Министерство образования и науки Российской Федерации

Владивостокский государственный университет
экономики и сервиса

---

**Е.А. МАЗУР**

# ИНОСТРАННЫЙ ЯЗЫК (ЕВРОПЕЙСКИЙ)

Практикум

Владивосток
Издательство ВГУЭС
2014

ББК 82.3Англ 9
М 12

Рецензент: Т.И. Яшина, доцент, зав. каф. западноевропейских языков, канд. пед. наук

**Мазур Е.А.**
М 12 ИНОСТРАННЫЙ ЯЗЫК (ЕВРОПЕЙСКИЙ): Практикум. – Владивосток: Изд-во ВГУЭС, 2014. – 96 с.

Практикум по дисциплине «Иностранный язык (модуль 3)» содержит информации по теме: «Cars. Repair and Maintenance». Цель практикума: обучение различным видам извлечения информации из оригинальных текстов на английском языке.

Для студентов специальности 230100(190603) Сервис транспортных и технологических машин и оборудования (автомобильный транспорт).

ББК 82.3Англ 9

Печатается по решению РИСО ВГУЭС

# ВВЕДЕНИЕ

Настоящий практикум рассчитан на студентов 2 курса направления «190600.62 Автомобильный сервис». Работа по данному практикуму развивает навыки профессионально ориентированного чтения.

Практикум состоит из следующих разделов:

1. Базовый курс.
2. Грамматический справочник.
3. Грамматические упражнения.
4. Тематический словарь и активный вокабуляр.

Базовый курс состоит из 11 уроков.

Структура урока базового курса:

1. Предтекстовые упражнения.
2. Текст 1.
3. Послетекстовые упражнения.
4. Текст 2 с упражнениями.

Предтекстовые упражнения служат для развития навыков работы со словарем по поиску нужной лексики. Текст 1 предназначен для развития навыков изучающего чтения. Послетекстовые упражнения предназначены для закрепления активной лексики и контроля понимания, а также навыков речи. Текст 2 предназначен для развития навыков ознакомительного чтения, упражнения к этому тексту – для контроля понимания.

Грамматический справочник содержит информацию, необходимую для освоения программного материала курса.

После грамматического материала даны упражнения, построенные на профессиональной лексике. Для отработки различных грамматических явлений рекомендуется пользоваться также грамматическим тренажером, с которым студенты знакомы по 1-му курсу.

Тематический словарь с иллюстрациями поможет студентам быстрее найти незнакомые слова. Активный вокабуляр разделен на 3 части, по каждой из который будет проводиться тест. Для лучшего усвоения лексики рекомендуется систематически пользоваться компьютерным тренажером VCB Tutor.

Материал практикума апробирован на кафедре Западноевропейских языков ВГУЭС.

# UNIT I

**Text: The Early Days of the Automobile**

**Grammar: Infinitive. Forms and Functions**

***1. Прочтите и переведите слова без словаря.***

Mechanical, opposition, escorted, transmissions, motorist, gasoline, standardize, automobile, industry, collect, antique, specialize, collection, rarity, motor, inefficient, instruction.

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Motor car, self-propelled vehicle, mechanical power, steam-driven vehicle, gasoline engine, four-stroke cycle of operation, four-cylinder engines, wheel, internal combustion engine, spare tyres, brakes

***3. Прочтите и переведите текст.***

## The Early Days of the Automobile

One of the earliest attempts to propel a vehicle by mechanical power was suggested by Isaac Newton. But the first self-propelled vehicle was constructed by the French military engineer Cugnot in 1763. He built a steam-driven engine which had three wheels, carried two passengers and ran at maximum speed of four miles. The carriage was a great achievement but it was far from perfect and extremely inefficient. The supply of steam lasted only 15 minutes and the carriage had to stop every 100 yards to make more steam.

In 1825 a steam engine was built in Great Britain. The vehicle carried 18 passengers and covered 8 miles in 45 minutes. However, the progress of motor cars met with great opposition in Great Britain. Further development of the motor car lagged because of the restrictions resulting from legislative acts. The most famous of these acts was the Red Flag Act of 1865, according to which the speed of the steam-driven vehicles was limited to 4 miles per hour and a man with a red flag had to walk in front of it. Motoring really started in the country after the abolition of this act.

In Russia there were cities where motor cars were outlawed altogether. When the editor of the local newspaper in the city of Uralsk bought a car, the governor issued these instructions to the police: "When the vehicle appears in the streets, it is to be stopped and escorted to the police station, where its driver is to be prosecuted."

From I860 to 1900 was a period of the application of gasoline engines to motor cars in many countries. The first to perfect gasoline engine was N. Otto who introduced the four-stroke cycle of operation. By that time motor cars got a standard shape and appearance.

In 1896 a procession of motor cars took place from London to Brighton to show how reliable the new vehicles were. In fact, many of the cars broke, for the transmissions were still unreliable and constantly gave trouble.

The cars of that time were very small, two-seated cars with no roof, driven by an engine placed under the seat. Motorists had to carry large cans of fuel and separate spare tyres, for there were no repair or filling stations to serve them.

After World War I it became possible to achieve greater reliability of motor cars, brakes became more efficient. Constant efforts were made to standardize common components. Multi-cylinder engines came into use; most commonly used are four-cylinder engines.

Like most other great human achievements, the motor car is not the product of any single inventor. Gradually the development of vehicles driven by internal combustion engine – cars, as they had come to be known, led to the abolition of earlier restrictions. Huge capital began to flow into the automobile industry.

From 1908 to 1924 the number of cars in the world rose from 209 thousand to 20 million; by 1960 it had reached 60 million! No other industry had ever developed at such a rate.

There are about 3,000 Americans who like to collect antique cars. They have several clubs such as Antique Automobile Club and Veteran Motor Car Club, which specialize in rare models. The clubs practice meetings where members can exhibit their cars. Collectors can also advertize in the magazines published by their clubs. Some magazines specialize in a single type of car such as glorious Model "T". A number of museums have exhibitions of antique automobile models whose glory rings in automobile history. But practically the best collection – 100 old cars of great rarity – is in possession of William Harrah. He is very influential in his field. The value of his collection is not only historical but also practical: photographs of his cars are used for films and advertisements.

In England there is the famous "Beaulieu Motor Museum" – the home for veteran cars. The founder of the Museum is Lord Montague, the son of one of England's motoring pioneers, who opened it in 1952 in memory of his father. Lord Montague's father was the first person in England to be fined by the police for speeding. He was fined 5 pounds for going faster than 12 miles per hour! In the Museum's collection there is a car called *the Silver Ghost* which people from near and far go to see. It was built by Rolls-Royce in 1907, and called *the Silver Ghost* because it ran so silently and was painted silver.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Подача пара, скорость была ограничена, ремонтные и заправочные станции, стандартный вид, многоцилиндровый двигатель, крайне неэффективный, максимальная скорость, развиваться такими темпами, специализироваться на редких моделях, ограничения.

***5. Выберите правильный вариант перевода подчеркнутого слова.***

a) для c) поскольку
b) в течение d) за

1. Many cars broke for the transmissions were still unreliable.
2. Photographs of old cars are used for films and advertisements.
3. Lord Montague's father was the first person in England to be fined by the police for speeding.
4. "Beaulieu Motor Museum" – the home for veteran cars.
6. Motorists had to carry large cans of fuel, for there were no filling stations to serve them.

***6. Укажите, в какой последовательности появились типы двигателей.***

a) gasoline engine
b) steam engine
c) internal combustion engine

***7. Укажите, соответствуют ли предложения тексту (True) или нет (False).***

1. French engineer Cugnot built a steam-driven engine.
2. The Red Flag Act didn't limit the speed of vehicles.
3. After World War I two-cylinder engines were most commonly used.
4. Veteran Motor Cars Club specializes in latest models.

***8. Выберите правильный вариант окончания предложений.***

1. N. Otto introduced…
   a) gasoline engine.
   b) spark ignition.
   c) four-stroke cycle of operation.
   d) multi-cylinder engine.
2. The idea of propelling a vehicle by mechanical energy belongs to…
   a) French engineer Cugnot.
   b) Isaak Newton.
   c) N. Otto.
   d) Russian engineers.
3. After World War I efforts were made …
   a) to standardize common component.
   b) to construct new brakes.
   c) to use diesel engine.
   d) to find rare models.
4. A famous *Silver Ghost* model is…
   a) Ford.
   b) Mercedes.

c) Lincoln.
d) Rolls-Royce.

