected to be sent to the conference. 4. They are sure to be offered a good job. 5. We know him to be a good scientist. 6. You expect him to understand your words. 7. I heard the

boys playing football. 8. His mother watched them reading a funny story.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. They are repairing the clock now. 2. We must separate these impurities from the metal. 3. We could not distinguish the liquid alloy from a single one-substance liquid. 4. They will have to separate iron from sylph with a magnet. 5. They had to cast metals into varied shapes. 6. We measure the strength of a metal by means of tensile tests. 7. We expressed tensile strength in pounds per square inch. 8. The workers of our shop have used special machines to produce wire.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. Steel can be made soft enough for machining. 2. Many shapes had to be manufactured at a relatively high cost. 3. Different kinds of steel will have to be used for this purpose. 4. This mountain has never been climbed before. 5. They will cool the liquid in a crucible. 6. Those newspapers had been carefully put away. 7. The boy was saved from drowning by the quickness of the driver. 8. The letter was being written at 5 o'clock yesterday.

Задание 11

Перепишите и переведите следующий текст.

TRACTORS

Tractors occupy an important place on the farm as a source of power, and on many farms they, together with trucks or trailers, have entirely displaced horses for farm work. An advantage of tractor power over the horse is that the tractor can be used continuously for heavy work. In addition to pulling implements like ploughs and cultivators, a tractor may be used with implements for bush-clearing, ditch-filling, and land-leveling. Small tractors of from 1 to 10 horsepower, fitted with single- or twin-cylinder petrol engines, may be used for garden and orchard work.

Farm tractors may be divided into two groups: wheeled and track-laying. Wheeled tractors may be further subdivided into standard and row-crop types. Standard wheeled tractors are used for

general farm work and do not have the special features associated with row-crop tractors. Row-crop tractors can be used for all ordinary purposes, but in addition they are specially designed for working on root and other row crops.

Track-laying tractors, or crawlers, have the great advantage that they can be used for heavy loads on almost any class of land. They are considerably more economical in fuel than are wheel machines, but their greater initial cost and their maintenance particularly that of the tracks, may outweigh this advantage. The crawler is, however, the more efficient type of tractor and, moreover, can go on the land earlier after rain and so can work a greater number of days per year.

Задание 12

Письменно ответьте на вопросы к тексту.

1. What agricultural machines occupy an important place on the farm as a source of power? 2. What is the advantage of tractor power over horse power? 3. What farm jobs are horses used for? 4. Describe the use of a tractor on the farm. 5. Name some pulling implements. 6. What tractors are used for garden and orchard work? 7. What are the two main groups of farm tractors? 8. What respects does the design of wheeled and track tractors differ in? 9. Name the two chief types of wheeled tractors.

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. Foreign students studying in Russia can spend their holidays visiting different parts of our country. 2. He spoke of the vast research work carried on at the laboratory. 3. Having looked through a lot of journals and papers, he began to write his report. 4. Being built of wood the bridge could not carry heavy loads. 5. Having been translated into many languages Pushkin's books became known all over the world.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. She is pleasant to look at. 2. He must have forgotten about it. 3. It all sounds too good to be true. 4. He seems to be writing. 5. To have been protected against the foxes, the hens are kept in a field surrounded by wire netting.

Вариант 4

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. There are four oceans: ... Pacific Ocean, ... Arctic Ocean, ... Atlantic Ocean and ... Indian Ocean.
2. If you study ... history, you've got to read a lot.
3. Read ... first lesson, please.
4. Is there ... moon round ... planet Venus?
5. Do you know who killed ... President Lincoln?

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. She makes all ... clothes
2. There was a cold wind blowing so I put on ... heavy coat.
3. ... would like to retell the text?
4. Nick would like to say ... words about ... journey.

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to consider, to replace, to measure, to consume, to correspond

Задание 4

Письменно поставьте 5 вопросов к предложению.

Our teacher always speaks English in class.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

cold, big, talented, comfortable, much, little

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to look through	Present Progressive
to know	Present Simple
to hear	Past Simple

to sleep	Past Progressive
to let	Future Simple
to read	Future Progressive
to invest	Past Perfect
to teach	Present Perfect
to understand	Future Perfect

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. You must study hard to become an engineer.
2. One cannot translate such an article without a dictionary in the first year.
3. You may take this book from the library.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. She seems to be surprised at this news.
2. His wife was said to be very beautiful.
3. The region proved to be rich in oil and gas.
4. She was likely to return in a week.
5. I wanted you to go with me.
6. He expected us to take part in the conference.
7. The dean ordered him to complete the work in two weeks.
8. They saw him rewriting a report.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. We use various grades of copper for engineering purposes.
2. We use some metals in the native state.
3. Chemists can convert chemical energy into heat.
4. Ancient people have used bronze since the prehistoric times.
5. Metallurgists extract aluminum from rock with high alumina content.
6. A new gas field will supply natural gas to our town.
7. A marble pavilion protects the house.
8. Tom gave Nick a book for his birthday.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. The alloys of iron are widely used nowadays.
2. Different metals have been produced in different ways.
3. The specimen will

be placed upon the plate. 4. Steel is used for the structural parts of buildings, rails and ships. 5. Cutting tools were made of carbon steel. 6. A new machine is being tested at our shop. 7. Large piping networks are laid to distribute water, steam, gas, oil and other fluids. 8. The flowers are watered by them regularly.

Задание 11

Перепишите и переведите следующий текст.

Disk Tillers

These tools are designed for both tillage and seeding. They consist of a single gang of disk blades, 20 to 26 in. in diameter, on a common axle, all throwing the soil the same way. The common axle differentiates these tools from regular disk plows which have the disk blades tipped back, necessitating separate axles and bearings for each blade.

Disk tillers are made as small as two-blade models cutting 15 in. wide up to models cutting 20 ft wide. They are highly economical of power. Seeding boxes are available for some models, enabling seed-bed preparation and wheat seeding to be done in one operation.

The forces acting on a disk tiller are similar to those acting on a plow except that the resultant lengthwise soil force on the blades is usually upward, requiring extra weight for penetration.

Trail-type disk tillers usually permit the angle of attack of the disk gang to be adjusted from 40 to 55°. In hard high-draft soil, penetration can be improved and width of cut decreased by increasing the angle, while maximum width can be taken with less angle in loose easy-working soils. This adjustment is provided by changing the angle of the land wheel and the furrow wheels with respect to the disk gang.

Hitching principles are similar to those for mold-board plows. The centre of draft is at the centre disk blade slightly below the surface of the ground.

Disk tillers are necessarily built heavier than mold-board plows and wheel weights can be added for penetration in hard soil.

Задание 12

Письменно ответьте на вопросы к тексту.

1. What are disk tillers designed for? 2. How are these tools made? 3. They are highly economical of power, aren't they? 4. What are seeding boxes available for? 5. What do trail-type disk tillers usually permit the angle of attack of the disk gang? 6. How can

penetration be improved and width of cut decreased? 7. What is this adjustment provided by? 8. Hitching principles aren't similar to those for mold-board plows, are they? 9. Is the centre of draft at the centre disk blade slightly below the surface of the ground?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. The eastern coast of North America washed by the Atlantic Ocean stretches for hundreds of miles. 2. When offered to stay a few days longer, she accepted the offer. 3. Having left the school, John Reed went to Harvard University. 4. Being astonished at what I saw, I turned on the light. 5. The article having been translated, he could read some book for pleasure.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. The plan will be discussed at the meeting to be held on October 21. 2. He is clever enough to answer the question. 3. He seemed to have been writing all day. 4. It was nice to have seen you. 5. The doctor told me not to go out for a week.

Вариант 5

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. ... lives of ... poets and ... musicians have often been unbearably difficult.
2. I'm not interested in buying ... silver or ... gold.
3. I can never forget ... time I've spent in ... Paris.
4. ... exercise is good for ... body.
5. Could you pass me ... salt, please?

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. ... like ... bisquits and ... sweets.
2. ... does ... live?
3. ... building is smaller than ... one.
4. Ann invited ... friends to ... birthday party.

Задание 3

Образуйте от данных глаголов существительные, используйте их в предложениях.

to create, to punish, to pronounce, to cut, to build

Задание 4

Письменно поставьте 5 вопросов к предложению.

You lived in that house ten years ago.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, используйте их в предложениях.

Near, late, beautiful, good, many, possible

Задание 6

Составьте предложения с данными глаголами, используйте их в указанной временной форме.

to tell	Present Progressive
to put	Past Progressive
to show	Future Progressive
to meet	Future Perfect
to make	Past Perfect
to understand	Past Simple
to swim	Present Perfect
to insist	Present Simple
to produce	Future Simple

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. We must learn new words every week. 2. I can go for a walk in the evening. 3. You may be free today.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. We saw them jump with parachutes. 2. He heard a car approaching from the opposite direction. 3. In the room he could see a man sitting in an old chair. 4. He went back to the window and, looking through it, suddenly saw her walking down the park. 5. The

river is supposed to flow in this direction. 6. His childhood is said to have been very difficult. 7. You are expected to know these things. 8. He didn't seem to know you.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. Electronic devices have revolutionized life. 2. Our engineers have developed many new devices. 3. Mendeleev observed interesting regularities in the properties of elements. 4. We use boilers for many purposes. 5. We frequently cannot burn fuels completely.

6. The application of electronics is changing the entire life of people. 7. Our engineers will design and construct new thermal power stations. 8. We'll invite our friends to a concert.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. Human-like thinking is done by electronics. 2. A new phenomenon of electricity was discovered by Edison. 3. Tremendous hydro-potential will be seen by the delegates in Siberia. 4. Computers are used by engineers in all the branches of economy. 5. Considerable scientific and technical progress has been achieved by our people. 6. Large atomic power stations are being constructed by the engineers in the USSR, US, and UK. 7. The letter was received yesterday. 8. Moscow was founded by Yuri Dolgorukiy in 1147.

Задание 11

Перепишите и переведите следующий текст.

Green Crop Drier

Drying is the most common method of conserving green plants used as hay. The aim of drying is to obtain concentrated fodder which can be stored for long periods and which contain the maximum nourishment and available in the green material. There are two methods for drying of fodder, i.e. drying in barns and drying in special driers.

Hay drying by aeration consists of two stages. Fodder which has been cut by a mover is left in swaths, where it is cured until its moisture content drops to 35 to 40%. During the second stage the fodder is dried by aeration, that is the cured fodder is stacked in a

barn over a perforated floor to the height of 2 to 2,5 m. Air is delivered by a blower through the fodder. The fodder is dried to a moisture level of 18 to 22 %.

Hay can be dried in special driers at any time, irrespective of the weather. Depending upon the temperature of the drying mediums hay driers are subdivided into low temperature and high temperature driers. Low temperature driers include tray driers and conveyor driers (continuous driers) where the temperature of the drying medium does not exceed 150 °C. The time required for drying is 20 to 30 minutes on conveyor driers and 50 to 70 minutes on tray driers depending upon the initial moisture content of the fodder. In case of high temperature driers the drying temperature reaches to about 1000 °C. Drum driers and pneumatic driers fall under this category. The drying time varies from several seconds to 20 minutes.

Задание 12

Письменно ответьте на вопросы к тексту.

1. Is drying the most common method of conserving green plants? 2. What is the aim of drying? 3. How many methods for drying of fodder are there? 4. Name the stages of hay drying by aeration. 5. How is air delivered? 6. Where can hay be dried? 7. Hay driers are subdivided into low temperature and high temperature driers, aren't they? 8. Do low temperature driers include tray driers and conveyor driers? 9. How does the drying time vary?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. Woolen goods produced by this factory are of good quality. 2. When asked about the research work carried out at the laboratory, he said that it was of great scientific importance. 3. Having registered all the letters, the secretary sent them down to be posted. 4. Being exhausted by his work, he threw himself on the bed. 5. Having been asked by the teacher, he couldn't answer any questions.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. The house is to be built. 2. We don't want to go to the lecture. 3. He was very sorry to have missed so many lessons. 4. I hate to be made fun of. 5. We can't allow the work to be examined carelessly.

Вариант 6

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. ...books of ... Pushkin are not difficult to read.
2. ... mining of ... coal is very important for our industry.
3. This is ... milk.
4. He is ...best student in ... our group.
5. Could you pass me ...sugar, please?

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. Go and ask ... for ... more paper.
2. There is ... ink in the bowl.
3. ... read ... books on this subject.
4. ... flat was more comfortable than ... one.

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to create, to replace, to open, to tell, to signify

Задание 4

Письменно поставьте 5 вопросов к предложению.

Peter decided to go to a medical school last year.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

bad, little, large, short, successful, famous

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to work	Present Progressive
to live	Present Simple
to give	Past Simple
to snow	Past Progressive
to play	Future Simple
to plant	Future Progressive

to meet
to carry out
to translate

Past Perfect
Present Perfect
Future Perfect

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. We can consume great quantities of oxygen in the burning of coal and wood. 2. Chemists must study many of the complex substances. 3. After they finish their homework, the children may watch TV.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. He is known to go to work in Siberia. 2. They are expected to come back in two days. 3. Their group is said to work on a big farm. 4. All the processes on the farm are reported to be mechanized. 5. We expect them to do it in time. 6. They know these fertilizers to be applied regularly. 7. We saw them work on the construction site. 8. I want you to study better.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. They invited us to their son's party yesterday. 2. We will finish this work tomorrow. 3. My parents have sent him a parcel today. 4. A great number of people visited this exhibition last week. 5. Every year Russia sends scientific expeditions to the Antarctic continent. 6. We will bring the magazines in a few days. 7. When I looked into the classroom, he was cleaning it. 8. The workers of our shop are taking part in the meeting now.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. You will be shown a lot of nice things at the museum. 2. A few new schools are built in our town every year. 3. Some experiments have been made this week. 4. The conference was held on Saturday. 5. My pen is made of plastics. 6. She has been asked to

draw a picture. 7. A new student is being tested by our teacher now.
8. The letter was being written by Ann at 5 yesterday.

Задание 11

Перепишите и переведите следующий текст.

History of Agricultural and Forestry Machinery

The earliest efforts of people were to lift themselves from primitive cultures through better tools for tilling, better methods of using the land.

If we took a look of our agricultural past now, we should explain why farming as an industry hasn't reached a technological state as advanced as electronics and other industries.

Man required some 10,000 years to learn making bread. And, until the 19th century, man's tools for tilling the Earth remained mainly unchanged - the sharpened stick, the simple hoe, and the crude plow.

Had the farmers in those days known more about land they wouldn't have continued overworking the richer farmland, and depleting the soil's fertility. The more they overworked it, the fewer crops they got.

In the middle of the 18th century farmers tried a device to ease their lives. That was the moldboard plow which was designed to eliminate weeds by turning over a thick layer of earth.

It remained unchanged for the next century, although the steel plow was introduced in 1837. The cast-iron plow would poison the soil as some farmers thought.

But progress in the design of other farming implements and tools advanced steadily. In 1831 the reaper appeared. In 1839 came disk plows. The new plow, introduced in 1863, allowed the farmer to tide instead of walking behind it. The year 1869 saw the appearance of the mechanical corn planter, 1875 - the self-binding reaper.

The first combine was built in 1836 and commercial production of combines started in the 1880's.

Of greatest significance, however, was the development of mechanical power for farm work. The most far-reaching invention for agriculture was the gasoline engine mounted on a farm tractor. This combination appeared in the 20th century.

The first tests with combustion engine carried out by Nicolas August Otto date from 1861. In 1876 he succeeded in producing a four-stroke engine suited for practical application. It had the power of 3 h.p. at 180 revolutions per minute.

Задание 12

Письменно ответьте на вопросы к тексту.

1. What were the earliest efforts of people?
2. How long did man require learning making bread?
3. What were man's tools for tilling the Earth?
4. In the middle of the 18th century farmers tried a device to ease their lives, didn't they?
5. When was the steel plow introduced?
6. Progress in the design of other farming implements and tools advanced steadily, didn't it?
7. When did commercial production of combines start?
8. What was of greatest significance?
9. Who were the first tests with combustion engine carried out by?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. They have got the modern equipment ordered some months ago.
2. Being lighter than water, oil is usually found above water.
3. Having won the first match by only one point, the players realized that they must train much harder to win the championship.
4. Being told of his arrival, I went to see him.
5. Having been three times seriously wounded, he was no longer fit for active service.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. There is nothing to be done.
2. He came here to buy a car.
3. It was nice to have spoken to you.
4. I have never heard him boasting.
5. She doesn't seem to be watching TV now.