***9. Прочтите текст и ответьте на вопросы***

## Components of the Automobiles

Automobiles are trackless, self-propelled vehicles for land transportation of people or goods, or for moving materials. There are three main types of automobiles. These are passenger cars, buses and lorries (trucks). The automobile consists of the following components: a) the engine; b) the framework; c) the mechanism that transmits the power-engine to the wheels; d) the body.

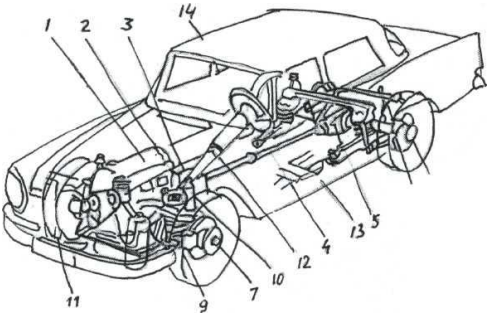



Fig. 1. Automobile:
**1.** engine; **2.** clutch; **3**. gearbox; **4.** propeller shaft; **5.** final drive gears; **6.** disk brake; **7.** front axle; **8.**rear axle; **9.** coil spring suspension; **10.** shock absorber; **11**. radiator; **12**. steering; **13.** chassis; **14.** body

Passenger cars are, as a rule, propelled by an internal combustion engine. They are distinguished by the horse-power of the engine, the number of cylinders on the engine and the type of the body, the type of transmission, wheelbase, weight and overall length.

There are engines of various designs. They differ in the number of cylinders, their position, their operating cycle, valve mechanism, ignition and cooling system. A typical passenger car is shown in Fig. 1.

Most automobile engines have six or eight cylinders, although some four-, twelve-, and sixteen-cylinder engines are used. The activities that take place in the engine cylinder can be divided into four stages which are called strokes. The four strokes are: intake, compression, power and exhaust. "Stroke" refers to the piston movement. The upper limit of piston movement is called top dead centre, TDC. The lower limit of piston movement is called bottom dead centre, BDC. A stroke constitutes piston movement from TDC to BDC or from BDC to TDC. In other words, the piston completes a stroke each time it changes the direction of motion.

# UNIT II

**Text: The Reciprocating Piston Petrol Engine. Modern Requirements**

**Grammar: Infinitive Constructions**

***1. Прочтите и переведите слова без словаря.***

Energy, mechanical, classify, conversion, limit, piston, construction, accelerate, economy, standard, atmospheric, emission, vibration, modern, carburetor, injection, hydraulic, clearance, filter, maneuvering, control, management, starting, control, compact, line, efficient, production, automatic, minimum, material, economic.

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Mounting system, noise, emission, energy conversion, spark ignition**,** air drug, complete stroke, reciprocating piston, induction, to monitor, compression, exhaust, sophisticated devices, combustion efficiency, after-treatment, by virtue, accelerating capability, transversely/ longitudinally mounted, fuel injection auxiliary supply systems

***3. Прочтите и переведите текст.***

## The Reciprocating Piston Petrol Engine

### Modern Requirements

**General background**

The motor vehicle engine is basically a device for converting the internal energy stored in its fuel into mechanical energy. It is classified as an internal combustion engine by virtue of its energy conversion taking place within the engine cylinders.

Since the term "energy" implies the capacity to perform work, the engine is thus able to propel the vehicle along the road and, within limits, overcome unwanted opposition to its motion arising from rolling friction, gradient resistance and air drug. To facilitate this process the engine is combined with a transmission system.

The vast majority of car engine is of the reciprocating piston type and utilize spark ignition to initiate the combustion project in the cylinders. They also operate on the four-stroke principle in which the piston travels one complete stroke for each of the successive events of induction, compression, combustion and exhaust.

**Modern requirements**

*Optimum performance.* With modern advances in engine design it is not particularly difficult to obtain sufficient power to give the car a high top speed, especially since the recent trend towards car bodies of lighter construction and more efficient aerodynamic shape. Today, however, a more important engine requirements than a further increase in top speed is an improved accelerating capability together with better flexibility in the low to middle speed range, or what is sometimes termed "driveability".

*Good fuel economy.* The overall aim of improving the fuel economy of cars is to minimize the amounts of crude oil used to provide petrol for their engines, because of constraints imposed by limited petroleum resources and rising costs. Fuel economy may also be made the subject of legislation, as it already is in America, where each manufacturer has to comply with corporate average fuel economy standards (or CAFE standards, as they are generally termed). For these reasons, further engine requirements are those of minimum weight so as to reduce car weight; improved combustion efficiency, better to utilize the fuel; the reduced friction losses between the working parts.

*Low pollution.* Since the late 1960s increasingly stringent legislation has been applied to limit the levels of atmospheric pollutants emitted from car engines. In general, legislation is concerned with carbon monoxide, which has toxic effects; unburned hydrocarbons, which contribute to atmospheric smog; and nitrogen oxides, which cause irritation to eyes and lungs, and also combine with water to produce acid rain that destroy vegetation.

To reduce these harmful emissions, not only very careful control of the combustion process is required in modern engine design, but also various sophisticated devices may have to be added for after-treatment of the exhaust gases.

*Minimum noise level.* Noise is generally defined as unwanted sound. Reducing interior noise makes a car more attractive to the buyer. Reducing exterior noise to socially acceptable limits has been the subject of increasingly stringent legislation in most countries since the late 1960s. Since the engine is an obvious source of noise an important requirement is that its design and installation should minimize noise emission, not only that directly radiated from the engine, but also that arising from vibrations transmitted through its mounting system to the car body interior.

*Easy cold starting.* An essential driver requirement of any engine is that it should possess good cold starting behaviour and then continue to run without hesitation during the warming-up period. A present-day additional requirement is that the cold starting process should be accomplished with the least emission of polluting exhaust gases and detriment to fuel economy. To monitor the required enrichment of the air and fuel mixture for cold starting, increasingly sophisticated controls are now being applied to carburetor auto-

matic choke and fuel injection auxiliary supply systems, these controls forming part of what are now termed "engine management systems".

*Economic servicing.* An important owner requirement of a car is that its engine design should acknowledge the need to reduce servicing costs. This aim may be approached by minimizing the number of items that need periodic attention by a service engineer. For example, the use of hydraulic tappets eliminates the need for adjustment of the valve clearances. It is also promoted by allowing ready access to those items of engine involved in routine preventive maintenance, such as drive-belt tensioner, spark plug, and petrol oil filters.

*Least weight.* Petrol engine should be made as light as possible. This is because a corresponding reduction in car weight can make significant improvements not only in fuel economy and acceleration capability, but also in general handling and ease of maneuvering the car.

*Compact size.* For modern car, the manufacturer strives to provide maximum interior space for minimum possible exterior dimensions. Thus the trend is towards having the front wheels driven, with the power unit (engine or transmission) installed transversely between them; the conventional arrangement was to have longitudinally mounted power unit from which the drive was taken to the rear wheels. It follows that the requirement now is for a more compact engine. This is because the engine length is controlled by the distance available between the steerable front wheels, less that required by the transaxle (combined gearbox and final drive), its width by the distance available between the radiator and the dash structure, less that required by the engine auxiliaries; and its height by the need for a low and slopping bonnet line, which contributes to efficient aerodynamic body shape.

*Economic manufacture.* This is a most important requirement for any new design of engine, since putting it into production demands a massive initial investment on the part of car manufacturer. For economic manufacture a new design of engine should lend itself as far as possible to existing automatic production processes and require minimum of special tooling. The cost of material will be reduced in building a smaller engine, and the construction should be as simple as possible to minimize the number of parts to be assembled and thereby farther reduce manufacturing costs.

### *4. Найдите в тексте эквиваленты слов и словосочетаний.*

Механическая энергия, большинство, цилиндры двигателя, важное требование, преобразование энергии, сопротивление движению, очевидный источник шума, трение качения, использовать, выхлопные газы, последовательные события, трансмиссия, топливная экономичность, ускорение

### *5. Выберите правильный вариант окончания предложений.*

1. The car engine is a device for....
   a) minimizing the amount of crude oil used to produce petrol.

b) converting the internal energy of fuel into mechanical energy.
c) initiating combustion process in the cylinders.
d) reducing exterior noise to socially acceptable limits.

2. Petrol engines operate on...
a) spark ignition.
b) compression ignition.

3. In internal combustion engine the conversion of energy takes place in...
a) a carburetor.
b) the engine cylinder.
c) the fuel tank.
d) the exhaust system.

4. Easy cold starting means …
a) definite temperature in the cylinder.
b) enrichment of air and fuel mixture.
c) improved combustion efficiency
d) running without hesitation during warm-up period.

5. The use of hydraulic tappets …
a) contributes to easy cold starting.
b) reduces exterior noise.
c) eliminates the need for adjustment of valve clearance.
d) makes the car much cheaper.

6. The trend is towards the front wheels driven with the power unit installed
a) longitudinally between them.
b) behind them.
c) above them.
d) transversely between them

7. For economic manufacture a design of engine should require …
a) compact size
b) minimum of special tooling.
c) increasingly sophisticated control.
d) ready access to its parts.

***6. Укажите, соответствуют ли предложения тексту (True) или нет (False)***

1. In the internal combustion engine energy conversion takes place within the engine cylinder.

2. Exhaust gases of the car do not contribute to pollution.

3. There is no need to minimize the amount of crude oil used to provide petrol.

4. A very important requirement of the engine is an improved accelerated capability.

5. Cold starting process should be accomplished with the least emission of polluting exhaust gases.

6. Petrol engine must be as heavy as possible.

7. Engine length is controlled by the distance between rear wheels.

8. The reduction of service cost is achieved by less amount of fuel.

***7. Выберите правильный ответ на вопрос.***

1. What type of piston do the most car engine have?

a) A rotary piston.

b) A reciprocating piston.

c) An epicyclical piston.

2. What is the source of noise?

a) The wheels

b) The engine

c) The doors

d) The pumps

3. What does the term “energy” imply?

a) The amount of fuel

b) The weight of a car

c) The longest service life

d) The capacity to perform work

***8. Прочтите текст без словаря***

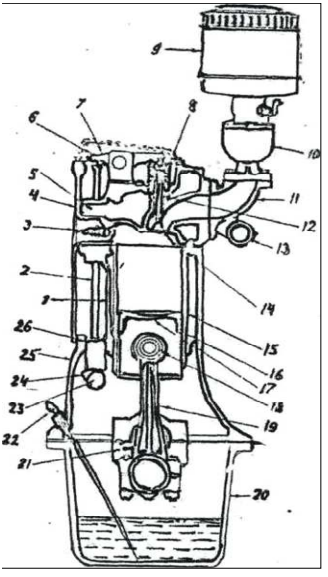



Fig. 1. Basic Engine Nomenclature: **1.** cylinder block; **2.** push rod; **3.** sparkplug **4.** cylinder head; **5.** water jacket; **6.** valve stemclearance adjustment;***7.*** rocker arm;***8***. valve spring; ***9.*** air clearer;***10.*** carburetor; ***11.*** intake manifold; ***12.*** valve guide;***13.*** exhaust manifold (connectedto exhaust valve behind intake valve); ***14***. intake valve (exhaust valve behind not shown); ***15.*** removable sleeve (wet liner); ***16.*** piston ring; ***17.*** piston; ***18.*** piston pin; ***19.*** connecting rod; ***20.*** oil pan; ***21.*** crankshaft; ***22.*** oil stick; ***23.*** camshaft;***24.*** cam; ***25.*** crankcase;***26.*** tappet.

## General Engine Layout

In designing an engine of a given power output, the requirements of light weight, compact overall dimensions and economy of operation must be borne in mind. By the latter not only a low specific fuel consumption is

understood, but also simple maintenance, fatigue resistance and long engine life. If all these requirements are to be met, they must be first of all thoroughly studied by the designer in order to enable him to select the fundamental engine parts and general layout best suited for given engine.

## Parts of Basic Combustion Engine

The basic petrol engine parts* are shown in Fig. 1. The most important parts, particularly for an automotive type engine, are: a cast-iron cylinder block (1) to hold the cylinders in a fixed position: a cast-iron or aluminum cylinder head (4) which is the covering for the combustion chamber: a cast-iron crankcase (25) which is usually formed with the cylinder block which, as its name implies, is a structure for holding the crankshaft; a pressed-steel oil pan (20) for sealing the bearings from dirt and holding the oil for lubrication; a forged-steel crankshaft (21) to transform the reciprocating motion of the piston to rotary motion of the drive shaft; a forged-steel connecting rod (19) to join the piston and the crankshaft; a cast-iron or aluminum piston (17) to receive the power impulse and to seal the cylinder so as to prevent the gases from escaping; a spark plug (3) to ignite the mixture of gasoline and air; an inlet valve (14) to admit the mixture and an exhaust valve to discharge the exhaust of burnt gases after the power stroke; valve spring (8) to control the motion of the valves; tappets (26) to take the thrust and eccentric loading imposed by the cams (24) of the camshaft (23). The camshaft is driven at one-half of the crankshaft speed by timing gears (not shown). The intake manifold (11) is a passageway leading to the inlet valves. At the beginning of this manifold there is a carburetor (10), which feeds the liquid fuel into the manifold air stream where it is partially vaporized.The exhaust manifold (13) similarly is the pipe or passageway leading from the exhaust valves to the atmosphere. Other parts are named in the illustration.

* The various parts of the engine may be made of many materials, but the most usual material is indicated in the text.

***9. Укажите, соответствуют ли предложения тексту (True) или нет (False)***

1. Cylinder heads are made of steel.
2. The exhaust manifold is a pipeline leading from exhaust valve to the atmosphere.
3. The most usual material for engine parts is copper.
4. Inlet valve is used to discharge the burnt gases.

***10. Выберите правильный вариант окончания предложений.***

1. The crankshaft is usually formed...
   a) with crankshaft.
   b) with cylinder block.

c) apart from cylinder block.
d) with air cleaner.

2. The function of a spark plug is...
   a) to exhaust the burnt gases.
   b) to hold the crankshaft.
   c) to ignite the mixture of gasoline and air.
   d) to control the motion of the valves.
3. The intake manifold is a passageway leading...
   a) to the exhaust valves.
   b) to the connecting rod.
   c) to the inlet valves.
   d) from the combustion chamber.

# UNIT III

**Text: The Reciprocating Piston Petrol Engine. Operating Principles**

**Grammar: Infinitive Constructions (Continued)**

***1. Прочтите и переведите слова без словаря.***

Operate, construct, patent, pioneer, cylinder, mixture, compress, electric, pressure, result, product, rotation, kinetic energy, term, mass, principle, reservoir, expansion, actual, practice, revolution.

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Motor vehicle petrol engine, liquid-fuelled motor vehicle engine, twin-cylinder Daimler engine, sequence of events, run, preliminary cranking of the engine, inlet valve, exhaust valve, induction stroke, compression stroke, power stroke, exhaust stroke, charge of mixture, by virtue,

***3. Прочтите и переведите текст.***

## The Reciprocating Piston Petrol Engine

### Operating Principles

**The four-stroke petrol engine**

As with the various repeating cycles of events in nature, so does the motor vehicle petrol engine need to operate on a constantly repeating cycle known as the four-stroke principle. It would seem to be generally accepted that the first internal combustion engine to operate successfully on the four-stroke cycle was constructed in 1876 by Nicolaus August Otto. Although the Otto engine ran on gas, which was then regarded as a convenient and reliable fuel to use, it nevertheless incorporated the essential ideas that led to the development in 1889 the first successful liquid-fuelled motor vehicle engine. This was twin-cylinder Daimler engine, patented and built by the German automotive pioneer Gottlibe Daimler. The Daimler engine was subsequently adopted by several other car manufacturers and, in most respects, it can be regarded as the true forerunner of the modern four-stroke petrol engine. In this type of engine the following sequence of events is continuously repeated all the time it is running.

*1. The induction stroke.* The piston is at the top dead center, TDC. Both inlet and exhaust valves are closed. As the piston descends the inlet valve opens so that a charge of mixture can flow into the cylinder.

*2. The compression stroke.* Immediately after piston reaches the lowest position (bottom dead center, or BDC) and begins to rise again the inlet valve is closed so that the mixture can be compressed by the rising piston.