Вариант 7

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. ... my pen is not bad.
2. I've got ... flat. ... flat is on ... third floor.
3. ... page seven is clean.
4. ...Don is one of ... biggest rivers in ... Europe.
5. ... President Medvedev took part in ... conference.

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. There isn't ... news.
2. Put ... spices into the soup.
3. ... dress is nice.
4. ... knows the way to the railway station?

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to achieve, to repair, to absorb, to work, to operate

Задание 4

Письменно поставьте 5 вопросов к предложению.

My friend wrote an interesting article last month.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

tall, old, difficult, complete, good, bad

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to see	Present Perfect
to be	Past Perfect
to write	Present Simple
to sit	Past Simple
to go	Present Progressive
to watch	Past Progressive
to speak	Future Progressive
to wear	Future Simple
to study	Future Perfect

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. We must write only one exercise now. 2. She can speak English well. 3. Some students may take their exams in December.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните

эти конструкции.

1. We saw the students help the farmers. 2. She heard a tram approach from the opposite direction. 3. These plants are known to be widely used for feeding animals. 4. The farmers consider the crops grown in the region to be especially useful. 5. We know our Earth to revolve around the Sun. 6. New uses of plants are expected to be found in the nearest future. 7. Lomonosov and Rithman happened to work at the same time. 8. Some liquids proved to be good conductors of electricity.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. I had translated this article before he left. 2. He has finished writing the essay today. 3. The teacher is asking Alice now. 4. She was opening the window when we came in. 5. We use chalk for writing. 6. They saw her at the theatre yesterday. 7. They will offer us a good job. 8. His friends talked a lot about a trip.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. Chalk is used for writing. 2. Many ships have been manufactured at a relatively high cost. 3. He has been sent by his parents to the Black Sea. 4. My friend was told this news yesterday. 5. They will be spoken about. 6. He is being asked by the police. 7. The boy was being offered a good job. 8. The letter was being written at 5 o'clock yesterday.

Задание 11

Перепишите и переведите следующий текст.

Tillage Implements

As you know tillage is used to prepare the ground for seeding or planting, to retard weed growth and to improve the physical condition of soil. Tillage includes various operations: plowing (primary tillage), harrowing (secondary tillage), deep tillage, cultivation, fertilizing, etc.

Primary tillage, or plowing, may be done by various kinds of plows, such as two-way plows, disk plows, rotary plows, etc. The plows may be both tractor-mounted and tractor-drawn.

Tractor-drawn plows are attached to the tractor by an

adjustable hitch which permits horizontal adjustment of the plow and prevents "nosing" of plow points. The hitch incorporates a spring release or some other device which disconnects the plow when it strikes an obstacle. In some plows each bottom is held in working position by a heavy spring which permits the bottom to raise and pass over the obstacle. Tractor-drawn plows are provided with a lifting mechanism which raises them from or lowers them to their working position. The lifting mechanism may be either mechanical or hydraulic. There are also two levers — one for regulating the depth of plowing, the other for leveling the plow.

A tractor-mounted plow is a compact unit of high maneuverability which is adjusted by means of hydraulic controls. Due to hydraulic controls the tractor operator can quickly connect and disconnect the implements without leaving the cabin. Tractor-mounted plows, like tractor-drawn plows, have two levers — one is used for regulating the depth, the other — for leveling the plow.

Secondary tillage, or harrowing, is done to refine the ground after plowing. Depending on the physical condition of soil and other factors various kinds of harrows must be used, such as, disc harrow, spike-tooth harrow, spring-tooth harrow, etc.

It goes without saying that all types of harrows, like plows, are either tractor-mounted or tractor-drawn.

There are other implements intended for retarding weed growth, such as row-crop cultivators, field cultivators, spring-tooth weeders, etc.

Задание 12

Письменно ответьте на вопросы к тексту.

1. What is tillage used for? 2. What operations does tillage include? 3. What kinds of plows may primary tillage be done? 4. How are tractor-drawn plows attached to the tractor? 5. Tractor-drawn plows are provided with a lifting mechanism, aren't they? 6. Have tractor-mounted plows, like tractor-drawn plows, two levers? 7. What are these levers used for? 8. What is harrowing done for? 9. Name the kinds of harrows.

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. In the north, Europe is washed by the Barents and the White seas formed by the Arctic Ocean. 2. Trying to give the definition of the rule, he had to choose the words carefully. 3.

Having caught a bad cold, he had to miss a few lessons. 4. These machines will be sent to the plant being constructed in this region. 5. Having been advised by the doctor to go to the south, she decided to spend her leave in Sochi.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. I hesitated a little which book to choose. 2 I can't hear a word, though he seems to be speaking. 3. He is happy not to have failed you. 4. This patient must be operated on immediately. 5. I'd like you to meet Max.

Вариант 8

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. Take ... pencil.
2. ... Moscow is ... capital of ... Russia.
3. This is ... my room. ... ceiling and ... walls are white.
4. ...sun is shining brightly today.
5. Open ... your copy book, please.

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. There isn't ... life in that girl.
2. ... have ... work to do today.
3. ... report was excellent.
4. ... pencil is on the floor?

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to communicate, to replace, to build, to consume, to correspond

Задание 4

Письменно поставьте 5 вопросов к предложению.
They do a lot of exercises at home.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

cold, big, talented, comfortable, much, little

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to do	Present Progressive
to sow	Past Progressive
to help	Future Progressive
to discover	Future Perfect
to construct	Past Perfect
to leave	Past Simple
to get	Present Perfect
to learn	Present Simple
to cost	Future Simple

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. Geologists can find oxides of many elements in the earth's crust. 2. We must consume great quantities of oxygen in the burning of coal and wood. 3. We may use metals in the main parts of structures or machine tools.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. Everybody knows Lomonosov to be one of the greatest scientists of his time. 2. The scientists consider silver and copper to be the best conductors of electricity. 3. Our teacher wanted this report to be made in time. 4. We know Franklin to have invented the lightning rod. 5. Faraday is known to have measured the electric current for the first time in the world. 6. The new plant is reported to have gone into operation in our town. 7. This instrument is considered to be useful for different purposes. 8. He is expected to finish his school in two years.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. We will send for a doctor immediately. 2. People speak English in many countries of the world. 3. They have sent a scientific expedition to Antarctica this year. 4. Nobody saw her yesterday. 5. They will bring the books in two days. 6. She is translating his article now. 7. His parents have sent him to the South. 8. John was writing the letter at 5 yesterday.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. Many guests were invited to my mother's birthday party yesterday. 2. This work will be finished tomorrow. 3. The letter is being sent by him now. 4. Computers are used by engineers in solving many problems. 5. He has been greatly impressed by Russian people. 6. We were being shown a large atomic power station. 7. The fax was being received at 2 yesterday. 8. Bryansk was founded in 985.

Задание 11

Перепишите и переведите следующий текст.

Potato Planter

Potato-seed pieces are entirely different in character from other seeds, and the seed-selection mechanisms differ accordingly. Because of the irregularity of the size and shape of cut seed, conventional type is not successful. One type of selector arm has cam-actuated jaws which close to grasp a seed piece while passing up through the well and then release it into the boot on the opposite side. Another type of selector arm has cam-actuated picker points which are projected through the picker arm face as it passes up through the seed well, thus spearing a seed piece and carrying it over to the opposite side, where the points are withdrawn, allowing the seed to drop in the furrow made by the opener. Seed flows sideways from the hopper into the seed well, the rate being regulated by the operator.

Potatoes are planted deep, and a wide V-opener is required to open a deep enough furrow for the seed. Disk coverers without press wheels are most common.

Large amounts of fertilizer are often used with potatoes, and

to avoid damage the fertilizer should be placed in bands at each side and slightly below the seed. A pair of disks open furrows for the fertilizer bands. The seed opener then splits the soil between the bands, thus covering the fertilizer and preventing contact with the seed. Fertilizer hoppers have belt-type or horizontal plate feeds capable of applying up to 3,000 lb per acre.

Potato planters are made as two-wheel trail-type implements only, since the weight and bulk of the seed and fertilizer required make tractor mounting impractical. One- and two-row machines are available. An operator is required on the planter to see that the seed flows into the well properly, and he is also relied upon to lift and adjust the furrow opener and to actuated the feed clutch and in some cases the row maker.

Задание 12

Письменно ответьте на вопросы к тексту.

1. Are potato-seed pieces entirely different in character from other seeds? 2. Are potatoes planted deep? 3. Large amounts of fertilizer are often used with potatoes, aren't they? 4. What does a pair of disks do? 5. How are potato planters made? 6. What must an operator do on the planter? 7. What opener is required to open a deep enough furrow for the seed? 8. Why do the seed-selection mechanisms differ? 9. What must be done to avoid damaging of the fertilizer?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. If given a dictionary, he'll be able to understand that Italian text. 2. Discussing an interesting problem, they didn't notice when she came in. 3. Having read the letter twice, he understood that the matter needed immediate attention. 4. Being checked with great care, the report didn't contain any errors. 5. Having been well prepared for the interview, he could answer all the questions.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. They must have forgotten about the meeting. 2. There is much to be done. 3. Be sure to come. 4. He pretended to have been reading all day. 5. He wanted the arrangements to be completed early in the month.

Вариант 9

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. I have ... few nice books.
2. Close ... window, please.
3. What has he got on ... his table?
4. ...Volga is ... greatest Russian river.
5. ... United Kingdom of ... Great Britain and ... Northern Ireland consists of many islands.

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. Mr. Black gave ... wife a leather bag for ... birthday.
2. The next voice to speak up was not the Lieutenant's but ...
3. «...of the two of them is right? », he asked me.
4. The natives eat ... meat raw.

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to punish, to open, to mix, to teach, to differ

Задание 4

Письменно поставьте 5 вопросов к предложению.

My friend wrote an interesting article last month.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

high, new, attentive, powerful, many, badly

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to discuss	Present Progressive
to reconstruct	Past Simple
to pass	Present Perfect
to ask	Present Simple
to read	Past Progressive

to speak	Future Perfect
to see	Past Perfect
to drink	Future Simple
to listen to	Future Progressive

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. We can produce heat by means of chemical action. 2. Viscous liquids must be mixed by a multi-bladed agitator. 3. The workers may employ this machine.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. Glass is said to have been invented 2,000 years ago. 2. Coal is known to play an important part in the development of all branches of industry. 3. The students of our technical higher schools are known to have their industrial training in specially equipped laboratories, workshops and enterprises. 4. Coal is supposed to have been used by Romans. 5. I know him to be a good student. 6. I expect him to understand your problem and to help you solve it. 7. I heard the girl singing. 8. The teacher watched them writing a test.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. They have sent him to Moscow. 2. Our engineers are discussing a very important problem now. 3. We will do this work tomorrow. 4. They have already looked through these magazines. 5. We always listen to his stories with great interest. 6. They were talking about new methods of teaching. 7. Our engineers designed and constructed a new power station. 8. He'll invite my sister to a concert.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. The first days at the Institute can't be forgotten. 2. The students were being grouped by the dean. 3. English is spoken in

many countries of the world. 4. We will be shown a house made of modern materials. 5. The group of people going to the excursion was joined by young men. 6. This question is being answered now. 7. Many experiments had been made by him. 8. Our classroom has been cleaned today.

Задание 11

Перепишите и переведите следующий текст.

Tomorrow's Farm Machinery (I)

One of the problems confronting designers is how to reduce soil compaction. Experts estimate that a tractor passes over one and the same place in a field nearly 40 times in a season. This pulverizes the active top layer of soil and closely packs the layer below 20-30 cm. The increasing weight and power of tractors create a threat that in time the fertile layer may vanish altogether. As a way out the combining of agricultural operations is suggested. For instance, cultivator-seeder unit developed by Russian scientists on the basis of the LTZ-100 is universal cultivator-seeder tractor.

Another promising innovation is a unit which combines subsoiling with fertilizer application. At present, fertilizer is strewn about the field and then ploughed into the soil. The new unit cultivates the soil and applies fertilizer simultaneously. It operates together with the heavy K-701 tractor, fitted with huge rubber tyres and extra wheels to reduce soil compaction.

Ordinarily, mouldboard ploughs used with this powerful tractor have a maximum swath of just over three meters, but a new unit's swath is a little more than four and a half meters, which makes it considerably more productive.

As a rule, cultivation is now begun in the middle of the field and carried out in spirals. This is the most economical method of using the present-day implements. But even so a machine has to cover a good deal of ground without actually being in operation; besides, a mistake made in determining where the centre of the field is results, not infrequently, in uncultivated sectors.

Designers are now testing a reversible plough which enables the driver to start working at any end of a field. After completing a run in one direction it turns the machine about practically on its axis, reverses the plough and starts in the opposite direction.

All these are machines of the very near future. The Russian scientists are also looking farther ahead, however.

Задание 12

Письменно ответьте на вопросы к тексту.

1. What is one of the problems confronting designers? 2. What is a universal cultivator-seeder tractor? 3. At present, fertilizer is strewn about the field and then ploughed into the soil, isn't it? 4. What does the new unit do? 5. What is the heavy K-701 tractor fitted with? 6. What swath do mouldboard ploughs used with this powerful tractor have? 7. What is the most economical method of using the present-day implements? 8. A reversible plough enables the driver to start working at any end of a field, doesn't it? 9. Are all these machines of the very near future or of the past?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. When asked about the condition of her health, she said she was much better. 2. Looking at the map of the world, you can see that water occupies the greater part of the earth's surface. 3. Having worked together for two years, they had learned a lot about each other. 4. Having been written long ago, the manuscript was impossible to read. 5. Being built with great skill and care, the mansion has been used by the family for centuries.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. I've got a wife and a son to look after. 2. The question will be discussed at the conference shortly to open in Moscow. 3. I didn't come here to be shouted at. 4. He seems to be sleeping. 5. She was very glad to have met his mother.

Вариант 10

Задание 1

Вставьте артикли, где необходимо, подчеркните и объясните их употребление.

1. Have we ... picture in ... room?
2. Peter has got ... pen on ... desk.
3. Where is ... duster?
4. What have you got in ... bag?
5. It is ... old dress.

Задание 2

Заполните пропуски подходящими по смыслу местоимениями, подчеркните их и переведите предложения на русский язык.

1. ... building is much smaller than ... one.
2. ... is Peter? Is ... a lawyer?
3. Let's stay here ... longer: it is such a nice place.
4. Buy ... bread and cheese for ... picnic.

Задание 3

Образуйте от данных глаголов существительные, употребите их в предложениях.

to build, to improve, to write, to press, to resist

Задание 4

Письменно поставьте 5 вопросов к предложению.
These students usually get home at 5 in the afternoon.

Задание 5

Образуйте степени сравнения от данных прилагательных и наречий, употребите их в предложениях.

exact, real, correctly, difficult, much, good

Задание 6

Составьте предложения с данными глаголами, употребите их в указанной временной форме.

to fly	Present Progressive
to take part	Present Simple
to translate	Present Perfect
to become	Past Simple
to make	Past Perfect
to transmit	Future Simple
to do	Future Progressive
to forget	Future Perfect
to cut	Past Progressive

Задание 7

Перепишите следующие предложения в Past Simple, Future Simple, используя эквиваленты модальных глаголов, подчеркните сказуемое.

1. My friend can take part in the conference.
2. We must use electrical devices.
3. This article may be translated in written form.

Задание 8

Переведите, обращая внимание на конструкции «сложное подлежащее» и «сложное дополнение», подчеркните эти конструкции.

1. She is known to be a good lecturer. 2. The actress is said to be very beautiful. 3. She seemed to have a nice collection of china. 4. He was unlikely to know her address. 5. He knows her mother to be a kind woman. 6. I expected her to take part in the conference. 7. I felt a caterpillar crawling on my arm. 8. We saw them fishing.

Задание 9

Измените активную форму глагола на пассивную, подчеркните её.

1. The director sent for him when the delegation arrived. 2. They have spoken much about the film this week. 3. They will laugh at him. 4. He shows the way to the station to the stranger. 5. The trip to London impressed him greatly. 6. The students are writing tests now. 7. My brother was repairing his car at 3 last night. 8. Jack has met the delegation this morning.