*3. The power stroke.* As the piston again reaches the TDC an electric spark is caused to pass between the points of the spark plug located at the pot of the cylinder in a zone referred to as a combustion chamber. The spark ignites the mixture. As both valves are closed, there is a considerable pressure rise; as a result the piston is forced down the cylinder.

*4. The exhaust stroke.* Before the piston reaches the BDC, the exhaust valve is opened, pressure is released, piston rises and purges the products of combustion from the cylinder and combustion chamber.

It thus follows that one complete cycle of operations occupies two complete revolutions of the engine crankshaft. Since energy is necessarily required to perform the initial induction and compression strokes of the engine piston before firing occurs, an electrical starter motor is used for preliminary cranking of the engine. Once the engine is running the energy required for performing subsequent induction, compression and exhaust strokes is derived from the crankshaft and flywheel system, by virtue of its kinetic energy of rotation. Kinetic energy is a term used to express the energy possessed by a body due to its mass and motion. The principle of an engine flywheel is therefore to act as a storage reservoir for rotational kinetic energy, so that it absorbs energy upon being speeded up, and delivers it when slowed down. In the four-stroke cycle, the functions of admitting the combustible charge before its compression and releasing the burnt gases after their expansion are performed by the engine inlet and exhaust valves. The opening and closing of the inlet and exhaust valves are not, in actual practice, timed to coincide exactly with the beginning and ending of the induction and exhaust strokes; nor is the spark timed to occur exactly at the beginning of the power stroke.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Электроды свечи зажигания, маховик, верхняя мертвая точка, заряд топливной смеси, камера сгорания, расположенный, повышение давления, коленчатый вал, полный оборот, двигатель с электростартером, надежное топливо.

***5. Закончите определение.***

Kinetic energy is the energy...

a) of expanding gases
b) stored in engine fuel
c) possessed by a body due to its mass and motion
d) released during burning of combustible charge

***6. Выберите правильный ответ.***

1. What is the position of valves during the intake stroke?
   a) Both valves are open
   b) Inlet valve is open.

c) Both valves are closed.
d) Inlet valve is closed.

2. When is the mixture of air and gasoline ignited?
a) During the intake stroke.
b) During the exhaust stroke.
c) During the power stroke.
d) During the compression stroke.

***7. Укажите, соответствуют ли предложения тексту (True) или нет (False).***

1. Daimler engine operated on two-stroke principle.
2. The opening of exhaust valve is timed to coincide exactly with the beginning of exhaust stroke.
3. One complete cycle if operation occupies two complete revolutions of the crankshaft.
4. Otto engine ran on gasoline.

***8. Укажите правильную последовательность действий.***

1. Piston begins to descend.
2. Both inlet and exhaust valves are closed.
3. Piston reaches BDC.
4. Inlet valve opens.
5. Piston is at TDC.
6. A combustible charge flows into the cylinder.

***9. Прочтите текст без словаря.***

## Engine Design

Automotive engines may be classified in several different ways according to these design features:

*Valve arrangement*. Engines may be classified according to the location of the valves and the number of valves per cylinder. Many engines have the valves located in the cylinder head, and these engines are referred to as overhead valve engines. The majority of engines have two valves per cylinder, but engines with four valves per cylinder have become increasingly popular in recent years.

*Camshaft location*. Engines with a single camshaft positioned above the valve train on the cylinder head may be referred to as single overhead camshaft (SOHC) engines. Other engines have two camshafts located above the valve train in the cylinder head, and these engines are called dual overhead camshaft (DOHC) engines. V-type engines may have dual camshafts located above each cylinder head. Some SOHC engines, or DOHC engines have the

camshaft located in the cylinder head rather than above the valve train. Other engines have the camshaft positioned in the cylinder block.

*Ignition type*. Engines may be classified as spark ignition (SI), or compression ignition (CI). In an SI engine, the air-fuel mixture in the combustion chamber is ignited by a spark at the spark plug electrodes. The fuel-air mixture in a CI engine is ignited by the heat of compression. Diesel engines use the CI principle, and these engines have much higher compression than SI engines.

*Cylinder arrangement*. The most common arrangements of engine cylinders are in-line, V-type, and opposed. An in-line engine has the cylinders mounted vertically and positioned in a line directly behind each other. V-type engines usually have 6 or 8 cylinders located in a V formation with an angle of 60 degrees or 90 degrees between the sides of the block. Other V-type engines have been used; for example, one manufacturer is now marketing a V10 engine. In an opposed engine, the cylinders are positioned horizontally across from each other.

*Number of cylinders*. Engines are designed with 3, 4, 5, 6, 8, 10, or 12 cylinders.

***10. Ответьте на вопросы.***

1. How may automotive engines be classified?
2. Where are the valves in many engines located?
3. How are these engines referred to?
4. How many valves per cylinder do engines have?
5. Why are engines called SOHC and DOHC?
6. What camshafts may V-type engines have and where are they located?
7. How may engines be classified according to ignition type?
8. In what engines are SI and CI used?
9. What are the most common arrangements of engine cylinders?
10. Describe every type of cylinder arrangement.

# UNIT IV

**Text: The Diesel Engine. Operating Principles**

**Grammar: Infinitive. Revision**

***1. Прочтите и переведите слова без словаря.***

Diesel, vacuum, temperature, depression, inject, cycle, generalization, thermal, equivalent, maximum, rotational, function, vibration, risk, finally, construction

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Smoky exhaust, thermal efficiency, compression ignition, cool running characteristics, pulling power, timing, cruising speeds, inject, turning effort or torque, ratio, fuel injection equipment

***3. Прочтите и переведите текст.***

## Diesel Engine. Operating Principles

**The four-stroke diesel engine**

The essential difference between the petrol and the diesel engine is that the former relies on spark ignition (SI) and the latter on compression ignition (CI). In the four-stroke diesel cycle the following sequence of events is continuously repeated all the time the engine is running.

*1. The induction stroke,* during which air only is taken into the combustion chamber and cylinder, as a result of a partial vacuum or depression created by the retreating piston.

*2. The compression stroke,* in which the advancing piston compresses the air into very small volume of the combustion chamber and raises the temperature high enough to ensure self-ignition of the fuel charge. This demands compression pressures considerably in excess of those employed in the petrol engine.

*3. The power stroke,* immediately preceding which the fuel charge is injected into combustion chamber and mixes with the very hot air, and during which the gases of combustion expand and perform useful work on the retreating piston.

*4. The exhaust stroke,* during which the products of combustion are purged from the cylinder and combustion chamber by the advancing piston and discharged into the exhaust system.

As in the case of the petrol engine, the timing for the opening and closing of the inlet and exhaust valves, and also that for injection the fuel departs from the basic four-stroke operating cycle.

**Comparison of diesel and petrol engines**

The following generalization may be made on the use of diesel versus petrol engines in commercial vehicles and, more recently, cars:

1. The diesel engine has better fuel economy than the petrol engine. This is because its thermal efficiency is 30-36 per cent, compared with the 22-25 per cent of a petrol engine. Thermal efficiency is the ratio of useful work performed by the engine to the internal energy it receives from its fuel.

2. The diesel engine has generally proved to be more reliable, to need less maintenance and also to have a longer life than an equivalent petrol engine. These advantages derive mainly from its sturdier construction and cooler running characteristics.

3. Although a petrol engine develops its maximum power at higher rotational speeds than an equivalent diesel engine, the latter can provide better pulling power. This is because the maximum turning effort or torque exerted by the crankshaft of the diesel engine is greater and also better maintained over a wider range of engine speeds.

4. A disadvantage of the diesel engine is that it tends to be heavy and bulky in relation to its power output. This is explained by the greater operating pressures and loads that have to be catered in the construction of the diesel engine.

5. The noise and vibration level of the diesel engine, especially under idling and low speeds operation, compares unfavourably with the petrol engine. Again, this is chiefly a function of the much higher cylinder pressures in the diesel engine. More recent diesel-engined motor cars have nevertheless been praised for their low level of noise at motorway cruising speeds.

6. The diesel engine is sometimes criticized for having smoky exhaust of unpleasant odour, although it is the invisible products of combustion in the exhaust gases of a petrol engine that are more harmful to the environment.

7. A safety consideration is that the fuel oil used in motor vehicle diesel engines is far less dangerously flammable than petrol, thus reducing fire risk in the event of an accident. Finally, the basic cost of the diesel engine, together with its associated fuel injection equipment, is generally higher than that of an equivalent petrol engine.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Искровое зажигание, частичный вакуум, существенное различие, по сравнению, на холостом ходу, обеспечить самовозгорание заряда топлива, поднимающийся/опускающийся поршень, четырехтактный дизельный двигатель, впускной и выпускной клапаны, гораздо менее огнеопасный, вредный для окружающей среды.