Задание 10

Измените пассивную форму глагола на активную, подчеркните её.

1. My suit is made of leather. 2. A new house is being built in my street. 3. He will be shown a new map of the world. 4. New books were taken from the library yesterday. 5. The soil had been fertilized by the farmers. 6. The examination was being held in this classroom. 7. I have been asked to explain the grammar material to my colleagues. 8. The northern, western and southern boundaries of Europe are formed by seas and oceans.

Задание 11

Перепишите и переведите следующий текст.

Tomorrow's Farm Machinery (II)

Designers have been making tractors more powerful to increase the speed of ploughing. But even a giant tractor like the K-700 A increases the width of the cultivated swath only slightly. By developing more powerful tractors, machines of 500 hp, for instance, the swath can be widened to six meters – but what about the weight of such giant tractors?

With today's ploughs a tractor expands its power not only on

tilling but also on overcoming the resistance of the soil to the movement of the plough through it. After long search, designers have developed a ploughshare having a more active reaction with respect to the engine. When moving across a field a plough loosens the soil by pushing its working parts away from the layer of earth. A tractor wheel or crawler track pushing away from the soil impacts a forward motion to the tractor. By attaching a cultivating tool to the rim of a wheel or to the crawler tracks you get a reaction cultivator. At present this principle is being applied in a mounted implement. One after another the working parts bite into the soil, loosening it, and at the same time push away from it helping the tractor. Thus, soil resistance (the reaction of the layer) is diverted into the direction of the movement instead of in the opposite direction, as in conventional ploughing. This considerably reduces the expenditure of energy in ploughing.

The use of reaction cultivation components is a highly promising field. They make swath as much as 12 m wide. Despite the fact that they are propelled by light tractors with more powerful engines cultivation goes ahead faster. This unusual type of implement is still in its infancy. Scientists believe that in future a self-propelled plough will be developed.

Задание 12

Письменно ответьте на вопросы к тексту.

1. Why have designers been making tractors more powerful?
2. Does a giant tractor like the K-700 A increase or decrease the width of the cultivated swath?
3. What does a tractor expand its power with today's ploughs for?
4. Designers have developed a ploughshare having a more active reaction with respect to the engine, haven't they?
5. How can you get a reaction cultivator?
6. What considerably reduces the expenditure of energy in ploughing?
7. Cultivation goes ahead faster despite the fact that reaction cultivation components are propelled by light tractors with more powerful engines doesn't it?
8. Is this unusual type of implement in its infancy?
9. Do you think a self-propelled plough will be developed?

Задание 13

Переведите, обращая внимание на употребление причастий. Определите и подчеркните их форму.

1. The problem discussed at the meeting is of great interest.
2. He wrote an article describing his impressions of the trip.
3. Having finished the experiment the students left the laboratory.
- 4.

Being written in pencil, the letter was difficult to read. 5. Having been built of concrete, the house was always cold in winter.

Задание 14

Переведите, обращая внимание на формы и функции инфинитива, подчеркните инфинитив.

1. To read a lot is to know a lot. 2. He doesn't seem to be writing anything now. 3. There is nothing to be done. 4. The houses to be built here will be of the same type. 5. Who is to blame?

САМОСТОЯТЕЛЬНАЯ РАБОТА №2

Вариант 1

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. Mechanical power for farm work has given man the most efficient means for tilling.

2. Electric machines are operating well on this farm.

3. This new harvesting combine is used for harvesting and cultivation of vegetables.

4. The fertilize spreader was supplied to the farm in time.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. The plant producing tractors is very powerful.

2. When operating the milking machine, follow the instructions of the manufacturer.

3. Labour productivity was improved with the help of the modern machinery installed on our farm.

4. The voltage produced by the system was not enough to start the engine.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. The operator had to test the new equipment.

2. One must be careful with sharp tools.
3. Poor farmers of India cannot get farm machinery to mechanize their work.
4. You may use electric motors to dry grain.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Предназначен для перевозки людей, грузовик, автомобили специального назначения, рама, двигатель, тип шасси, бензовоз

V. Перепишите текст и переведите его письменно.

Classification of Automobiles and Tractors

The automobile (car or truck) is a self-propelled (motor) vehicle intended for transporting goods and/or people and for carrying out special tasks.

As to purpose, motor vehicles are divided into transport vehicles, special-purpose vehicles, and competition vehicles.

Transport vehicles are classed in several types:

- car-motor vehicles intended for carrying small groups of people (up to eight in number);
- buses - passenger service vehicles designed for carrying large groups of people (more than eight in number);
- trucks-motor vehicles intended for carrying various cargos.

According to cargo (load-carrying) capacity, trucks are in turn divided into the following classes: pick-up trucks (up to 0.5 t), light trucks (from 1 to 2 t), medium trucks (from 2 to 5 t), heavy trucks (from 5 to 15 t), and overweight trucks (more than 15 t).

Trucks used to carry loose and sticky goods are equipped with tipping bodies and are referred to as dump trucks.

Special-purpose vehicles, as their name implies, are intended for special work and are equipped accordingly. This group includes truck cranes, tank trucks, seed-filler trucks, etc. These are modifications of standard transport vehicle models.

Competition vehicles are cars specially designed for racing.

As to the type of chassis, motor vehicles may be either framed or frameless.

Framed vehicles have a support structure, called frame, to which all the component parts of the vehicle are attached.

Frameless (unit-construction) vehicles have no frame, and all their component parts are attached directly to the vehicle body. The body in this case is referred to as unitized.

As to the prime mover, automobiles may be powered by carburettor engines, diesel engines, or electric motors.

Carburettor engines operate mainly on gasoline (petrol), diesel engines run on diesel fuel, and electric motors are supplied from storage batteries. Accordingly, automobiles are divided into gasoline-powered, diesel-powered, and battery-powered types.

The tractor is a wheeled or tracked self-propelled vehicle used as a power means for moving agricultural, road-building, and other machines equipped with special tools, and also for towing trailers. The tractor engine can be used as a prime mover for active (moving) tools or stationary farm machinery through the intermediary of the power takeoff (PTO) shaft or belt pulley.

The uses of the tractor in agriculture are many, and so different types of tractor are needed to do different types of farm work.

VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. We consider the results of ploughing to be excellent.
2. Electricity is known to be introduced in many branches of agriculture.
3. The engine to be used on farm tractors is very powerful.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. There are several milking machines on the farm, ten of them being new.
2. Having built a number of tractor and harvester making plants our country increased its output of agricultural machinery.
3. Generator is a device converting mechanical energy from the engine into a flow of electric current.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. New types of machines are being used to improve soil fertility.
2. Soon agriculture will be mechanized with modern

machinery.

3. Regulator is used to regulate the generator output.

Вариант 2

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. The aggregate capacity of agricultural machinery is increasing year by year.

2. Our mechanical engineering has provided the agriculture with all necessary machinery.

3. This tractor was bought by the farm last year.

4. Modern equipment is used for seedbed preparation.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т.е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. Track-laying tractors used for very heavy work are also called crawlers.

2. Generators producing electricity can get their power from steam or water.

3. Supplying agriculture with high-quality machinery, we can greatly increase its economic efficiency.

4. While testing the engine, they put down the results.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. Agricultural machinery should be more mobile.

2. Mechanization must be implemented on a large scale in cattle-breeding.

3. But for machine harvesting tomatoes can ripen at different times.

4. Electric motors have to take care of all stationary work on the farm.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Двигатель внутреннего сгорания, топливо, зажигание,

поршень, 4-тактные двигатели, двигатели с водяным охлаждением, выхлопные газы

V. Перепишите текст и переведите его письменно.

Classification of Engines

Modern farm tractors and automobiles are powered by piston-type internal combustion engines. An internal combustion engine is one in which the thermal energy supplied by a burning fuel is directly transformed into mechanical energy by the controlled combustion of the fuel in an enclosed cylinder behind a piston. Such engines are classified according to the following basic features:

(a) by the method of mixing fuel and air: engines with external mixing - carburettor engines and gas engines; engines with internal mixing - diesel engines;

(b) by the method of ignition of air-fuel mixture: spark ignition engines-carburettor engines and gas engines; compression ignition (self-ignition) engines - diesel engines;

(c) by the number of piston strokes in one complete cycle of operations: four-stroke engines and two-stroke engines;

(d) by the kind of fuel used: gasoline (petrol) engines, gas engines, and diesel engines;

(e) by the cooling method: liquid-cooled engines and air-cooled engines;

(f) by the number of cylinders: single cylinder engines and multicylinder engines (double-cylinder, four-cylinder, six-cylinder, eight-cylinder, and twelve-cylinder engines);

(g) by the cylinder arrangement: single-row engines and double-row engines including V-type ones in which the two rows of cylinders are arranged at an angle to each other.

The engine takes oxygen to burn the fuel, therefore the latter is mixed with air. A mixture of atomized fuel and air in certain proportions by weight is called air-fuel mixture. The air-fuel mixture entering a cylinder of a running engine intermingles with unscavenged exhaust gases and thus forms what is known as the combustible charge.

Engines using a special device-carburettor-to mix fuel with air are referred to as carburettor engines. In such engines, the air-fuel mixture is ignited by a spark. In diesel engines, the air-fuel mixture forms inside the cylinder and is self-ignited by the heat of compressed air. Carburettor engines are used mainly on light and medium trucks and cars and also on tractors where they serve to start

the main engines. The main engines powering modern tractors and heavy trucks are of the diesel type.

VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. Scientists are considered to be working out new possible applications of this combine.

2. The capacity of this mobile station seems to range from 600 to 700 kilowatt.

3. The machine to be put into operation is quite new.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. Increasing mechanization on plant growing and livestock farms, we raise labour productivity.

2. For the experiment we need several electrical devices to be connected in series.

3. Many agricultural processes having been mechanized, the work of the farmers became much easier.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. The application of machinery for cultivation will be expanded.

2. Electric spreaders are being used to remove the manure from the barnyard.

3. The tractor has been used to plough heavy soil.

Вариант 3

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. The farm has finished the installation of a new automatic feeding system.

2. Scientists are working on the modification of known machinery.

3. A new tractor- and harvester-making plant was constructed in the town.

4. A milking machine is used for automatic milking of the cows.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. General purpose tractors used on most farms are of the most common type.

2. Unless tested the machine must not be put into operation.

3. Having a mighty pulling power, a tractor passes through any difficult ground.

4. Vaporizing-oil engines starting on petrol are similar to petrol engines.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. The plant must provide our farmers with the necessary equipment.

2. We can raise labour productivity by increasing mechanization on farms.

3. The new machine had to supply water to the cow-house.

4. For machine harvesting tomatoes should not ripen simultaneously.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Система зажигания, двигатель, выхлопной клапан, такт впуска, поршень, октановое число, сила тяжести, воздушно-топливная смесь

V. Перепишите текст и переведите его письменно.

The Fuel System

The fuel systems of diesel and carburettor engines differ in principle.

In the carburettor engine the combustible mixture of required composition is prepared from air and fuel in a special device -

carburettor - and is then delivered in desired amounts to the individual cylinders of the engine.

In tractor starting engines, fuel is fed by gravity from tank to carburettor through combination fuel filter and sediment trap.

In automobile carburettor engines, fuel is drawn from tank through combination fuel filter and sediment trap and a fuel line by pump which delivers it to carburettor. On the intake stroke, atmospheric air is drawn into the carburettor through air filter (cleaner) where it is cleaned of foreign matter. In the carburettor, the incoming air is mixed with finely atomized fuel and then passes into intake pipe (manifold). The preparation of the air-fuel mixture continues in the intake pipe where the fuel evaporates and mixes more intimately with the air. The process ends in the engine cylinders during the intake and compression strokes. After the combustible charge has burned, the burnt gases are expelled into the atmosphere through the exhaust pipe (manifold) and muffler.

The automobile carburettor engines operate mainly on gasoline (petrol). To obtain a satisfactory engine performance with reasonable fuel economy, the gasoline fuel must possess adequate volatility and knock resistance.

Combustion knock also is called detonation. Detonation is an extremely rapid, explosion-like combustion of the fuel in the engine cylinders. The engine must not be allowed to knock, for this condition is attended by heavy impact loads on the pistons, piston pins, and crank-shaft main and connecting rod bearings and leads to local overheating of the engine components, burning of pistons and valves, smoky exhaust, loss of engine power, and increased fuel consumption. The onset of detonation is related not only to the knock resistance of the fuel, but also to the engine speed and load conditions, carbon deposition on the pistons and the cylinder head, ignition timing, etc.

The knock resistance of gasoline fuels is evaluated in terms of their octane number, or rating. The octane number of a fuel is determined by comparing its knock resistance with the knock resistance of a blended reference fuel of known octane rating. The reference fuel is a mixture of two fuels: heptane and iso-octane. Heptane has a low knock resistance and its octane rating is arbitrarily taken to be zero. On the other hand, the knock resistance of iso-octane is high, and its octane rating is arbitrarily set at 100.

The octane number of a fuel is defined as the percentage by volume of iso-octane in such a mixture of iso-octane and heptane as is equal to the test fuel in knock resistance. The higher the octane rating

of a fuel, the higher its knock resistance.

VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. The new plant for processing agricultural production is expected to be built next year.

2. We consider electrical machines to have vast application on every farm.

3. Blinov is known to be an inventor of the first tracklayer tractor.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. Their farm has well-trained instructors teaching young men to operate the new harvester.

2. The new equipment having been installed, the plant could increase the output of agricultural implements.

3. Subjecting certain crystalline materials to pressure, Pierre Curie observed that they produced an electric charge.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. The new modification of the sugar-beet harvester is being installed on our farm.

2. The combine is usually operated by one man.

3. Milking of cows has been organized well on our farm.

Вариант 4

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. This machine is doing the job many times faster than a man can do it manually.

2. The electrician has repaired the milking machine and now it is in operation.

3. The development of agriculture is connected with the

development of mechanization

4. The cleaned grain was gathered in the bin of the combine and then taken away by lorries.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. Generator is a device converting mechanical energy into a flow of electric current.

2. Tractors found on many small holdings and gardens were two-wheeled.

3. One must be careful when working with sharp tools.

4. A unit measuring the current in amperes is called ammeter.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. The farmer can increase the output of his produce because his machinery is quite new.

2. The new motor had to remove barnyard manure.

3. One should not keep the batteries uncharged.

4. The farmer may easily operate this machine.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Система смазки, обеспечивать смазкой трущиеся поверхности, карбюраторный двигатель, жидкость, вязкость, примесь

V. Перепишите текст и переведите его письменно.

The Lubrication System

During operation, the movable engine components slide or roll over stationary ones. The rubbing surfaces of the engine components, despite their being machined to a high degree of finish, have irregularities or asperities. The surface irregularities of the working parts in rubbing contact interlock or cohere, so that the friction force opposing the relative motions of the parts is increased, thus reducing the engine power. Dry friction is attended by increased

heating and accelerated wear of the working parts. To reduce friction and, at the same time, cool the parts, a film of lubricating oil is introduced between the rubbing surfaces of the parts. The oil film keeps the surfaces apart, thereby providing a condition of fluid friction instead of dry friction. With fluid friction, there is no direct contact between the surfaces of parts in relative motion, hence friction losses in the film of oil are much smaller than those generated by dry friction, and wear of the parts is greatly reduced.

The purpose of the engine lubrication system is to supply oil continuously to the rubbing engine parts and remove heat from them.

The working parts of automotive engines are lubricated with high-quality engine oils. These oils must possess an optimum viscosity, high lubricity, or oiliness, good anticorrosive properties, and high stability. To improve the service properties of engine oils, they are treated with special additives.

According to the new engine oil classification system adopted in this country, engine oils are classed in six groups: A, Б, B, Г, Д, and E. The engines of farm tractors and automobiles use oils belonging to groups Б, B, and Г. Group Б oils are intended for light-duty engines, group B oils-for moderate-duty engines, and group Г oils-for severe-duty engines. Under this classification system, various grades of engine oil are designated by symbols including both letters and numerals, for example, M-8Б₁, M-10 Г₂. In these symbols of grades, the letter M means engine oil, the numerals 8 and 10 indicate the kinematic viscosity of the oils at 100°C in mm²/s, the letters Б and Г denote the classification groups the oils belong to, the subscript 1 shows that the oil is intended for use in carburettor engines, and the subscript 2, in diesel engines.

Viscosity is a very important characteristic of engine oils, for it determines their ability to flow. An oil with excessively high viscosity is very thick, and it is difficult for it to penetrate the clearances between the rubbing engine parts, while an oil with too low viscosity flows easily and does not stay in the clearances. In both cases, wear on the rubbing surfaces of the working parts is intensified and the engine power is reduced. Oil gets thicker as it becomes colder. Therefore, oils with a viscosity of 10mm²/s are usually used in summer and those 8 mm²/s in viscosity, in winter. It is essential that the oil used should strictly comply with the particular engine specifications and the season.

The reliable operation of engines largely depends on the purity of the engine oils used. The oils must be free from mechanical impurities and water. These contaminants get into the

oils mainly during shipment, reception, dispensing, and storage. Crankcase oils are especially prone to contamination with mechanical impurities where the engines are run in conditions of the ambient air heavily laden with dust. Therefore, when handling engine oils every measure must be taken to prevent their being contaminated with mechanical impurities and water.

VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. The new harrow is reported to have been put into mass production.
2. The new model of a potato digger to be tested next month was necessary for farm workers.
3. We consider the tractor driver operating this very complex machine to be highly skilled.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. The stream of electrons moving along the conductor is called an electric current.
2. Working with machines, sharp tools, motors one must be careful.
3. The mixture being burnt, the useless gases must be removed or exhausted from the cylinder.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. The labour productivity of farmers has been increased by means of mechanization.
2. The yield of milk is measured by means of a recording meter.
3. The new electric motor is being installed in the cow-house.

Вариант 5

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-

временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. The farm workers have completed the automatic shearing of the sheep.

2. Scientists are trying to improve agricultural machinery.

3. Harvesting was mechanized all round.

4. Petrol lubrication is used in small two-stroke engines.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. The type of tractor used on the land depends on the type of work that is done.

2. The plant producing electricity is very powerful.

3. Being a qualified technician, he kept the farm equipment in proper operating condition.

4. When handling a battery, keep it away from your clothes.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. If the tractor has to stand out at temperatures below zero it is necessary to prevent the water in the cooling system from freezing.

2. This equipment should produce packages for milk with the highest accuracy.

3. You must be attentive when operating the bulldozer.

4. Powerful tractors can widen the swath to six metres.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Система охлаждения, расход топлива, удаление избыточного тепла, поршень, головка цилиндра, износ частей двигателя, клапан

V. Перепишите текст и переведите его письменно.

Cooling System Classification

The temperature of gases in the cylinders of a running engine averages around 1000°C. During engine operation, the gases heat the walls of the cylinders, pistons, and cylinder head. If the engine had not been cooled properly, the film of lubricating oil between the

rubbing components of the engine would have been burnt off, resulting in undue wearing of the components, possible seizure of the pistons because of their excessive expansion, and other troubles.

An excessive heat removal from the engine (engine overcooling) reduces the engine power and increases the consumption of fuel, because of poor air-fuel mixing conditions and increased friction losses due to poor lubricating properties of oil at low temperatures. Excessively low operating temperatures cause incomplete burning of the heavier fuel fractions, resulting in heavy carbon deposits accumulating on the combustion chamber walls, pistons, and valve heads, with ensuring seizure of the piston rings and valves.

Thus, the overcooling of the engine is as undesirable as its overheating. For a water-cooled engine to operate normally, the temperature of the cooling water must be in the range 80 to 95°C.

The cooling system serves to remove heat from the hot engine components and maintain normal temperature conditions of the running engine. The withdrawal of the excess heat in internal combustion engines is effected through their forced cooling by some liquid (liquid cooling) or the ambient air (air cooling).

Engines with a liquid cooling system are the more common. The cooling medium, or coolant, in them is either water or some low-freezing liquid, called antifreeze. The system includes water jacket for cooling the cylinder block and head, radiator, water pump, and fan, and also auxiliaries: coolant distribution manifold, thermostat, connecting hoses, drain cocks, and coolant temperature gauge (thermometer).

In diesel engines using an auxiliary internal combustion engine for starting purposes, the starting engine, as it runs prior to cranking the main engine, is cooled by natural convection. The cooling water flows, as a result of temperature difference, from the cylinder jacket to the cylinder head jacket of the starting engine and then to the cylinder head jacket of the main engine, where it gives off its heat to the cylinder head, and then flows back to the cylinder jacket of the starting engine. The natural circulation of the water by convection is known as thermo-siphon cooling.

When the main engine is running, the cooling water is forced to circulate through the cooling system by centrifugal water pump. The pump draws water from the radiator lower tank, termed the collector tank, and forces it under pressure into cylinder block jacket where it cools the walls of the cylinder. The water then passes upwards through holes and ducts into the cylinder head jacket. The

ducts direct vigorous flows of water around the exhaust guides and seats that are subjected to the most severe heating and also around the brass injector tubes, or sleeves, to protect the fuel-injection nozzles against overheating and prevent their spray holes being clogged with carbon. While the engine is cold, the water leaving the cylinder head is directed by the thermostat to the inlet side of the water pump, so that it flows by-passing the radiator (along the minor coolant circuit), but after the engine has warmed up, the thermostat directs the water to the upper, or header, tank of the radiator (along the major coolant circuit). As the water flows through the numerous tubes between the header and collector tanks of radiator, it is cooled by the air that is induced to flow between the tubes by cooling fan. The water leaving the collector tank is again forced by the water pump into the engine jacket.

Thanks to the relatively high rate of coolant flow maintained in the cooling system, the difference in coolant temperature between the outlet and inlet of the engine jacket is not very high (4 to 7°C), which is beneficial for a more uniform cooling of the engine.

VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. The device is known to operate well in field conditions.
2. The crawler to be used for ploughing is very powerful.
3. This electric motor is supposed to fulfil all stationary work on our farm.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. This high-quality machinery being installed on the farm, the farmer could increase the output.
2. Vaporising-oil engines starting on petrol are similar to petrol engines.
3. Handling sharp tools, one must be careful.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. Agricultural machines are widely used in cattle-breeding.

2. Our farm has been fully mechanized to increase its output.
3. Several machines are being repaired in our shop.

Вариант 6

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. This machine is doing the job many times faster than a man can do it manually.
2. The electrician has repaired the milking machine and now it is in operation.
3. The development of agriculture is connected with the development of mechanization
4. The cleaned grain was gathered in the bin of the combine and then taken away by lorries.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. The type of tractor used on the land depends on the type of work that is done.
2. The plant producing electricity is very powerful.
3. Being a qualified technician, he kept the farm equipment in proper operating condition.
4. When handling a battery, keep it away from your clothes.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. Agricultural machinery should be more mobile.
2. Mechanization must be implemented on a large scale in cattle-breeding.
3. But for machine harvesting tomatoes can ripen at different times.
4. Electric motors have to take care of all stationary work on die farm.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Двигатель внутреннего сгорания (ДВС), топливо, лошадиная сила, зажигание, головка цилиндров, выхлопные газы, форсунка

V. Перепишите текст и переведите его письменно.

Types and functions of engines and motors

The term engine usually refers to petrol engines, diesel engines and jet engines (or jets). In engineering, motor usually means electric motor - but in general language, 'motor' can also refer to petrol and diesel engines. Engines and motors power (or drive) machines by generating rotary motion - for example, to drive wheels. In jet engines, compressors and turbines rotate to generate thrust - pushing force, produced by forcing air from the back of the engine at high velocity.

As an engine produces a couple - rotary force - the moving parts of the machine it is driving will produce resistance, due to friction and other forces. As a result, torque (twisting force) is exerted on the output shaft of the engine. Torque - calculated as a turning moment, in newton metres - is therefore a measure of how much rotational force an engine can exert. The rate at which an engine can work to exert torque is the power of the engine, measured in watts. Although engineers normally calculate engine power in watts, the power of vehicle engines is often given in brake horsepower (bhp). This is the power of an engine's output shaft measured in horsepower (hp) - a historic measurement of power.

BrE: petrol; AmE: gasoline

BrE: petrol engine; AmE: gasoline engine

Internal combustion engines

Petrol and diesel engines are internal combustion engines. This means they are driven by the combustion (burning) of fuel in enclosed, sealed spaces called combustion chambers. In petrol and diesel engines, the combustion chambers are cylinders surrounded by a cylinder block and closed at the top by a cylinder head. Each cylinder contains a piston. The number of piston cylinders in an engine varies - engines in small motorcycles have only one, while sports car engines may have twelve.

Fuel is supplied to each cylinder from a tank. In most engines, the flow of fuel is generated by a pump, which forces it - at high pressure - through fuel injectors. These vaporize the fuel, allowing it to mix with air. Using this mixture (of fuel and air), most

engines function as four-stroke engines. This means they work on a cycle of four stages - or four strokes. A stroke is an upward or downward movement of a piston.

The cycle of four-stroke petrol engine

1. Induction or intake

The intake valve opens. The mixture enters the cylinder through a port (opening) in the cylinder head while the piston moves downwards.

2. Compression

The intake valve closes. The piston moves upwards, compressing the mixture.

3. Power or ignition

The spark plug produces a spark, which ignites (lights) the mixture. On ignition, the mixture explodes, generating a sudden pressure which forces the piston down.

4. Exhaust

The exhaust valve opens, and the piston moves upwards, forcing the exhaust gases – those produced during combustion – out of the cylinder via the exhaust port. The exhaust valve then closes and the cycle begins again.

VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. The device is known to operate well in field conditions.

2. The crawler to be used for ploughing is very powerful.

3. This electric motor is supposed to fulfil all stationary work on our farm.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. This high-quality machinery being installed on the farm, the farmer could increase the output.

2. Vaporizing-oil engines starting on petrol are similar to petrol engines.

3. Handling sharp tools, one must be careful.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод

простых, продолженных и сложных времен глагола в страдательном залоге.

1. The labour productivity of farmers has been increased by means of mechanization.
2. The yield of milk is measured by means of a recording meter.
3. The new electric motor is being installed in the cow-house.

Вариант 7

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. The farm workers have completed the automatic shearing of the sheep.
2. Scientists are trying to improve agricultural machinery.
3. Harvesting was mechanized all round.
4. Petrol lubrication is used in small two-stroke engines.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. The plant producing tractors is very powerful.
2. When operating the milking machine, follow the instructions of the manufacturer.
3. Labour productivity was improved with the help of the modern machinery installed on our farm.
4. The voltage produced by the system was not enough to start the engine.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. The farmer can increase the output of his produce because his machinery is quite new.
2. The new motor had to remove barnyard manure.
3. One should not keep the batteries uncharged.
4. The farmer may easily operate this machine.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

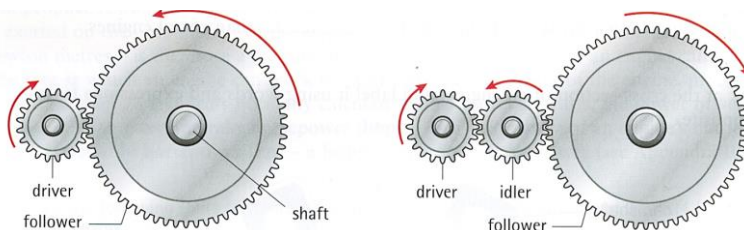
Промежуточная шестерня, зубья, ведущее колесо, привод, ведомая шестерня, карданный вал, зубчатая передача

V. Перепишите текст и переведите его письменно.

Gears

Gear wheels, or gears, are wheels with teeth (or cogs). The teeth interlock (fit together) with those of other gear wheels. When one gear wheel revolves, the other revolves with it - in the opposite direction - as their teeth mesh together. Gears are normally fitted to shafts. They transmit rotary motion from one shaft to another - that is, they transmit drive. Drive, usually supplied by an engine or motor, causes a shaft to revolve. A shaft connected directly to an engine or motor is called a driveshaft - or an input shaft. A gear wheel on a driveshaft is called a driver. The second gear wheel, which meshes with the driver is called a follower - the driver drives the follower.

An assembly of several shafts and gear wheels is called a gear train or transmission system. It begins with an input shaft and ends with an output shaft. The system may contain idler gears (or idlers). These change the direction of a follower.



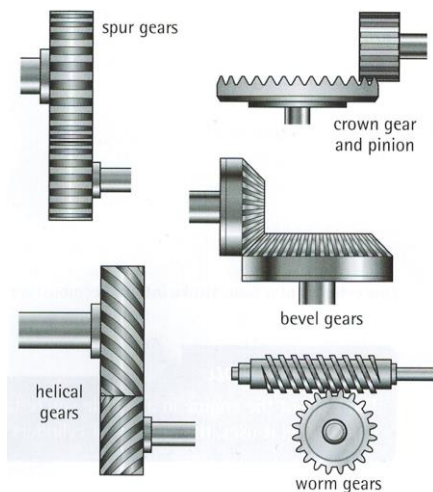
Gears can provide a mechanical advantage by using different gear ratios. In the diagrams above, the driver has 20 teeth and the follower has 60 teeth. Therefore the driver rotates three times to make the follower rotate once. So the gear ratio is 3:1 (three to one). This means that if, for example, the input speed - that is, the speed of the driver - is 3,000 rpm, the output speed (of the follower) will be 1,000 rpm.

In some machines, a gearbox is used to provide a number of different gear ratios. A gearbox has a gear selection system, which allows gears to be changed (or shifted) while the transmission is

running. This may be a manual gearbox, where gears are changed by a person, or an automatic gearbox, which automatically selects a higher gear or lower gear, as needed.

Types of gear wheel

- Spur gears are the simplest gears. The teeth run straight across the wheel.
- Helical gears have curved teeth, so that they mesh together more smoothly.
- Bevel gears allow drive to be transmitted through an angle - often 90°.
- Crown gears transmit drive through 90°, often to a small gear called a pinion.
- Worm gears transmit drive through an angle. They also allow a low output speed relative to the input speed of the worm. They can provide a 'one way' drive, as a worm can drive a gear but a gear cannot drive a worm (the mechanism will lock).



VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. Scientists are considered to be working out new possible applications of this combine.

2. The capacity of this mobile station seems to range from 600 to 700 kilowatt.
3. The machine to be put into operation is quite new.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. The stream of electrons moving along the conductor is called an electric current.
2. Working with machines, sharp tools and motors one must be careful.
3. The mixture being burnt, the useless gases must be removed or exhausted from the cylinder.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. The application of machinery for cultivation will be expanded.
2. Electric spreaders are being used to remove the manure from the barnyard.
3. The tractor has been used to plough heavy soil.

Вариант 8

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. The farm has finished the installation of a new automatic feeding system.
2. Scientists are working on the modification of known machinery.
3. A new tractor- and harvester-making plant was constructed in the town.
4. A milking machine is used for automatic milking of the cows.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на

русский язык.

1. Generator is a device converting mechanical energy into a flow of electric current.

2. Tractors found on many small holdings and gardens were two-wheeled.

3. One must be careful when working with sharp tools.

4. A unit measuring the current in amperes is called ammeter.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. If the tractor has to stand out at temperatures below zero it is necessary to prevent the water in the cooling system from freezing.

2. This equipment should produce packages for milk with the highest accuracy.

3. You must be attentive when operating the bulldozer.

4. Powerful tractors can widen the swath to six metres.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Звездочка, шкив, возвратно-поступательное движение, распределительный вал, коленчатый вал, поршень, шатун

V. Перепишите текст и переведите его письменно.

Chains, sprockets and pulleys

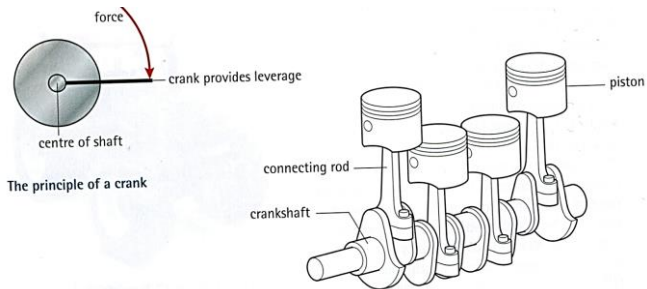
Drive can be transmitted from one shaft to another, across a distance, by roller chains (or chains). Chains drive, or are driven by, toothed wheels called sprockets. Pairs of sprockets with different numbers of teeth can provide different gear ratios. A bicycle is an example of a machine with chain drive.