***5. Укажите, соответствуют ли предложения тексту (True) или нет (False).***

1. Fuel charge and air are taken into the combustion chamber together.
2. Thermal efficiency of a diesel engine is higher than that of a petrol engine.
3. A diesel engine operates on spark ignition.
4. With a diesel engine there is less fire risk in the event of an accident.

***6. Выберите правильный вариант окончания предложений.***

1. During the induction stroke the depression is created by...
   a) advancing piston.
   b) powerful pump.
   c) retreating piston.
   d) the valves.
2. The maximum torque exerted by the crankshaft of a diesel engine is...
   a) less than that of a petrol engine.
   b) greater than that of a petrol engine.
   c) equal to that of a petrol engine.
3. The diesel engine is sometimes criticized for...
   a) less reliability.
   b) having smoky exhaust.
   c) large amount of consumpted fuel.
   d) its ignition equipment.
4. Thermal efficiency is...
   a) the amount of fuel it takes.
   b) temperature reached in its cylinders.
   c) the ratio of useful work performed by the engine to the internal energy it receives from its fuel.

***7. Укажите правильную последовательность тактов.***

1. The power stroke
2. The compression stroke
3. The exhaust stroke
4. The induction stroke

***8. Прочтите текст без словаря.***

to deliver – *зд.* обеспечивать
displacement – рабочий объем
truck – грузовой автомобиль
soot – нагар
glow plug – запальная свеча
to aid – помогать, способствовать

generate – вырабатывать
to screw – завинчивать
resemble – иметь сходство

**Question:** How come a diesel engine doesn't have spark plugs?

**Answer:** Because diesel engines use the heat of compression to ignite fuel instead of a spark. Diesel engines have very high compression ratios, typically 16 to 1 and higher. When the piston comes up on the compression stroke, therefore, it creates very high temperatures in the combustion chamber. A diesel engine has no carburetor or throttle like a gasoline engine, so only air is drawn into the cylinders. The fuel is then injected directly into the combustion chamber through a mechanical fuel injector. When it hits the hot air, it ignites and burns just like gasoline ignited by a spark. It's a relatively simple design that delivers high fuel efficiency (typically 30 to 40% higher than a gasoline engine of equal displacement) and low carbon monoxide emissions (but a lot of soot).

**Glow Plugs**

Most passenger car and light truck diesel engines have something called "glow plugs" to aid cold starting. Because the diesel engine relies only on heat to ignite the fuel, generating enough heat while cranking a cold engine can be a problem. So each cylinder has a small electric heating element (the glow plug) screwed into an area of the combustion chamber called the "pre-combustion chamber" to help get the engine started.

A glow plug resembles a miniature spark plug except that it has no electrodes. On the end that screws into the head is a metal bulb with a resistor inside that glows red hot when voltage is passed through it. The glow plugs are wired to a relay and a timer and are used only when the engine is first started. The plugs go out once the engine starts.

On older diesels, a "WAIT" light comes on when the ignition is first turned on to allow time for the glow plugs to heat up. When the WAIT light goes out (which may take from 5 to 20 seconds depending on the application), the engine can be cranked and started.

Glow plugs can eventually burn out and may have to be replaced. A symptom of bad glow plugs would be hard cold starting problems.

***9. Выберите правильный вариант окончания предложений***

1. To ignite fuel a diesel engines use ….
   a) the kinetic energy
   b) the heat of compression
   c) the spark
   d) the mechanical energy

2. On the compression stroke piston creates very high temperatures in the ….

a) injector
b) float chamber
c) cylinder
d) combustion chamber

3. The fuel is then injected directly into the combustion chamber through ….

a) a throttle
b) a mechanical fuel injector
c) special wires
d) a carburetor

4. To help get the engine started each cylinder has ….

a) a mechanical heating element
b) a relay
c) an electric heating element
d) combustion chamber

5. Glow plugs can eventually ….

a) fail
b) rust
c) burn out
d) leak

# UNIT V

**Text: Engine Cooling**

**Grammar: Participle I. Forms and Functions.**

***1. Прочтите и переведите слова без словаря.***

Theory, efficient, material, result in, metal, system, practice, specific, mass, constant, inertia, generate, circulating, portion, immune, service, criticisms, reserve, deform, structure, circulate, region, atmosphere, thermosyphonic, block, radiator, conduction, convection, originally, collector, tank, jacket

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Adverse effects, engine lubrication, lubricating oil films, heat exchanger matrix, engine coolant, mean temperature difference, corrosive products,

rubber connecting hose, leakage, sheet metal ducting, baffle, header pipe,

water jacket, fin, the specific heat, inlet elbow, valve port, creep

***3. Прочтите и переведите текст.***

## ENGINE COOLING

**The need for engine cooling**

From the viewpoint of converting heat into mechanical energy, it follows that if each piston accomplished its power stroke starting at the temperature of combustion, such an engine would in theory be highly efficient. To achieve it in practice, however, would entail unacceptably high operating temperatures with adverse effects on both engine lubrication and materials.

Excessively high operating temperatures would cause breakdown of the lubricating oil films, resulting in undue wearing and possible seizure of the working parts. The behaviour of metals at high temperatures also differs from that at normal temperatures and can produce a condition known as creep, in which the metal deforms slowly and continuously at a constant stress. For these reasons the engine must be provided with a system of cooling, so that it can be maintained at its most efficient practicable operating temperature. In practice, motor vehicle engines are designed either for indirect cooling by air through the medium of water or, less commonly, for direct cooling by air. These two systems are known simply as water cooling and air cooling respectively. Each system possesses certain advantages over the other.

**Advantages of water cooling**

1. Cooling is more uniform because heat is transferred with greater rapidity from he engine metal surfaces to water than it is to air. This can be explained by the specific heat of water being higher than that of air, so that if equal masses of water and air each receive the same quantity of heat, the water will experience the least rise of temperature. Consequently there will be a more rapid transfer of heat as a result of the higher mean temperature difference between the metal surfaces and the water in contact with them.

2. Cooling is more constant because the time taken for water to rise through a given temperature range is longer than that for the same mass of air. This property of water possessing a greater thermal inertia than air can be advantageous in maintaining a more nearly constant operating temperature – that is, when the rate of heat emission equals the rate at which heat is generated in the engine.

3. Interior heating for the vehicle is improved because outside air may be directed through the heat exchanger matrix, which can be conveniently heated by circulating a portion of the engine coolant through it.

**Advantages of air cooling.**

1. Warm-up of engine is more rapid because of the lower specific heat of the air cooling medium; heat is less readily transferred from the engine metal to the air being circulated around it, as a result of their lower mean temperature difference.

2. The system is inherently more reliable because air cooling is immune to either freezing or boiling of the coolant around the cylinder heads and cylinders, and to the loss of coolant. It is also free from any build-up of corrosive products that can restrict coolant passages.

3. Less maintenance is required in service because there is neither the requirement to check the cooling medium for level and condition, nor the need to inspect rubber connecting hoses for signs of leakage.

Certain criticisms that are customarily levelled at air cooling should be treated with some reserve: these include less reliability for heavy-duty application, greater power consumption and noisiest operation.

## ENGINE AIR – COOLING SYSTEM

With air cooling, the engine structure is directly cooled by inducing air to flow over its high-temperature surfaces. They are finned to present a greater cooling surface area to the air, which in non-motor-cycle applications is forced to circulate over them by means of a powerful fan. The car engine structure is almost entirely enclosed by sheet metal ducting, which incorporates a system of baffles. A similar arrangement is used with the diesel engine. These baffles ensure that the through flow of air is properly directed over the cooling surfaces of the cylinders and cylinder heads. To maintain

uniform temperatures, the air is forced to circulate around the entire circumference of each cylinder and its cylinder head, the direction of flow being along the cooling fins. These are greatest in number, consistent with providing a sufficient area of flow, on the high-temperature surfaces of the cylinder head in the region of exhaust valve. The complete system forms what is known as a plenum chamber in which the internal pressure is higher than that of the atmosphere.

Finally, the heated air is discharged from the plenum chamber to the atmosphere, or redirected to heat the car interior.

## ENGINE WATER – COOLING SYSTEM

A very simple form of engine water-cooling, known as natural or thermosyphonic circulation, was used in many early motor vehicles up to the late 1930s. This type of water-cooling system consisted of the following components:

*Water jacket*. This was formed partly in the cylinder block and partly in the cylinder head and surrounded the cylinder walls, combustion chamber and valve ports. It was provided with a lower inlet and an upper outlet connection, the latter sometimes being called the header pipe.

*Radiator*. The purpose of the so-called radiator is to dissipate the engine heat rejected to the coolant. This it does mainly by conduction and convection. It originally consisted of an upper header tank that received the heated coolant from the engine; a matrix or core that served to disperse the down flow of coolant onto fine streams and also provided for a through flow of cooling air; and a lower collector tank from which coolant was returned to the engine jacket.

*Flexible connection* Rubber hoses with clips were used to connect the cooling jacket header pipe to the inlet pipe of the radiator header tank and the outlet pipe of the radiator collector tank to the inlet elbow of the cooling jacket.

*Other fittings.* The radiator header tank was fitted with a filler cap and an overflow pipe and the collector tank with a drain tap. Suitable mounting lugs were also provided at the top and bottom of the radiator.

*Radiator fan.* In many, but not all, early thermosyphonic cooling system a fan was mounted behind the radiator and driven by belt and pulleys from either the crankshaft or the camshaft. Its purpose was to assist the through flow of air normally resulting from the forward motion of the vehicle and also create an air flow when the vehicle was stationary with the engine idling.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

С точки зрения, преобразовать тепло в механическую энергию, температура горения, высокоэффективный, в теории, на практике, накопительная камера, водяное охлаждение, воздушное охлаждение, преимущество, свойство, сквозной поток воздуха

***5. Выберите правильный вариант окончания предложений.***

1. Condition in which metal deforms slowly and constantly at a certain stress is called ….
   a) seizure.
   b) wearing.
   c) converting.
   d) creep.
2. Excessively high operating temperatures would cause …
   a) increase of oil consumption.
   b) build-up of corrosive products.
   c) breakdown of a lubricating oil film.
   d) higher emission of polluting gases.
3. Air cooling system is more reliable because …
   a) special heat of air is rather low.
   b) cooling is more constant.
   c) power consumption is not great.
   d) it is immune to the loss of coolant
4. With water cooling system the transfer of heat is more rapid because of …
   a) greater thermal inertia of water than that of air.
   b) higher mean temperature difference between water and metal surface.
   c) low loss of coolant.
   d) maintaining a more nearly constant operating temperatures.
5. With air cooling the warm-up of engine is more rapid because …
   a) less maintenance is required.
   b) outside air may be directed through the heat exchange matrix.
   c) specific heat of air is lower.
   d) There is neither boiling or freezing of the coolant.

***6. Укажите, соответствуют ли предложения тексту (True) или нет (False)***

1. Specific heat of water is higher than that of the air.
2. Warm-up of an air-cooled engine is more slow.
3. Cooling is used to avoid overheating of engine.
4. The behaviour of metals at low and high temperatures is quite the same.
5. In motor cycles air is forced to circulate by means of a fan.
6. Water jacket is provided with the header pipe.
7. Plenum chamber is used in water-cooling systems.

***7. Одно из подчеркнутых словосочетаний употреблено неправильною. Укажите его.***

1. In case of air cooling the objects of criticism are less reliability for heavy-duty applications (A), excessive wear of parts (B), greater power consumption (C), noisiest operations (D).

2. A water-cooling system consists of an inlet valve (A), a water jacket (B), a radiator C) and flexible connections (D).

***8. Выберите правильный ответ на вопрос.***

1. How is the engine cooled with air cooling system?
   a) It is cooled by air heated to a certain degree.
   b) It is cooled with the help of some control devices.
   c) It is directly cooled by inducing air to flow over high-temperature surfaces.
   d) It is cooled by lubricating oil film.
2. Why are high-temperature surfaces finned?
   a) To reduce internal pressure in plenum chamber.
   b) To present a greater cooling area to air.
   c) To avoid adverse effects on engine materials.
   d) To maintain constant temperature in cylinders.
3. What is the purpose of the radiator?
   a) To connect cooling jacket header pipe to inlet pipe of header pipe.
   b) To force the air to circulate around the entire circumference of cylinders.
   c) To prevent loss of coolant.
   d)To dissipate the engine heat rejected to the coolant.
4. Where is the radiator fan mounted?
   a) Above the radiator.
   b) Behind the water jacket.
   c) Behind the radiator.
   d) Below the radiator.

***9. Укажите номера предложений, в которых описывается система воздушного охлаждения.***

1. With the help of baffles the through flow of air is properly directed.
2. Radiator fan is driven by belt and pulleys from either crankshaft or camshaft.
3. In plenum chamber the internal pressure is higher than that of the atmosphere.
4. High-temperature surfaces are finned.
5. Rubber hoses with clips are used to connect the cooling jacket header pope to the header tank.

***10. Прочитайте текст без словаря.***

rural setting – сельская местность
gravel roads – гравийная дорога
debris – наслоения грязи, пыли
to trap – улавливать

to deteriorate – ухудшаться
heavy-duty truck – грузовой автомобиль большой грузоподъемности
to embed – глубоко въедаться

**Question:** How often should I replace my air filter?

**Answer:** It's hard to give a specific time or mileage figure because the life of the filter depends on how much crud it ingests. A filter that lasts 20,000 or even 30,000 miles on a vehicle that's driven mostly on expressways may last only a month or two in a rural setting where the vehicle is driven frequently on gravel roads. Changing it annually or every 15,000 miles for preventative maintenance may be a good recommendation for the city driver, but not its country cousin.

Regardless of the mileage or time, a filter should be replaced before it has reached the point where it creates a significant restriction to airflow. But when exactly that point is reached is subject to opinion.

A slightly dirty filter actually cleans more efficiently than a brand new filter. That's because the debris trapped by the filter element helps screen out smaller particles that try to get through. But eventually every filter reaches the point where it causes enough of a pressure drop to restrict airflow. Fuel economy, performance and emissions begin to deteriorate and get progressively worse until the dirty filter is replaced.

Many heavy-duty trucks have a "restriction" meter on the air filter housing that signals when the filter is dirty enough to need replacing. But lacking such a device, the best you can do is guess.

Removing the filter and holding it up to a light will show you how dirty it is. If it's really caked with dirt, it obviously needs to be replaced. Trying to shake or blow the dirt out is a waste of time because too much of it will be embedded in the filter fibers.

NOTE: Many filters that appear to be dirty are in fact still good and do not really need to be replaced. So it's up to you. If you think it's dirty, replace it. If you don't think it's dirty enough to need replacing, then don't.

***11. Скажите, соответствуют ли данные предложения тексту. Если не, опровергните их. Используйте фразы That's (not) true, That's (not) right, I(don't) agree.***

1. The life of the filter doesn't depend on a specific time or mileage.
2. A filter lasts the same time on a vehicle that's driven mostly on expressways and in a rural setting,
3. You should replace a filter before it creates a significant restriction to airflow.
4. A new filter always cleans better than even a slightly dirty one.
5. Performance, fuel economy, and emissions do not depend on a filter.
6. You may simply try to shake or blow the dirt out instead of replacing the filter.

# UNIT VI

**Text: Oil Engine Breakdown**

**Grammar: Participle II. Functions.**

***1. Прочтите и переведите слова без словаря.***

Numerous, construction, results in, risk, clearance; periodical tests, principal, bolt, construct, vibration, shock, generally, test, tendency circulating, serious, contain, prevention, efficiency, temperature, inefficient

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Breakdown, fastenings, failure, seizure, knocking, slack, bedplate, wreckage of the engine, cylinder castings, sedimentary, descaling, affect adversely, strain, cracking, lubrication, damaging stresses, clearance, smash, friction, consequence

***3. Прочтите и переведите текст.***

## Oil Engine Breakdown

There are numerous causes of oil engine breakdowns; these include unsatisfactory design and construction of the engine, which are by no means common causes, and which in any case are matters for the engine maker. Other causes are unsatisfactory adjustment of the parts, improper alignment of the parts, failure of fastenings, faulty cooling of the engine, and inefficient lubrication.