Belt drive works in a similar way to chain drive. Belts are usually smooth and are fitted around smooth pulley wheels (or sheaves). However, toothed belts and toothed pulley wheels can be used in applications where a smooth belt could slip. A combination of several pulleys can give a mechanical advantage - for example, in cranes to lift heavy loads. In this case, cables - also called wire ropes - are used instead of belts.

Conversion between reciprocating and rotary motion

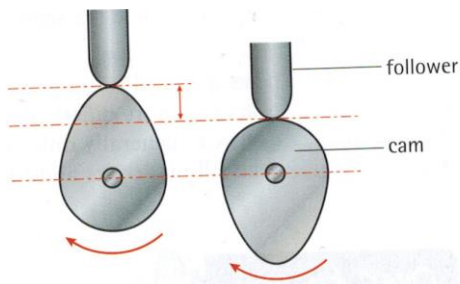
The reciprocating linear motion of pistons is converted to

rotary motion by connecting rods (or conrods) and a crankshaft. The shape of the crankshaft allows the connecting rods to exert force at a distance from its centre. This increases the turning moment they generate. Bicycle pedals are an example of a simple crank.



In an engine, a heavy wheel - called a flywheel - is fitted to the end of the crankshaft. This provides momentum, giving the pistons more constant motion.

As well as driving a machine or vehicle, the motion of an engine's crankshaft is used to open and close the valves in the cylinder head. Rotary motion is transmitted, often via a toothed belt or chain, to the camshaft at the top of the engine. The cams fixed on camshaft cause followers - which are connected to the valves - to move up and down as the cam revolves. As they move, they open and close the valves.



VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. We consider the results of ploughing to be excellent.
2. Electricity is known to be introduced in many branches of agriculture.

3. The engine to be used on farm tractors is very powerful.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. Increasing mechanization on plant growing and livestock farms, we raise labour productivity.

2. For the experiment we need several electrical devices to be connected in series.

3. Many agricultural processes having been mechanized, the work of the farmers became much easier.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. Agricultural machines are widely used in cattle-breeding.

2. Our farm has been fully mechanized to increase its output.

3. Several machines are being repaired in our shop.

Вариант 9

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. The aggregate capacity of agricultural machinery is increasing year by year.

2. Our mechanical engineering has provided the agriculture with all necessary machinery.

3. This tractor was bought by the farm last year.

4. Modern equipment is used for seedbed preparation.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. General purpose tractors used on most farms are of the most common type.

2. Unless tested the machine must not be put into operation.

3. Having a mighty pulling power, a tractor passes through any difficult ground.

4. Vaporizing-oil engines starting on petrol are similar to petrol engines.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. The farmer can increase the output of his produce because his machinery is quite new.

2. The new motor had to remove barnyard manure.

3. One should not keep the batteries uncharged.

4. The farmer may easily operate this machine.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

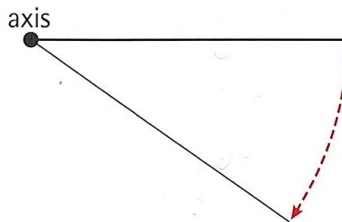
Ключ, возвратно-поступательное движение, обороты двигателя, тахометр, угловая скорость, центробежная сила, динамическое трение

V. Перепишите текст и переведите его письменно.

Angular motion axis

If a spanner is used to tighten a bolt, one end remains in the same position on the bolt, while the other end turns. This type of motion, where one end of a component pivots while the other end follows the arc of a circle, is called angular motion. An example is a flap on an aircraft wing, which can be moved to different positions. The point at the centre of angular motion is called the axis of rotation (or axis). We say that the motion occurs about the axis (around it).

The speed of angular motion is measured as angular velocity, and increases in angular velocity are measured as angular acceleration.



Angular motion

Rotary and reciprocating motion

When angular motion is through 360 degrees, it is called a revolution (or rotation). When moving parts of machines, such as wheels, turn through complete revolutions - once, several times, or for continuous periods - we say they revolve (or rotate). The rotational velocity of revolving parts, or rotating parts, is measured in revolutions per minute (rpm) - often called revs per minute. The motion of revolving parts is called rotary motion.

Rotary motion generates centrifugal force - that is, force which pushes outwards, away from the axis of rotation. An increase in rotational velocity results in a higher centrifugal force.

Some components move backwards and forwards. This type of motion is called reciprocating motion (or reciprocating action) the component reciprocates. In machines, reciprocating motion is often converted (changed) to rotary motion. An example is a piston.

Engine revs

The abbreviation for revolution - rev - is widely used to talk about engines. For example:

- The rotational velocity of an engine is measured by a rev counter.
- High and low engine speeds are described as high revs and low revs.
- Maximum engine speed can be controlled by a rev limiter.
- If an engine's rev limit is exceeded, we say the engine is over-revved.
- An engine designed to run at high speed is a high-revving engine.
- When engine speed is increased momentarily, we say the engine is revved (or revved up). - We can say an engine is revved to a certain speed - for example, revved to 6,000 rpm.



A rev counter

Friction

Moving parts cause friction. Friction is the force of resistance when two surfaces slide against each other. Frictional resistance is measured as the coefficient of friction. This is the force required to overcome friction in order to allow an object made of a specific material to slide along the surface of another specific material.

There are two types of friction. Static friction - sometimes called stiction - is the frictional resistance between two surfaces that are at rest (not moving). It measures the force needed to start a sliding action. Dynamic friction is the friction between two surfaces that are already sliding against each other. It measures the force needed to keep a sliding action going. More force is needed to overcome static friction than to overcome dynamic friction.

VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. The device is known to operate well in field conditions.
2. The crawler to be used for plugging is very powerful.
3. This electric motor is supposed to fulfill all stationary work on our farm.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. There are several milking machines on the farm, ten of them being new.
2. Having built a number of tractor and harvester making plants our country increased its output of agricultural machinery.
3. Generator is a device converting mechanical energy from the engine into a flow of electric current.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. New types of machines are being used to improve soil fertility.
2. Soon agriculture will be mechanized with modern machinery.

3. Regulator is used to regulate the generator output.

Вариант 10

I. Перепишите следующие предложения, подчеркните в каждом из них глагол-сказуемое и определите его видо-временную форму и залог. Переведите предложения на русский язык, обратите внимание на перевод пассивных конструкций.

1. Mechanical power for farm work has given man the most efficient means for tilling.

2. Electric machines are operating well on this farm.

3. This new harvesting combine is used for harvesting and cultivation of vegetables.

4. The fertilize spreader was supplied to the farm in time.

II. Перепишите следующие предложения, подчеркните Participle I и Participle II и установите функции каждого из них, т. е. укажите, является ли оно определением, обстоятельством или частью глагола-сказуемого. Переведите предложения на русский язык.

1. Track-laying tractors used for very heavy work are also called crawlers.

2. Generators producing electricity can get their power from steam or water.

3. Supplying agriculture with high-quality machinery, we can greatly increase its economic efficiency.

4. While testing the engine, they put down the results.

III. Перепишите следующие предложения, подчеркните в каждом из них модальный глагол или его эквивалент. Переведите предложения на русский язык.

1. The plant must provide our farmers with the necessary equipment.

2. We can raise labour productivity by increasing mechanization on farms.

3. The new machine had to supply water to the cow-house.

4. For machine harvesting tomatoes should not ripen simultaneously.

IV. Выпишите из текста эквиваленты к словам и словосочетаниям:

Ускорение, замедление, рычаг, крутящий момент, скорость, сила тяжести, гаечный ключ

V. Перепишите текст и переведите его письменно.

Acceleration and motion

If an object is at rest (not moving) and is free to move (not fixed), an external force - a force from outside - will make the object accelerate. This means the velocity of the object (the speed of its movement in a given direction) will increase. Velocity is measured in metres per second (m/s). If acceleration is constant - that is, if the rate of acceleration remains the same - it is measured as the increase in velocity (in metres per second) that is achieved each second. The unit of acceleration is therefore metres per second per second - stated as metres per second squared (m/s²).

If an object is in motion (moving) and is subjected to an opposing force - that is, one acting on it in the opposite direction - the object will decelerate. As with acceleration, deceleration is measured in m/s². If something moves in a straight line, we say its movement is linear - a car accelerating and driving along a straight road is an example of linear acceleration and linear motion.

On earth, acceleration due to gravity is roughly 10 m/s². In other words, if an object is dropped and left to free fall, its velocity will increase by 10 m/s every second (not allowing for air resistance). Acceleration and deceleration, such as that generated -by aircraft and cars, can be compared with acceleration due to gravity. This relative measure is called G-force (G stands for gravity). An acceleration of 10 m/s² is measured as 1 G, 20 m/s² as 2 G (or 2 Gs), and so on.

Inertia

The greater the mass of an object, the greater the external force required to cause it to accelerate or decelerate. Resistance to acceleration or deceleration, due to the mass of an object, is called inertia. When an object is in motion, its resistance to deceleration, due to inertia, is often called momentum.

Simple machines

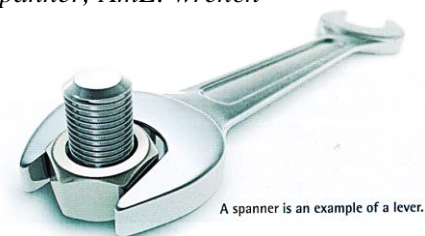
The word machine generally refers to an assembly which has parts that move. However, a simple machine can be a very basic device. A simple machine is something which provides a mechanical advantage - that is, the load generated by the machine (the force it puts out, or output) is greater than the effort (the force put in, or input) required to generate the load.

An example of a simple machine is a lever, which is used

with a fulcrum - a point which acts as a support, and allows the lever to pivot (turn around the support). If the lever is placed so that the distance between the effort and the fulcrum is greater than the distance between the load and the fulcrum, a mechanical advantage is created.

In general language, the turning force generated by a lever is called leverage. In engineering, a turning force is called a turning moment (or moment). Moments are calculated by multiplying the distance from the fulcrum, in metres, by the magnitude of the force, in newtons. They are measured in newton metres (Nm).

BrE: spanner; AmE: wrench



VI. Перепишите и письменно переведите на русский язык следующие предложения. Помните, что объектный и субъектный инфинитивные обороты соответствуют придаточным предложениям.

1. The new harrow is reported to have been put into mass production.
2. The new model of a potato digger to be tested next month was necessary for farm workers.
3. We consider the tractor driver operating this very complex machine to be highly skilled.

VII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод зависимого и независимого причастных оборотов.

1. This high-quality machinery being installed on the farm, the farmer could increase the output.
2. Vaporizing-oil engines starting on petrol are similar to petrol engines.
3. Handling sharp tools, one must be careful.

VIII. Перепишите и письменно переведите на русский язык следующие предложения. Обратите внимание на перевод простых, продолженных и сложных времен глагола в страдательном залоге.

1. The new modification of the sugar-beet harvester is being installed on our farm.

2. The combine is usually operated by one man.

3. Milking of cows has been organized well on our farm.

РАЗДЕЛ IV

ПОДГОТОВКА РЕЗЮМЕ

Резюме (resume or CV – Curriculum Vitae) это первый документ, с которого начинается знакомство работодателя с кандидатом на вакансию. Иногда знакомство на этом этапе и заканчивается, и причиной тому достаточно часто бывает как неправильно оформленное резюме, так и нечётко изложенные события жизни. Конечно, главной причиной отказа не столько форма, сколько содержание резюме.

Поэтому к составлению резюме необходимо подходить со всей серьёзностью и помнить несколько важных моментов:

- выделять заголовки разделов жирным шрифтом;
- соблюдать нужный интервал между разделами.

Именно это позволит легко читать резюме и выбрать нужный раздел. В целом перечень разделов может быть различным, но чаще всего содержит следующее:

- личные данные (имя, дата и место рождения, адрес, телефон, e-mail);
- данные о текущей должности и предыдущих местах работы, достижениях, специальных навыках;
- образование;
- интересы и увлечения;
- рекомендации.

По стилю изложения резюме должно быть кратким и чётким.

ПОДГОТОВКА АННОТАЦИИ НА СТАТЬЮ (РАБОТУ, ТЕКСТ)

Для подготовки аннотации, можно рекомендовать использовать в начале текста следующие фразы:

The title of the text (article) is....;

The text (article) is written by...;

The text (article) is taken from the book...;

The text (article) gives us an outline...;

The text (article) goals ...

The text (article) faces the problem...;

The main problems discussed are...;

The author emphasizes the idea of...;

The text (extract from the article) deals with (the problem of)...;

The article touches upon the issue of...;

The extract from the book is concerned with...;
This text is about...;
The extract centers round the problem of...;
The problem of the text is of great importance ..., etc.

В середине предлагаемой аннотации будут уместны фразы:

The author believes that...;
He points out that...;
The text (article) discusses...;
The text (article) examines (analyzes, stresses, indicates, includes, suggests, defines, conveys, illustrates)...;
It was observed in the text (article)...;
It was further noted...;
In this regard...;
It is clear from the text that...;
It farther says that...;
One of the main problems to be singled out is ...;
Great importance is also attached to;
We shouldn't forget that...;
It should be noted that;
It must be mentioned that...;
In my opinion;
To my mind...;
According to the text...;
Judging from the author's point of view...;
Among other problems the text raises the problem of..., etc.

Закончить аннотацию можно с помощью следующих слов или фраз:

Finally (in the end) the author admits (emphasizes) that...;
To sum it up;
In summary;
Summing the text up (summing it up);
The author comes to the conclusion that;
I think (suppose, believe)...;
In general...;
On the whole;
In particular...;
It is common knowledge...;
Having analyzed the information it is possible to say;
In conclusion;
All things considered we can come to the conclusion, etc.

РАЗДЕЛ V

КРАТКИЙ ГРАММАТИЧЕСКИЙ СПРАВОЧНИК

§1. ГЛАГОЛ TO BE В SIMPLE (INDEFINITE) TENSES И ЕГО ФУНКЦИИ.

Глагол **TO BE** переводится как «быть, находиться, быть в состоянии, располагаться». Глагол **TO BE** имеет особые формы в настоящем, прошедшем и будущем временах, их следует знать наизусть.

Спряжение глагола to be в Simple (Indefinite) Tenses (в настоящем, прошедшем и будущем времени) (Present, Past, Future Tenses)

Present Indefinite	Past Indefinite	Future Indefinite
affirmative form		
I am You are He (she, it) is We (you, they) are	I was You were He (she, it) was We (you, they) were	I (we) shall be You will be He (she, it) will be We, you (they) will be
interrogative form		
Am I? Are you? Is he (she, it)? Are we (you, they)?	Was I? Were you? Was he (she, it)? Were we (you, they)?	Shall I (we) be? Will you be? Will he (she, it) be? Will you (they) be?
negative form		
I am not (I'm not). he (she, it) is not (isn't). we (you, they) are not (aren't).	I was not (wasn't). he (she, it) was not (wasn't). we (you, they) were not (weren't).	I (we) shall not (shan't) be. he (she, it, you, they) will not (won't) be.

Функции глагола «to be» в предложении:

а) **смысловый глагол** (т.е. переводится «есть, является»).

Напр: London is the capital of Great Britain. - Лондон – столица Великобритании.

б) **вспомогательный глагол** для образования длительных времен (Continuous Tenses) и страдательного залога

(Passive Voice). Напр: He is watching an interesting film. - Он смотрит интересный фильм. The window is opened. - Окно открыто.

в) **модальный глагол**, после которого глагол употребляется с частицей **to**. Эта форма используется для выражения заранее запланированного или условленного действия (должен, намерен что-либо сделать по плану, по расписанию, по договоренности). Напр: The train is to arrive at 8.15. - Поезд приходит в 8.15 (по расписанию)

г) **глагол-связка**, в этом случае связывает подлежащее с именной частью сказуемого. Напр: We are students. - Мы студенты. He is hungry. - Он голоден.

Существует ряд выражений, где глагол **to be** не переводится, а приобретает окраску действия, выраженного прилагательным (именная часть сказуемого с глаголом-связкой **to be**):

to be mistaken - ошибаться, to be glad - радоваться, to be upset – печалиться, to be tired of – устать, to be proud of — гордиться, to be angry — сердиться, to be sure — быть уверенным, to be late - опаздывать, to be sorry – сожалеть, to be sad – грустить, to be happy – быть счастливым.

§2. ГЛАГОЛ TO HAVE В SIMPLE TENSES И ЕГО ФУНКЦИИ

Глагол to have означает «иметь, обладать». Предложения с этим глаголом в русском языке соответствуют неопределенно-личным оборотам «у меня/у него есть».

Спряжение глагола to have

в Simple (Indefinite) Tenses

**(в настоящем, прошедшем и будущем временах)
(Present, Past, Future Tenses)**

Present Indefinite	Past Indefinite	Future Indefinite
affirmative form		
I have You have He (she, it) has We (you, they) have	I had You had He (she, it) had We (you, they) had	I (we) shall have You will have He (she, it) will have We (you, they) will have

interrogative form		
Have I?	Had I?	Shall I (we) have?
Have you?	Had you?	Will you have?
Has he (she, it)?	Had he (she, it)?	Will he (she, it) have?
Have we (you, they)?	Had we (you? they)?	Will you (they) have?
negative form		
I have no (not any)...	I had no (not any)...	I (we) shall not (shan' t) have...
You have no (not any)...	You had no (not any)...	You won't have...
He (she, it) has no (not any)...	He (she, it) had no (not any)...	He (she, it) won't have...
We (you, they) have no	We (you, they) had no (not any)...	We (you, they) won't have

Функции глагола **to have** в предложении:

а) **смысловый глагол** со значением «иметь, обладать».

Напр: He has many books. - У него (он имеет) много книг. I have a fax. (I have got a fax.) У меня есть факс.

Have и **have got** означает «владеть, обладать». Но **have got** — более неформальное, поэтому в разговорной речи оно употребляется чаще, чем **have**. **Have** употребляется в официальной обстановке и на письме. В данном случае для вопросительной и отрицательной формы нужен глагол **to do**.
Напр: **Do** you **have** a fax? - I **don't have** a fax. **Have** you **got** a fax? - I **haven't got** a fax.

б) **вспомогательный глагол** для образования перфектных времен (Perfect Tenses) с Participle II (т. е третьей формой глагола). Для образования вопросительных и отрицательных предложений в подобных случаях глагол **to do** не употребляется. Напр: They **have** already **written** the test. Они уже написали тест. **Have** you **written** the test yet?

в) **модальный глагол**, после которого инфинитив употребляется с частицей **to**. Отрицательная и вопросительная формы образуются при помощи глагола **to do**. Напр: My friend is ill and I **have to** visit her every day. - Моя подруга больна, и мне приходится навещать ее каждый день. **Why do** you **have to** visit your friend so often? - Почему Вам приходится навещать подругу каждый день?

г) **часть фразового сказуемого**, в котором **have** теряет свой смысл и не переводится. Если в этих случаях следующее за глаголом **have** существительное стоит с артиклем **a (an)**, такое сочетание выражает однократность действия.

Напр: to have tea (coffee, milk) пить чай (кофе, молоко);
to have breakfast (dinner, supper) завтракать (обедать, ужинать);

to have a talk – переговорить;

to have a walk – прогуляться;

to have a rest – передохнуть;

to have a look – взглянуть;

to have a discussion – обсудить.

Для образования вопросительных и отрицательных предложений, когда глагол **have** является частью фразового сказуемого, употребляется глагол **to do**. Напр: Do you have tea or coffee in the morning? - Ты пьешь утром чай или кофе?

§3. ОСНОВНЫЕ ФОРМЫ ГЛАГОЛА (FOUR FORMS OF THE VERB)

Английский глагол имеет 4 основные формы:

— **Инфинитив** (Infinitive). Без частицы **to** эта форма глагола служит для образования настоящего и будущего неопределенного времени действительного залога;

— **Прошедшее неопределенное время** (Past Simple). Эта форма используется для образования соответствующей видо-временной формы действительного залога. Она образуется при помощи прибавления окончания **-ed** к первой форме глагола;

— **Причастие прошедшего времени** (Participle II). Служит для образования перфектных видо-временных форм действительного залога (со вспомогательным глаголом **to have**) и различных сложных видо-временных форм страдательного залога (со вспомогательным глаголом **to be**) и, как и вторая форма, образуется при помощи прибавления окончания **-ed** к первой форме глагола;

— **Причастие настоящего времени** (Participle I). Эта форма служит для образования длительных видо-временных форм настоящего, прошедшего и будущего времени и образуется при помощи прибавления окончания **-ing** к первой форме глагола.

Напр: live – lived – lived – living

Это относится к **правильным глаголам** (Regular Verbs),

которые составляют большую часть английских глаголов. **Неправильные глаголы** (Irregular Verbs) образуют форму прошедшего неопределенного времени и причастие прошедшего времени по особым правилам. Формы неправильных глаголов представлены в таблице (всегда смотри в конце словаря).

Напр: do – did – done – doing.

THE FOUR FORMS OF THE VERB (ЧЕТЫРЕ ФОРМЫ ГЛАГОЛА)

<i>Инфинитив (неопределенная форма глагола) Infinitive (что делать?)</i>	<i>Прошедшее простое Past Indefinite (что сделал?)</i>	<i>Причастие прошедшего времени Participle II</i>	<i>Причастие настоящего времени Participle I</i>
to have to be to help to ask	had was/were helped asked	had been helped asked	having being helping asking

§4. ИНФИНИТИВ (INFINITIVE)

1. Формы инфинитива и их перевод

Indefinite Active to do Indefinite Passive to be done действие одновременное с действием сказуемого (в личной форме)	I am glad <u>to help</u> you. Я рад помочь вам. She was glad <u>to be helped by</u> me. Она была рада, что я ей помог.
Continuous Active to be doing Действие в процессе его развития одновременно с действием сказуемого (в личной форме)	I was glad <u>to be helping</u> them at that time. Я был рад, что тогда помогал вам.
Perfect Active to have done Perfect Passive to have been done действие, которое предшествует действию, выраженному сказуемым	She is glad <u>to have helped</u> him. Она рада, что помогла ему. I am glad <u>to have been helped</u> <u>by you.</u> Я рад, что вы помогли мне.

2. Функции инфинитива

В предложении инфинитив может быть:

1. **подлежащим:** е. g. To walk in the garden was pleasant. - Гулять в саду было приятно.

2. **определением:** е. g. The amount to be paid includes the cost of packing. - Сумма, которая должна быть уплачена, включает стоимость упаковки.

3. **прямым дополнением:** е. g. He asked me to wait a little. - Он попросил меня немного подождать.

4. **именной частью составного именного сказуемого:** е. g. The duties of a student are to attend all classes, to do all tasks and so on. - В обязанности студента входит - посещать все занятия, выполнять все задания и т.д.

5. **частью составного глагольного сказуемого:** е. g. They must be doing it now. - Они должны сейчас это делать. He doesn't like to be interrupted. - Он не любит, чтобы его перебивали. I am happy to have been invited here. - Я рад, что меня сюда пригласили.

6. **обстоятельством цели, следствия:** е. g. In 1980 to meet the increasing demands for highly qualified specialists Bryansk Agricultural Institute was formed. - Чтобы удовлетворить возрастающие потребности в высококвалифицированных специалистах, в 1980 году был организован БСХИ. It is too cold to go for a walk today.- Сегодня слишком холодно, чтобы гулять.

§5. ПРИЧАСТИЕ I (PARTICIPLE I), ЕГО ФУНКЦИИ

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

В английском языке, как по форме, так и по значению, выделяется два причастия: причастие I (Participle I) и причастие II (Participle II).

Причастие I в английском языке образуется от любого глагола присоединением к основе глагола окончания — ing, на русский язык такие причастия переводятся соответствующими

действительными причастиями - определениями с суффиксами - ущ ющ, ащ/ящ.

e.g. He watched the falling snow. Он смотрел на падающий снег.

Причастие I употребляется для образования сложных глагольных форм группы Continuous (Progressive): I am (was/shall be) writing. - Я пишу (писал/буду писать).

Будучи промежуточным разрядом между глаголом, прилагательным и наречием, причастие в предложении выступает в базовых функциях прилагательного и наречия. Причастие I может выполнять следующие **функции**:

- определения: e.g. The falling leaves cover the ground. Падающие листья покрывают землю. The girl sitting on the bench is very attractive. Девушка, которая сидит на скамейке, очень красивая.

- обстоятельства (времени, причины, образа действия, сравнения и т.д.) с союзами while, as if, as though, though, if): e.g. Taking ink, she began to write. Схватив чернила, она начала писать. If being invited I'll go there.- Если меня пригласят, я пойду туда.

- части сложного сказуемого (группы Continuous): e.g. He is watching an interesting film now. Сейчас он смотрит интересный фильм.

части оборота «сложное дополнение» (Complex Object): e.g. I saw him crossing the street. - Я видел, как он переходил улицу.

- вводной части предложения (одно причастие никогда не употребляется в этой функции): e.g. Generally speaking, I don't like such people. - Вообще говоря, я не люблю таких людей.

§6. ПРИЧАСТИЕ II (PARTICIPLE II), ЕГО ФУНКЦИИ

Причастие II (Participle II) в английском языке по своей форме соответствует третьей основной форме глагола (причастия правильных глаголов образуются при помощи окончания — ed; неправильных - изменением корневой гласной (to sing – sung), изменением корневой гласной и прибавлением окончания - en (to speak – spoken), изменением корневой гласной и прибавлением окончания - d или – t (to build – built), без всякого изменения (to put – put) и супплетивно (to go – gone , to be – been).

Причастие II (Participle II) соответствует русскому

страдательному причастию настоящего времени с суффиксами -ем/им, прошедшего времени с суффиксами -нн/-т, а также действительному причастию со страдательным значением, оканчивающемуся на — вш(ийся).

Функции причастия II в предложении:

1. Определения : e.g. The fallen leaves covered the ground. Упавшие листья покрыли землю.

2. Обстоятельства (времени, причины, образа действия, сравнения и т.д.), (в этой функции причастие II следует за союзом when, while, if, though, etc.): e.g. If invited I'll go to this party. - Если меня пригласят, то я пойду на вечеринку.

3. части сказуемого (для образования сложных глагольных форм группы Perfect и всех времен глагола в страдательном залоге (Passive Voice): e.g. I have (had/ shall have) written. - Я написал (напишу). I am (was/ shall be) asked. - Меня спрашивают (спросили, спросят).

4. части оборота «сложное дополнение» (Complex Object): e.g. When I saw him so confused I realized everything. - Я всё понял, когда увидел его таким смущённым.

§7. ГРУППА НЕОПРЕДЕЛЁННЫХ (ПРОСТЫХ) ВРЕМЁН (INDEFINITE (SIMPLE) TENSES)

Времена группы Simple (Indefinite) указывают на то, что действие совершается, совершалось или совершится вообще, без указания на характер протекания действия, без уточнения условий и безотносительно к другому действию или моменту (т.е. не связаны с определённым моментом, констатируют факт совершения действия).

Образование:

Present Simple (Indefinite): в утвердительной форме глагол во всех лицах и числах, кроме 3 лица единственного числа, совпадает с формой инфинитива этого глагола без частицы to. В 3-ем лице единственного числа к глаголу прибавляется окончание – s (после согласных s, ch, sh окончание -es: pass — passes). В вопросительной и отрицательной форме глагол-сказуемое состоит из вспомогательного глагола does (для 3 л. ед.ч.) или do (для всех остальных лиц и чисел) и смыслового глагола (в форме инфинитива без частицы to). В вопросительном предложении вспомогательный глагол ставится перед подлежащим, а смысловой глагол после подлежащего. В отрицательной форме следующий порядок слов: подлежащее -

вспомогательный глагол - отрицательная частица not - смысловой глагол – другие члены предложения. Напр: You get up at 6 o'clock every day. When do you get up every day? You do not get up at 6 o'clock every day. He gets up at 7 o'clock every day. When does he get up every day? He does not get up at 6 o'clock every day.

Past Simple (Indefinite): в утвердительной форме к правильным глаголам добавляется окончание -ed; форму неправильных глаголов следует запоминать наизусть (см. таблицу). В вопросительном и отрицательном предложениях глагол-сказуемое состоит из вспомогательного глагола did (для всех лиц и чисел) и смыслового глагола (в форме инфинитива без частицы to). Напр: He watched TV yesterday. Did he watch TV yesterday? He didn't watch TV yesterday.

Future Simple (Indefinite): в утвердительной, вопросительной и отрицательной форме глагол-сказуемое состоит из вспомогательного глагола shall (для 1-го лица ед. и мн. ч) или will (для всех остальных лиц) и смыслового глагола. В утвердительной форме вспомогательный глагол ставится после подлежащего и перед смысловым глаголом. В вопросе - перед

подлежащим. Напр: I shall be at home this evening. Will you be at home this evening? I shall not be at home this evening.

Употребление:

1. для констатации общеизвестных фактов. Напр: The Earth goes round the Sun. Земля вращается вокруг Солнца.

2. для выражения постоянных, регулярно повторяющихся действий в настоящем, прошедшем и будущем времени. Напр: He does not drink (drank, will not drink) coffee in the morning. Он не пьет (пил, не будет пить) утром кофе.

3. для перечисления последовательных действий, которые происходят постоянно, часто в настоящем, прошедшем и будущем времени. Напр: I usually get up, dress myself, have breakfast and go to school in the morning. - Утром обычно я встаю, одеваюсь, завтракаю и иду в школу. Last year I got up, dressed myself, had breakfast and went to school in the morning. — В прошлом году утром я вставал, одевался, завтракал и шел в школу. Next year I shall get up, dress myself, have breakfast and go to school in the morning - В следующем году утром я буду вставать, одеваться, завтракать и ходить в школу.

Indefinite (Simple) Tenses. Active Voice Неопределенное время. Действительный залог

Present	Past	Future
He <i>writes</i> letters every week. writes does write Does he <i>write</i> letters every week? He <i>does not (doesn't) write</i> letters every week	He <i>wrote</i> the letter yesterday. wrote did write Did he <i>write</i> the letter yesterday? He <i>did not (didn't) write</i> the letter yesterday.	He <i>will write</i> the letter tomorrow. will write Will he <i>write</i> the letter tomorrow? He <i>will not (won't) write</i> the letter tomorrow
ПОКАЗАТЕЛИ ВРЕМЕНИ		
Present настоящее время	Past прошедшее время	Future будущее время
today; every day/week/year; seldom; usually; sometimes; always; often	yesterday; last week/month; 3 days ago; a week ago, 2 years ago; in 1998	tomorrow; next week/year/month; in 3 days; in future; in an hour; in a moment, in 2013

§8. ГРУППА ДЛИТЕЛЬНЫХ ВРЕМЁН (CONTINUOUS (PROGRESSIVE) TENSES)

Времена группы Continuous (Progressive) указывают на то, что действие совершается, совершалось или совершится в определенный момент времени, что оно длится какой-то промежуток времени, т.е. действие рассматривается как процесс.

Образование:

Present, Past, Future Continuous образуются при помощи вспомогательного глагола to be в соответствующем времени, лице и числе (am, is, are - в настоящем времени; was, were - в прошедшем времени и shall be/will be в будущем времени) и причастия I.

to be + Participle I

В вопросительной форме вспомогательный глагол ставится перед подлежащим. В отрицательной - частица not ставится между вспомогательным и смысловым глаголом. Напр: The children are (were, will be) playing in the yard. Where are (were, will be) the children playing? The children are (were, will be) playing in the yard.

Употребление:

1. для выражения действия, длящегося в данный момент

речи в настоящем, прошедшем и будущем времени. Напр: It is (was, will be) raining now (then, at this moment tomorrow). Сейчас (тогда, в это время завтра) идет дождь (шел, будет идти).

2. для выражения временного действия, происходящего в какой-то определенный период в настоящем, прошедшем и будущем. Напр: We are (were, will be) living in a hotel until we can (could, can) find a house to buy. - Мы живем (жили, будем жить) в гостинице до тех пор, пока не сможем (смогли, сможем) купить дом.

3. для выражения действия, которое является постоянной привычкой. Напр: I am (was, shall be) wearing a hat when it's too sunny. Я ношу (носил, буду носить) шляпу, когда слишком солнечно.

4. для выражения действий, намеченных на ближайшее будущее, запланированных заранее (только для Present Continuous). Напр: I'm leaving tomorrow. My train is at 8.30. Я уезжаю завтра. Мой поезд в 8.30.