Unsatisfactory adjustment of parts which work together results in excessive wear and tear. There is risk of seizure and breakdown if the parts are too tight, or are not provided with the necessary clearance; and in knocking and consequent damaging stresses if they are too slack. It is well to regard knocking as a sign of approaching breakdown, and give attention to the trouble immediately it is noted.

Improper alignment causes over-stress of the various parts, which is likely to cause early breakdown. Periodical alignment tests carried out by men capable of doing this highly skilled work are strongly advised.

The principal cause of cracking of crankshafts and bedplates is improper alignment. Fastenings for oil engines include bolts, set screws and studs. These occasionally fail because they are not suitably designed and constructed of high-class material. Failure, however, is far more often owing to neglect to keep the fastenings quite tight when the connected parts are subjected to motion, vibration, and if shocks, so that hammering or knocking and its evil consequences result. Connecting-rod bolts in particular must be kept quite tight, for the slightest hammering with these will soon lead to failure, and this will generally be followed by a costly smash, and perhaps wreckage

of the engine. All important fastenings should be tested for tightness as frequently as practicable.

Excessive tightening, or the application of undue force to the spanner, is a common cause of failure of bolted fastenings, especially of small fastenings. Anyone can tighten a nut or a set screw, but comparatively few men can do the work properly, because of the general tendency to apply more tightening force than is necessary. The tightening of important oil engine fastenings is a job for skill and care.

When the cooling of an engine by the circulating water is faulty, probable serious consequences are cracking of the cylinder castings, seizure of the piston and consequent breakdown. To ensure satisfactory cooling, an ample supply of good clean water must be circulated continuously through the water spaces while the engine is running, and for a short time after a stationary engine is shut down. If water containing sedimentary or scale-forming matter must be used, frequent washing out or descaling is essential for the prevention of overheating and breakdown. It is a common mistake to suppose that a large volume of cold water must be circulated, and that the lower the outlet temperature, the better. This practice cools the engine too much, and not only reduces the engine efficiency, but induces unwanted stresses in tile cylinder castings, and adversely affects the piston and cylinder lubrication. Approved practice is to introduce the water al a temperature well above cold water temperatures – at least 100º F – and regulate the volume so that the outlet temperature will be at least 140º F.

As with unsatisfactory adjustment of parts which work together, inefficient lubrication results in excessive friction and wear, with risk of seizure and breakdown. If a piston, owing to this trouble, does not move very freely in the cylinder, connecting rod bolts are unduly strained. Should the piston seize, the bolts may fail immediately, and a disastrous breakdown occur, including smashing of the piston itself, and irreparable damage to the crankshaft, which is one of the most costly parts of an oil engine.

The modern oil engine by a first-class maker is a reliable machine and the risk of breakdown is slight if the engine is well looked after by a careful attendant.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Ни в коем случае, неправильная регулировка, заглушить двигатель, болт, установочный винт, шпилька, плохая центровка, малейший стук, надежный механизм, гайка, периодические проверки выравнивания, растрескивание коленвала, пока двигатель работает, болты шатуна

***5. Выберите правильный вариант окончания предложений.***

1. If parts are too tight, there is a risk of…
   a) knocking.
   b) seizure.

c)cracking.
d) hammering.

2. Excessive tightening may result in…
a) smashing of the piston.
b) cracking of the crankshaft.
c) failure of bolted fastenings.
d) overheating.

3. The outlet temperature of cooling water must be...
a) 100°F.
b) 100°C.
c) 140°F.
d) 200°F.

***6. Укажите, соответствуют ли предложения тексту (True) или нет (False).***

1. Periodical alignment test are not necessary.
2. Not anyone can tighten a nut or a set screw properly.
3. The lower the outlet temperature of the water, the better.
4. Inefficient lubrication results in excessive tear and wear.

***7. Одно из подчеркнутых словосочетаний употреблено неверно. Укажите его.***

1. Causes of engine breakdowns include failure of fastening (A), inefficient lubrication (B), accidents (C), faulty cooling (D).

2. Fastenings for oil engine include bolts (A), springs (B), set screws (C) and studs (D).

***8. Прочитайте текст без словаря.***

to solve – решить
catalytic converter – каталитический нейтрализатор выхлопных газов
misfire – пропуск зажигания
to dump – сбрасывать
to soar – резко повышаться
to meltdown – расплавлять
copper – медь

**Question:** I have a couple of bad plug wires on my engine. Should I replace only the bad ones or the entire set?

**Answer:** It depends on your budget, how much longer you plan to keep your vehicle, and how much time you want to spend fixing your car. If one plug wire is bad, chances are you have others that are getting bad, too. Replacing only the wire that's bad will solve your immediate ignition problem and minimize your repair expense. But sooner or later another wire will fail,

and another, and another. So you can wait until the next problem develops to replace the next wire, and so on as the need arises, or you can replace all of the wires at once and be done with it. It's up to you.

**Don't Ignore It**

How much of an effect can a bad plug wire have on performance? One misfiring plug in a four cylinder engine can cause a 25% drop in power and fuel economy, not to mention an enormous increase in exhaust emissions.

There is also the possibility that a bad plug wire may damage your catalytic converter. The converter's job is to reburn exhaust pollutants, not raw fuel. But that's what happens when a plug misfires because of a bad wire. With every other revolution of the engine, a cylinderfull of unburned gasoline is dumped into the exhaust. When the raw fuel hits the converter, temperatures soar. This can overheat the converter and cause a meltdown of the catalyst inside resulting in a partial or complete blockage in your exhaust system!

**About Ignition Wires**

The spark plug wires or sables conduct high voltage current from the distributor or ignition coil pack (distributorless ignition systems) to fire the spark plugs. The cables are part of the engine's "secondary" ignition system.

The spark plug wire's job is to provide a conductive path that doesn't leak voltage. The earliest spark plug wires were copper, aluminum or steel wire wrapped with insulation sufficient to contain about 12,000 volts (12 KV) of electricity. But when high voltage current surges through a low resistance wire, the wire becomes a broadcast antenna and sends out radio waves.

***9. Ответьте на вопросы***

1. What can replacing only the bad wire do?
2. How can power change with a misfiring plug?
3. What is a job of catalytic converter?
4. Where is unburned gasoline dumped?
5. Why can a partial or complete blockage in exhaust system happen?
6. What are the spark plug wires used for?
7. When does a low resistance wire become a broadcast antenna?

# UNIT VII

**Text: Complete Overhaul of Vehicle Oil Engines**

**Grammar: Participial Constructions.**

***1. Прочтите и переведите слова без словаря.***

Factory, inspection, accident, type, process, pump, placed, monorail, individual container, condition, detector, section, litre, standard, special, production line, spray, assembly

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Journal, the fuel-injection pump and other subassemblies, an assembly track, the sump, cleaning solutions and solvents, the stripping bay, reface and harden, 'dry' liners, 'wet' liners, metal spraying, grinding, sludge, rust, valve cover

***3. Прочтите и переведите текст.***

## Complete Overhaul of Vehicle Oil Engines

Engines come back to the factory after years of service, having suffered varying degrees of wear and tear. After an inspection in order to ensure that the engine has not suffered gross damage from neglect or from impact in an accident, it is marshalled with others of the same type. From the receiving bay, engines pass into the factory and the process is to remove the fuel-injection pump and other sub-assemblies. The sump, valve cover and other exterior parts are then removed, enabling the interior parts and other items to be easily cleaned and handled. The partly dismantled engine now passes on to the tunnel wash, where it is thoroughly cleaned. On emerging from the tunnel wash, the unit is placed on a monorail and moves on to the stripping bay, where bits and pieces are removed, including cylinder head studs. As the parts are detached they are inspected and each serviceable one is placed in an individual container for further treatment. Parts automatically discarded as no longer serviceable are scrapped.

All usable parts are passed through a number of cleaning solutions and solvents. At this stage, oil, sludge, rust and carbon are removed and the part is then so clean that it is difficult to reconcile it with the condition in which it was received. All parts now pass into a bay and are sorted out and inspected. Cylinder blocks, cylinder heads, crankshafts, etc., pass into the crack-detector section before being inspected. Parts received from the inspection section go on to the rework section. Here they undergo machining operations, such as grinding of crankshaft to either 0.015 in., 0.030 in., or 0.045 in. under-size.