Основные группы глаголов, которые обычно не употребляются в длительных видо-временных формах:

1. глаголы, означающие мыслительную деятельность: believe, think, assume, consider, understand, suppose, expect, agree, know, remember, forget.

2. глаголы чувства: like, love, detest, hate, hope, prefer, wish, want.

3. глаголы восприятия: see, hear, taste, smell.

Continuous (Progressive) Tenses Active Voice

Длительное время. Действительный залог

Present	Past	Future
He <i>is writing</i> the letter now.	He <i>was writing</i> the letter at 5 yesterday.	He <i>will be writing</i> the letter tomorrow after supper.
<i>is writing</i>	<i>was writing</i>	<i>will be writing</i>
Is he writing the letter now?	Was he <i>writing</i> the letter at 5 yesterday?	<i>Will</i> he be writing the letter tomorrow after supper?
He <i>is not (isn't) writing</i> the letter now.	He <i>was not (wasn't) writing</i> the letter at 5 yesterday.	He <i>will not (won't) be writing</i> the letter after supper.

ПОКАЗАТЕЛИ ВРЕМЕНИ		
Present настоящее время	Past прошедшее время	Future будущее время
now, at present, at the moment	from 9 to 11 yesterday, at 5 yesterday, all day long, when I came	at 8 tomorrow; at 8 on Friday, from 5 to 6 tomorrow, all day long tomorrow

§9. ГРУППА СОВЕРШЁННЫХ ВРЕМЁН (PERFECT TENSES)

Образование:

Времена группы Perfect образуются при помощи вспомогательного глагола *to have* в соответствующем времени (*have, has* - в настоящем времени; *had* - в прошедшем времени и *shall/will have* в будущем времени) и причастия II.

to have + Participle II

В вопросительной форме вспомогательный глагол ставится перед подлежащим. В отрицательной - частица **not** ставится между вспомогательным и смысловым глаголом (в будущем времени после (*shall/will*). Напр: I have (had, shall have) read this book already.

Have (had, shall you have) you read this book yet? I have (had) not (shall not have) read this book yet.

Употребление:

Настоящее совершенное время (**Present Perfect**) выражает связь действия, которое уже произошло, совершилось, с настоящим моментом речи (имеется результат) или обозначение действия в отрезке времени, который начался в прошлом и продолжается в момент высказывания мысли. Напр: Have you ever been to America? Ты когда-нибудь был в Америке? (Жизненный опыт до настоящего момента). I have read this book already. Я уже прочитал эту книгу. (результат - я знаю ее содержание).

Прошедшее совершенное время (**Past Perfect**) выражает действие, которое уже совершилось до определенного момента в прошлом, или ранее другого действия, имевшего место в прошлом. Ранее совершившееся действие выражается временем Past Perfect, более позднее действие в прошлом стоит в Past Simple. Напр: When I arrived he had already left. Когда я приехал, он уже уехал (перед тем, как я приехал).

Будущее совершенное время (**Future Perfect**) выражает

действие, которое будет закончено до определенного момента в будущем. Напр: He will have come back home by 3 o'clock. Он придет домой к 3 часам.

Perfect Tenses. Active Voice

Совершенное время. Действительный залог

Present	Past	Future
<p>He <i>was written</i> the letter already.</p> <p><i>has written</i></p> <p>Has he already <i>written</i> the letter?</p> <p>He <i>has not (hasn't) written</i> the letter yet.</p>	<p>He <i>had written</i> the letter when the phone rang.</p> <p><i>had written</i></p> <p>Had he <i>written</i> the letter when the phone rang?</p> <p>He <i>had not (hadn't) written</i> the letter when the phone rang.</p>	<p>He <i>will have written</i> the letter by that time.</p> <p><i>Will have written</i></p> <p>Will he <i>have written</i> the letter by that time?</p> <p>He <i>will not (won't) have written</i> the letter by that time.</p>
ПОКАЗАТЕЛИ ВРЕМЕНИ		
Present настоящее время	Past прошедшее время	Future будущее время
just; yet; already; ever; never; by...o'clock; lately; recently; this year/week/month; for; since	by ...o'clock yesterday; hardly; nearly; barely; scarcely; when...	by the end of the year; by tomorrow; before the classes begin

§10. СТРАДАТЕЛЬНЫЙ ЗАЛОГ (PASSIVE VOICE)

В английском языке глаголы могут иметь 2 залога: действительный (Active Voice) и страдательный (Passive Voice). Глагол в действительном залоге показывает, что подлежащее является действующим, активным лицом, т.е. совершает действие. Глагол в страдательном (пассивном) залоге показывает, что подлежащее является объектом действия (т.е. пассивно, не действует само), на него направлено действие. Напр: Yuri Dolgoruky founded Moscow 8 centuries ago. - Юрий Долгорукий основал Москву 8 веков назад. (Active Voice) Moscow was founded 8 centuries ago by Yuri Dolgoruky. - Москва была основана 8 веков назад Юрием Долгоруким. (Passive Voice)

Страдательный залог употребляется в тех случаях, когда

нас интересует не лицо или предмет, совершающее действие, а лицо или предмет, над которым совершается действие.

Образование:

Форма страдательного залога образуется с помощью вспомогательного глагола to be в соответствующем времени и причастия II смыслового глагола.

to be + participle II

Напр: Every problem was solved. Каждая проблема была решена.

Passive Voice

Indefinite	Continuous	Perfect
спрашивают обычно, всегда, каждый день am (is, are) asked	спрашивают сейчас, все еще am (is, are) being asked	спрашивают уже (результат) have (has) been asked
спросили вчера, когда-то в прошлом was/were asked	спрашивали, когда я приехал was/were being asked	спросили, был спрошен к тому моменту, уже had been asked
спросят, будет спрошен завтра will be asked	вместо отсутствующей формы Future Continuous употребляется Future Indefinite will be asked	спросят, будет спрошен к тому моменту will have been asked
be V₃	be being V₃	have been V₃

Употребление:

Страдательный залог в предложении употребляется тогда, когда говорящий либо не знает, кто совершает действие, либо не придаёт этому значения. Однако если возникает необходимость назвать лицо, совершившее действие, то употребляется оборот с предлогом **by**. Предлог **with** употребляется, когда называется предмет, посредством которого совершено действие:

e.g. The window was opened by Nick. Окно было открыто Колей.

e.g. The water-melon was cut with a knife. Арбуз был разрезан ножом.

Существуют различные способы перевода на русский язык предложений в страдательном залоге:

1. Предложением с глаголом-сказуемым на -ся/-сь (строятся, строились, будут строиться).

2. Предложением со сказуемым, выраженным глаголом «быть» в соответствующем времени и кратким страдательным причастием смыслового глагола (построены, были/будут построены).

3. Неопределённо-личной конструкцией, т.е. предложением, где нет подлежащего, но оно подразумевается.

Напр: New houses are built in Moscow. 1. Новые дома строятся в Москве. 2. В Москве построены новые дома. 3. В Москве строят новые дома.

§11. ГЕРУНДИЙ (GERUND), ЕГО ФУНКЦИИ

В английском языке существует неличная форма глагола, которая выражает действие в процессе и сочетает в себе свойства глагола и существительного. Так как в русском языке аналогичной формы нет, герундий переводится, как правило, существительным, глаголом или деепричастием. Герундий образуется от неопределённой формы глагола путем прибавления окончания **-ing**. Напр: **Solving** this problem is very difficult. - Решение этой проблемы (решить эту проблему) - очень трудная задача.

Герундий имеет следующие свойства существительного:

1. Может быть подлежащим: e. g. Reading books is always interesting. - Чтение книг всегда интересно.

2. Герундию может предшествовать предлог, и в этом случае герундий может быть дополнением, определением или обстоятельством: e. g. I think of going to South this year. - Я думаю поехать на юг в этом году (дополнение). There are different ways of solving the problem. - Существуют различные способы решения этой проблемы (определение). We translated the text without using a dictionary. - Мы перевели текст, не пользуясь словарём (обстоятельство).

3. Герундий может быть прямым дополнением и частью сказуемого: e.g. I like reading books. — Я люблю чтение книг. My hobby is reading books. — Мое хобби чтение книг.

4. Герундий может определяться притяжательным местоимением или существительным в притяжательном или

общем падеже. Сочетание герундия с предшествующим ему местоимением или существительным называется герундиальным оборотом. Герундиальный оборот переводится на русский язык придаточным предложением, где существительное (или местоимение) соответствуют существительному или местоимению в функции подлежащего, а герундий — глаголу-сказуемому: e.g. There was no hope of his coming back in time. — Не было надежды на то, что он вернется вовремя.

Герундий обладает следующими глагольными признаками:

1. Может иметь прямое дополнение и определяться наречием: e.g. I don't like reading aloud. — Я не люблю читать вслух.

2. Имеет следующие формы времени и залога:

Время	Залог	
	Active	Passive
Indefinite	doing	being done
Perfect	having done	having been done

Функции герундия в предложении:

1. подлежащее: e.g. Reading is my hobby. Чтение — мое хобби.

2. дополнение: e.g. I'm fond of reading. Я люблю чтение.

3. именной частью составного именного сказуемого: e.g. Her greatest pleasure is reading. Ее самое большое удовольствие — чтение.

Герундий употребляется в следующих конструкциях:

1. There is (was) no + герундий + smth: There is no hiding these facts. - Эти факты не спрячешь.

2. to be worth (hate) + герундий + smth: The picture is worth seeing. - Фильм стоит посмотреть.

3. (can) avoid (afford, stand, help, want) + герундий + smth: I can't avoid speaking to her. — Я не мог избежать разговора с ней.

4. to give up + герундий + smth: I can't give up smoking. Я не могу бросить курить.

5. on (after, before, by, without) + герундий + smth: He left without saying a word. Он ушёл, не говоря ни слова.

6. to begin (start, go on, continue, stop) + герундий + smth: He goes on painting even after having lost his sight. — Он

продолжает рисовать даже после потери зрения.

7. после глаголов: to avoid, to enjoy, to require, to mind, to mention, to suggest, to like, to prefer, to go, to come, to start, to finish, to intend, to remember и др. Напр: I enjoy going to football matches and can't stand watching the matches on TV. - Я получаю удовольствие, когда хожу на футбольные матчи, и терпеть не могу смотреть матчи по телевизору.

§ 12. ВСПОМОГАТЕЛЬНЫЕ ГЛАГОЛЫ (AUXILIARY VERBS)

Вспомогательные глаголы - это глаголы, с помощью которых образуются сложные глагольные формы. Вспомогательные глаголы не имеют своего самостоятельного лексического значения и служат лишь показателем времени, залога, наклонения и в некоторых случаях - лица и числа смыслового глагола. К вспомогательным глаголам относятся глаголы **to be, to have, to do, shall, will, should, would**. Глаголы to be, to have, shall, should, will, would употребляются в модальном значении, а глаголы to be, to have, to do, кроме того, употребляются как смысловые глаголы. Вспомогательные глаголы часто не переводятся. Они имеют следующие сокращенные отрицательные формы: aren't, isn't (no am not), haven't, hadn't, don't, doesn't, didn't, shan't, won't, shouldn't, wouldn't.

§ 13. МОДАЛЬНЫЕ ГЛАГОЛЫ (MODAL VERBS)

Модальные глаголы выражают не действие, а отношение к действию (возможность или невозможность его совершить), поэтому после модальных глаголов стоит основной глагол, выражающий действие, в неопределенной форме без частицы to.

Модальные глаголы не изменяются по лицам, не имеют неличных форм; инфинитива, герундия и причастия. Вопросительная и отрицательная формы этих глаголов образуются без вспомогательного глагола. В вопросе модальный глагол ставится перед подлежащим. В отрицательной форме частица not ставится сразу после модального глагола. Глагол can и отрицательная частица not пишутся слитно (cannot). Напр: Can you do it? Must I do it? No, I cannot do it.

В английском языке существуют следующие модальные

глаголы: **can, may, must, should, ought to, need, would, shall, will, dare**. Модальные глаголы имеют следующие сокращенные отрицательные формы: **can't, couldn't, mustn't, mightn't**. Модальные глаголы **can, must, may** имеют эквиваленты.

Значение модальных глаголов	Эквиваленты модальных глаголов
can - мочь, уметь	To be able to - мочь, быть в состоянии
must - долженствовать, обязан нужно, необходимо	To have to - приходится, должен To be to - должен по плану
may - мочь, иметь разрешение	To be allowed to - иметь разрешение

МОДАЛЬНЫЕ ГЛАГОЛЫ И ИХ ПЕРЕВОД

Глагол	Переводится	Примеры
Can	мочь, уметь	He can read English. Он может читать по-английски.
May	мочь, иметь разрешение	He may take the book. Он может взять эту книгу.
Must	долженствовать	I must do this work today. Я должен выполнить эту работу сегодня.
Should	следует, долженствовать	You should write the article. Вам следует написать эту статью.
Need	нужно, надо	We need your help. Нам нужна ваша помощь.
Ought to	следовало бы, следует	You ought to do it at once. Вам следовало бы сделать это сразу же.
Would	хотеть, желать	He said he would take me to the office. Он сказал, что хочет отвезти меня в офис.
Shall	должен, обязан	When I speak, you shall listen. Когда я говорю, ты обязан слушать.
Will	желать, намереваться	I will not (won't) go to school today. Я не желаю сегодня идти в школу.
Dare	смечь, отважиться	How dare you come here! Как ты смеешь приходить сюда!

CAN - имеет значение «мочь, уметь, обладать физической или умственной способностью, умением выполнить действие», выраженное инфинитивом глагола, с которым сочетается **can**. Напр: I can swim. — Я умею плавать. He can speak English. — Он умеет говорить по-английски. Can I speak to the chief? — Могу я поговорить с начальником? Can Ann say it?

— Неужели это Анна говорит?

Глагол can имеет форму прошедшего времени could и эквивалент

to be able to - быть в состоянии. Он требует наличия частицы to в следующем за ним инфинитиве и употребляется во всех видо-временных формах.

Напр: He is (was, will be) able to come in time. Он может (смог, сможет) приехать вовремя.

MAY имеет значение «разрешения, возможности, предположения, сомнения, неуверенности, выражения упрёка, замечания». Напр: He might get the tickets for the concert. - Возможно, он купит билеты на концерт. May we use the dictionaries? - Можно нам пользоваться словарями? — Yes, you may. — Да, можно. No, you may not. — Нет, нельзя (вежливый отказ). No, you mustn't. — Нет, нельзя. (категоричное запрещение). Глагол may имеет форму прошедшего простого времени might и эквивалент to be allowed to - разрешать, который может употребляться во всех временных формах в этом значении. Напр: He is (was, will be) allowed to stay here. Ему разрешают (разрешили, разрешат) остаться здесь.

MUST выражает «необходимость, моральную обязанность» и соответствует в русском словам «должен, нужно, надо». Наряду с must употребляются to have to (приходится, вынужден), to be to (должен, обязан, согласно договору, указу, постановлению, расписанию) во всех временах. Напр: I must hurry to catch the last train. Я должен торопиться, чтобы успеть на последний поезд. The student are to attend classes. — Студенты должны посещать все занятия (согласно уставу).

§ 14. ЛИЧНЫЕ МЕСТОИМЕНЕНИЯ

<i>Число</i>	<i>Лицо</i>	<i>Именительный падеж</i>		<i>Объектный падеж</i>		
		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

§ 15. УКАЗАТЕЛЬНЫЕ МЕСТОИМЕНЕНИЯ

Этот – this; эти – these

Тот – that; те – those

§ 16. ПРИТЯЖАТЕЛЬНЫЕ МЕСТОИМЕНЕНИЯ

	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

§ 17. ВОПРОСИТЕЛЬНЫЕ МЕСТОИМЕНЕНИЯ И НАРЕЧИЯ

Кто?
Кому?
Какой?

who?
whom?
what (+noun)?

Какой, который из ..?	which?
Чей?	whose?
Что?	what?
Где?	where?
Когда?	when?
Почему?	why?
Как?	how?
Сколько?	how many ..? (how much ..?)

§ 18. СТЕПЕНИ СРАВНЕНИЯ ПРИЛАГАТЕЛЬНЫХ И НАРЕЧИЙ

<i>положительная</i>	<i>сравнительная</i>	<i>превосходная</i>
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

§ 19. 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	держатъ, 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

§ 20. СЛОВООБРАЗОВАНИЕ. АФФИКСЫ:

<i>существительных</i>	<i>прилагательных</i>	<i>глаголов</i>	<i>наречий</i>
-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			

РАЗДЕЛ VI

ТЕЗАУРУС

Морфология (Morphology)

Имя существительное (Noun)

Имя существительное – это часть речи, объединяющая слова, которые обозначают одушевлённые и неодушевлённые предметы (Personal and Non-Personal Nouns), вещества (Materials) и явления природы (Natural Phenomena). Они бывают исчисляемыми и неисчисляемыми (Count and Mass Nouns). Большинство существительных имеют два числа: единственное и множественное (Singular and Plural Number). В английском языке только одушевлённые существительные имеют два падежа: общий и притяжательный (Common and Possessive Case) и в 3 лице ед.ч. различаются по родам (Masculine, Feminine and Neuter Gender).

Артикль (Article)

Артикль – это служебное слово, которое служит определителем существительного, при этом собственного, отдельного вещественного значения не имеет. В английском языке существуют два артикля: неопределённый (Indefinite Article) и определённый (Definite Article).

Местоимение (Pronoun)

Местоимение - это часть речи, объединяющая слова, которые не называют предметов, а только указывают на них. По своему значению местоимения делятся на следующие разряды:

- 1) личные (Personal Pronouns);
- 2) притяжательные (Possessive Pronouns);
- 3) возвратные (Reflexive Pronouns);
- 4) указательные (Demonstrative Pronouns);
- 5) взаимные (Reciprocal Pronouns);
- 6) вопросительные (Interrogative Pronouns);
- 7) относительные (Relative Pronouns);
- 8) отрицательные (Negative Pronouns);
- 9) неопределённые (Indefinite Pronouns);
- 10) обобщающие (Universal Pronouns);
- 11) союзные (Conjunctive Pronouns).

Имя прилагательное (Adjective)

Имя прилагательное – это часть речи, объединяющая слова, которые выражают признак предмета. В английском языке прилагательные не имеют рода и формы множественного числа, в предложении могут играть роль определения и именной части сказуемого. Различают прилагательные качественные и относительные (Gradable or Non-Gradable Adjectives). Качественные прилагательные имеют три степени сравнения: положительную (Positive Degree), сравнительную (Comparative Degree) и превосходную (Superlative Degree).

Наречие (Adverb)

Наречие – это часть речи, объединяющая слова, которые указывают на признак действия или на обстоятельства, при которых протекает действие. Наречие относится к глаголу и показывает где, когда и каким образом действие происходит, в предложении играет роль обстоятельства и определения, и как прилагательное, может иметь три степени сравнения. По своему строению наречия делятся на простые, производные и сложные.

Имя числительное (Numeral)

Имя числительное - это часть речи, объединяющая слова, которые обозначают количество или порядок предметов при счёте. Различают количественные, порядковые и дробные числительные (Cardinal, Ordinal and Fractional Numerals).

Предлог (Preposition)

Предлог – это служебное слово, указывающее на отношение существительного или местоимения к другим словам в предложении. Предлоги выражают пространственные, временные, причинные и другие отношения и по своему значению объединяются в группы. По форме предлоги делятся на простые и составные. В роли предлогов могут употребляться некоторые словосочетания.

Союз (Conjunction)

Союз - это служебное слово, которое служит для соединения слов и словосочетаний в простом предложении или соединения простых предложений в сложном. Союзы делятся на сочинительные и подчинительные. По форме союзы бывают простыми и сложными.

Глагол (Verb)

Глагол - это часть речи, объединяющая слова, которые обозначают действие или состояние. Английские глаголы можно разделить на следующие группы:

1) знаменательные (смысловые) глаголы (Full Verbs) – выражают действие, состояние, процесс, поэтому всегда переводятся;

2) модальные глаголы (Modal Verbs) – выражают не само действие, а лишь отношение к нему, поэтому за ними всегда следует ещё и смысловой глагол. Они также всегда переводятся на русский язык;

3) вспомогательные глаголы (Auxiliary Verbs) – не выражают никакого действия, они служат для образования сложных форм глаголов, поэтому обычно не переводятся;

4) глаголы-связки (Stative Verbs) – не выражают действия, служат для связи подлежащего со смысловой частью сказуемого и показывают время, лицо, число. На русский язык эти глаголы также не переводятся.

В предложении глаголы употребляются в двух формах: личной и неличной.

Личные формы глагола (Finite Forms of the Verb)

К личным формам глагола относятся: императив (Imperative), простое настоящее время (Present Simple Tense), простое прошедшее время (Past Simple Tense). Глаголы в личной форме играют роль сказуемого.

Наклонение (Mood)

Глагол в личной форме может быть в одном из трёх наклонений: изъявительном (Indicative Mood), повелительном (Imperative Mood), сослагательном (Subjunctive Mood). В изъявительном наклонении он имеет следующие характеристики: время (Tense), вид (Aspect), залог (Voice).

Время (Tense)

Время глагола – это грамматическая категория, которая выражает отношение действия, названного глаголом, к моменту речи. В английском языке есть три грамматических времени глагола: настоящее, прошедшее и будущее. В пределах каждого времени существуют формы, указывающие на время действия или состояния, обозначенного глаголом.

Вид (Aspect)

Понятие вида глагола в английском языке не совпадает с аналогичным понятием в русском языке ни по значению, ни по способу образования глагольных форм. Различают общий и длительный вид.

Залог (Voice)

Формы залога показывают, является ли подлежащее лицом (предметом), совершающим действие, или лицом (предметом), подвергающимся действию. В английском языке различают действительный и страдательный залог (Active Voice and Passive Voice).

Основные формы глагола (Forms of the Verb)

Английский глагол имеет 4 основные формы:

- 1) инфинитив (Infinitive);
- 2) прошедшее неопределённое время (Past Simple);
- 3) причастие прошедшего времени (Participle II);
- 4) причастие настоящего времени (Participle I).

Времена английского глагола (Tenses of the Verb)

В английском языке имеются 4 группы глагольных видовременных форм, а именно:

- 1) неопределённые или простые (Indefinite or Simple);
- 2) длительные (Continuous or Progressive);
- 3) завершённые (Perfect);
- 4) длительные завершённые (Perfect Continuous or Perfect Progressive).

Времена группы Indefinite (Simple)

Времена группы Indefinite (Simple) (неопределённые, простые) с определённым моментом не связаны. Они лишь констатируют факт совершения действия без указания на характер протекания действия и безотносительно другому действию или моменту речи.

Времена группы Continuous (Progressive)

Времена группы Continuous (Progressive) (длительные, продолженные) обозначают действие, соотносённое с каким-то определённым моментом, действие в процессе его развития.

Времена группы Perfect

Времена группы Perfect (завершённые) выражают действие, соотнесённое (связанное) с каким-то моментом или действием, а именно действие, предшествующее этому моменту или действию.

Времена группы Perfect Continuous (Perfect Progressive)

Времена группы Perfect Continuous (Perfect Progressive) (длительные завершённые) выражают длительное действие, законченное к определённом моменту времени.

Согласование времён (Sequence of Tenses)

Под согласованием времён (или последовательностью времён) в английском языке подразумевается временная взаимосвязь между сказуемым главного предложения и сказуемым придаточного, главным образом, дополнительного предложения.

Неличные формы глагола (Non-Finite Forms of the Verb)

Неличные формы глагола выражают действие без указания лица и числа и поэтому не могут самостоятельно выполнять в предложениях функцию сказуемого. К ним относятся инфинитив (Infinitive), герундий (Gerund) и причастие (Participle).

Инфинитив (Infinitive)

Инфинитив – неопределённая (словарная) форма глагола. Различают инфинитив активного и пассивного залога (Infinitive Active and Infinitive Passive).

Причастие (Participle)

Причастие – это неличная форма глагола, которая обладает свойствами глагола с одной стороны, и свойствами прилагательного или наречия, - с другой. В английском языке различают причастие I и II. Причастие с зависимыми от него словами образует причастный оборот (Participial Construction).

Герундий (Gerund)

Герундий – это неличная форма глагола, которая обладает свойствами глагола и существительного.

Синтаксис (Syntax)

Словосочетание (Word Combination)

Словосочетание – это сочетание двух или более знаменательных слов, связанных по смыслу и грамматически и представляющих собой сложные наименования явлений объективной реальности. Словосочетание состоит из главного и зависимого слов.

Предложение (Sentence)

Предложение – это сочетание слов, выражающих законченную мысль. Слова, входящие в состав предложения и отвечающие на какой-нибудь вопрос, являются членами предложения. Они делятся на главные и второстепенные. По своему составу предложения бывают простыми (Simple Sentences) и сложными (Compound and Complex Sentences).

Простое предложение (Simple Sentence)

Простые предложения имеют только одну грамматическую основу. В зависимости от цели высказывания предложения могут быть повествовательными (утвердительными или отрицательными) (Declarative Affirmative or Negative Sentences), вопросительными (Interrogative Sentences) и побудительными (повелительными или восклицательными) (Imperative Sentences).

Сложное предложение (Compound and Complex Sentence)

Сложные предложения имеют две или несколько грамматических основ, которые соединяются между собой при помощи сочинительных или подчинительных союзов или союзных слов.

Порядок слов (Word Order)

В английском языке твёрдый порядок слов. Для повествовательных предложений характерен прямой порядок слов: подлежащее – сказуемое – дополнение – обстоятельство (может занимать место в начале или конце предложения).

В вопросительных предложениях используется обратный порядок: вспомогательный глагол – подлежащее – смысловая часть сказуемого – остальные члены предложения, исключение составляют вопросы к подлежащему.

Виды вопросов (Types of Questions)

Существуют 4 типа вопросов:

- 1) общий (General Question),
- 2) альтернативный (Alternative Question),
- 3) специальный (Special Question),
- 4) разделительный (Disjunctive Question).

Общий вопрос (General Question)

Общий вопрос – это вопрос, который относится ко всему предложению и требует утвердительного или отрицательного ответа.

Альтернативный вопрос (Alternative Question)

Альтернативный вопрос – это вопрос, предполагающий в ответе выбор между двумя или более предметами, действиями или качествами, выраженными однородными членами предложения, соединёнными союзом *or* (или).

Специальный вопрос (Special Question)

Специальный вопрос – это вопрос, который относится к отдельному члену предложения и начинается с вопросительного слова.

Разделительный вопрос (Disjunctive Question)

Разделительный вопрос - это вопрос, требующий краткого утвердительного или отрицательного ответа, т.е. подтверждения или отрицания мысли, выраженной в вопросе, и который состоит из двух частей.

Подлежащее (Subject)

Подлежащее - это главный член предложения, который отвечает на вопрос «кто? что?», обозначает предмет или лицо, выполняющее действие и может быть выражен существительным, местоимением, числительным, герундием или инфинитивом.

Сложное подлежащее (Complex Subject)

Конструкция «сложное подлежащее» или «именительный падеж с инфинитивом» не имеет соответствующего оборота в русском языке. Она состоит из существительного в общем падеже или местоимения в именительном падеже и инфинитива, следующего за глаголом-

сказуемым, и является в английском языке эквивалентом подлежащего придаточного предложения, на русский язык переводится дополнительным придаточным предложением.

Сказуемое (Predicate)

Сказуемое - это главный член предложения, который отвечает на вопрос «что делать?», обозначает действие, состояние или другой признак подлежащего и выражает грамматическое значение одного из наклонений. Сказуемое может быть простым и составным.

Дополнение (Object)

Дополнение – это второстепенный член предложения, который отвечает на падежные вопросы и может быть выражен существительным, местоимением, числительным, герундием или инфинитивом.

Сложное дополнение (Complex Object)

Конструкция «сложное дополнение» или «объектный падеж с инфинитивом» не имеет аналога в русском языке. Она состоит из местоимения в объектном падеже или существительного в общем падеже и инфинитива, на русский язык переводится дополнительным придаточным предложением.

Определение (Attribute)

Определение - это второстепенный член предложения, который отвечает на вопросы «какой? который? чей?», может быть выражен существительным, местоимением, числительным.

Обстоятельство (Adverbial Modifier)

Обстоятельство - это второстепенный член предложения, который отвечает на вопросы «где? когда? куда? как?» и т.д. Различают обстоятельства места, направления, времени, способа, частоты, степени.

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
breather - сапун
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
channel section - швеллер

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
engagement - зацепление
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
flywheel - маховик
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

Л

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

Мм

machine tool — станок
maintenance - техническое обслуживание и ремонт
malfunction - неисправность
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
reinforce - усиливать
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
rigid - жёсткий
rim - обод, зубчатый венец
rivet - заклёпка
rubber pad – резиновая прокладка

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 clutch - 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
strengthen - укреплять
suspension member - элемент подвески
synchronesh 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
twists - повороты
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
weld - сварка
wheeled vehicle - колесное транспортное средство
wheels - колеса
windshield wipers - стеклоочистители ветрового стекла
work out — разрабатывать

Библиографический список

Основной

1. Английский язык для инженеров / Т.Ю. Полякова, Е.В. Синявская. О.И. Тынкова, Э.С. Улановская. 7-е изд., испр. М.: Высш. школа, 2005. 463 с.
2. Professional English in Use. Engineering/Mark Ibbotson. Cambridge University Press, 2011. 144 p.
3. Cambridge English for Engineering/Mark Ibbotson. Cambridge University Press, 2010. 112 p.
4. English Grammar in Use/ Raymond Murphy. Third Edition, Cambridge University Press, 2009. 379 p.
5. English Vocabulary in Use/Stuart Redman. Second Edition, Cambridge University Press, 2010. 263 p.

Дополнительный

1. Английский язык для технических вузов / И.П. Агабеян, П.И. Коваленко. 4-е изд. Ростов н/Д: Феникс, 2002. 350 с.
2. Методические рекомендации и учебные пособия
 - а) English: учебное пособие для студентов 2-го курса инженерно-технологического факультета / Е.В. Андриющенко, С.Н. Поцепай. Брянск: Изд-во Брянская ГСХА, 2010. 84 с.
 - б) English for Engineers: методические рекомендации и задания контрольной работы № 2 по английскому языку для студентов 2 курса факультета заочного обучения / Е.В. Андриющенко, С.Н. Поцепай, М.В. Семышев. Брянск: Изд-во Брянская ГСХА, 2010. 50 с.
 - в) Английский язык: методические рекомендации и задания контрольной работы № 1 по английскому языку для студентов 1 курса факультета заочного обучения / Е.В. Андриющенко, С.Н. Поцепай. Брянск: Изд-во Брянская ГСХА, 2009. 68 с.

Ссылки на Интернет-источники:

www.wikipedia.org
www.jstor.org
www.careercornerstone.org
www.asee.org
www.loc.gov
www.ewb-international.org
www.engineersagainstopoverty.org
www.imeche.org
www.britannica.com
www.engineeringmotion.com
<http://mechanicalengineerings.com>
<http://agriculturalengg.blogspot.ru>
www.abareconomichs.com
<http://www.regional.org.au>
<http://greatachievements.org>
<http://gutenberg.org>
www.claas.com
www.profi.co.uk

ОГЛАВЛЕНИЕ

1. Предисловие	3
2. Раздел 1	4
3. Раздел 2	60
4. Раздел 3	105
5. Раздел 4	174
6. Раздел 5	176
7. Раздел 6	199
8. Word Bank	207
8. Библиографический список	215

Учебное издание

Поцепай Светлана Николаевна
Андрющенок Елена Владимировна
Семьшев Михаил Васильевич

АНГЛИЙСКИЙ ЯЗЫК

**Учебное пособие
для аудиторных занятий и самостоятельной работы студентов**

*по направлению подготовки 35.04.06 «Агроинженерия»,
магистерская программа
Технические системы и технологии в агробизнесе*

Квалификация магистр

Редактор Лебедева Е.М.

Подписано к печати 15.11.2018 г. Формат 60x84 ¹/₁₆.
Бумага офсетная. Усл. п. л. 12,66. Тираж 25 экз. Изд. № 6275.

Издательство Брянского государственного аграрного университета
243365 Брянская обл., Выгоничский район, с. Кокино, Брянский ГАУ