Camshafts are checked for alignment and if necessary, straightened or re-centered journals are ground to 0.005 in. and cams refaced and hardened. Cylinder blocks for the 5.1- and 3.4-litre engines are fitted with standard size 'wet' liners, whilst the other 2.2- and 2.55-litre units have new standard 'dry' liners fitted. Cylinder heads are refaced and new exhaust and inlet valves installed; valve-seat inserts are fitted where necessary. All seatings are tested. The valve-rocker shaft, when necessary, is built-up and machined; rocker arms are rebushed and pads reground and rehardened. There is a special production line for cylinder blocks and heads.

Connecting rods are stripped, caps refaced and replaced, and the housing honed and new thin wall bearings fitted to suit the crankshaft crankpin size; the small-end bush is removed and a new one fitted. All flywheels have the starter ring removed, the face ground and a new starter ring shrunk on.

Where possible, parts are built up by metal spraying, and there is a special section for this purpose. Parts which receive this treatment include camshafts, journals, water-pump shafts, rocker shafts, etc. After being metal sprayed the parts are machined to standard size.

Assembly of the engine takes place on an assembly track, one line for each type of engine. The cylinder block-cum-crankcase is first on the line, then each piston and connecting-rod assembly is fitted. Next comes the crankshaft, and so on until the unit is completely assembled. Finally, the engine passes into the last shop to complete its tests. All tests are carried out at full load to ensure that the engine, after passing its tests, is suitable and ready for installation.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Частично разобранный двигатель, различные степени износа и разрывов, получить значительные повреждения, готовый к установке, при полной нагрузке, более не пригоден к эксплуатации, выполнить тесты, наружные части, дать возможность, шпильки головок цилиндров, дальнейшая обработка, заменить втулку, сборка двигателя, шлифование, совмещение

***5. Укажите, соответствуют ли предложения тексту (True) или нет (False).***

1. The interior parts can be cleaned and handled after removing the exterior parts.
2. The usable parts don't need any washing.
3. Sludge, rust and carbon are removed from the parts with the help of cleaning solutions.
4. Camshafts are straightened or re-centered if necessary.
5. All seatings are tested.
6. All flywheels have the starter ring replaced.

***6. Выберите правильный вариант окончания предложений.***

1. Parts automatically discarded as no longer serviceable are …
   a) removed
   b) replaced
   c) scrapped
   d) ground
2. Before being inspected cylinder blocks, pass into …
   a) the tunnel wash
   b) the crack-detector section
   c) an assembly track
   d) the stripping bay
3. All tests are carried out at …
   a) high pressure
   b) normal compression
   c) low temperature
   d) full load
4. After passing all the tests, the engine is suitable and ready for …
   a) rehardening
   b) metal spraying
   c) installation
   d) alignment

***7. Прочитайте текст без словаря.***

stem – стержень
to suck – всасывать
knurling – насечка
sleeving – гильзование
boring out – расточка, сверление
finish – отделка
instances – случай
bearing – подшипник
to regain – снова приобрести

**Question:** My engine uses about a quart of oil every 1,000 miles. Should I be concerned?

**Answer:** Not if you plan to sell or trade your vehicle soon. An engine that uses a quart of oil every 1,000 miles is starting to show the effects of wear. The amount of oil it is still acceptable, but it will gradually increase as the miles add up. When it reaches the point where it's using a quart every 500 miles or less, it's time for an overhaul.

Oil consumption depends primarily on two things: the valve guides and piston rings. If the valve guides are worn, or if there's too much clearance between the valve stems and guides, or if the valve guide seals are worn,

cracked, missing, broken or improperly installed, the engine will suck oil down the guides and into the cylinders. The engine may still have good compression, but will use a lot of oil.

An oil consumption problem caused by worn valve guides can usually be cured by a valve job. Knurling, sleeving or replacing the guides, or boring out the guides and installing valves with oversized stems will stop the loss of oil.

Oil can also get past the rings if the rings or cylinders are badly worn or damaged, if the cylinders were not honed properly when the engine was built (or rebuilt), or if the rings were installed improperly.

When a newly-built engine is first started, the rings require a certain amount of time to "seat" or break-in. If the rings fail to seat properly, the engine will use oil. This may be the case if somebody applied the wrong finish to the cylinders, failed to clean and lubricate the cylinders properly before the engine was fired up, or didn't use the proper break-in procedure.

If the rings and/or cylinders are at fault, the engine will have lower than normal compression readings.

In some instances, worn rod bearings, excessive bearing clearances and/or excessive oil pressure can splash too much oil on the cylinders causing oil to get past the rings.

The cure for worn rings and cylinders is to overhaul the engine block. The cylinders have to be refinished and new rings installed to regain good oil control.

***8. Ответьте на вопросы***

1. What does using a quart of oil every 500 miles or less mean?
2. What does oil consumption depend on?
3. How can oil consumption problem caused by worn valve guides cured?
4. What can stop the loss of oil?
5. Why can oil get past the rings?
6. What will happen if the rings fail to seat properly?
7. When can too much oil be splashed on the cylinders?

# UNIT VIII

**Text: How and Where to Look For Leaks**

**Grammar: Participle. Revision.**

***1. Прочтите и переведите слова без словаря.***

Pedal, master, cylinder, inspect, examine, pumps, stop, indication, check, detection, thermostat, radiator, indicate, carburetor, differential, transmission, selector, system

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

Radiator drain plug, filler plug, engine core plug, heater hoses, heater core, handle, filler neck, thermostat housing, substance, leakage, radiator pressure cap, evaporate, fittings, carburetor mounting bolts,

***3. Прочтите и переведите текст.***

## How and Where to Look For Leaks

*Brakes.* The first evidence of a brake fluid leak that many drivers get is when the brake pedal hits the floor. Don't let it go this far. If the pedal starts to get low, check fluid level in the master cylinder. It should be about ½ inch from the top. A brake system can leak from lines, hoses, connections, wheel cylinders or master cylinder. Inspect for leaks by examining connections. hoses and lines from the master cylinder back to each wheel while someone pumps the brake pedal. If the leak is from a connection, tightening the nut will often stop it. If a line or hose is leaking, replace it. If you spot brake fluid on the sidewall of a tire, the wheel cylinder is probably leaking. Pull the wheel and check. Another indication of a wheel cylinder leak is a wheel that grabs when the brake pedal is applied. If you haven't uncovered the leak, don't give up. It is probably internal, past the seals of the master cylinder. The master cylinder should be overhauled or replaced.

*Cooling system.* To determine if the cooling system is leaking, check the coolant level by removing the radiator pressure cap. Make sure the engine is cold. The top of the coolant should be 1 to 3 inches below the top of the filler neck. Never overfill the radiator. If the radiator is losing coolant, check all connections for leakage while the engine is cold. Small leaks in particular can escape detection when the engine is hot, because coolant will evaporate rapidly. Start the engine (cold) and examine top and bottom hoses, hose connections, thermostat housing, radiator top and bottom tanks, radiator core, radiator drain plug, engine core plugs, heater hoses and heater core. If you don't spot the actual leak, shut off the engine and examine everything once more. A grayish-white or rust-colored substance is a sign of a leak. One more leakage

possibility is an internal crack in the block. Heat up the engine, put out the oil dipstick and let some oil drop on the hot exhaust manifold. If it sizzles, it signifies that coolant is getting into the oil.

*Engine.* An engine may be using oil because of an internal problem, such as worn piston rings or valve guides. However, you should not overlook the possibility that oil may be leaking. I n fact, an external examination is the first thing to perform if the oil dipstick indicates a loss of oil. While you are driving, if your engine drips just three drops of oil every 100 feet, it will lose three quarts in 1,000 miles! Often the cause may be a bad gasket that requires replacement.

*Fuel system.* When full, fuel systems handle anywhere from 17 to 26 gallons of volatile gasoline and are extremely troublesome. However, connections can loosen. That's why you should tighten fuel-line and fuel-pump fittings.In addition, give carburetor mounting bolts and cover screws a twist.

*Shock absorbers.* Inspect shock absorbers at the seal covers for shock-absorber fluid, a thin liquid that has a brown tint. A slight trace of fluid around the seal cover is acceptable. However, if the leak is heavy, replace the shock absorber.

*Differential.* Remove the filler plug and check with your finger. Level should be high enough to feel the fluid. If not, add lubricant and tighten the differential cover bolts. This will stop any loss of fluid unless the cover gasket is bad.

*Transmission.* In most cases you bring the transmission up to operating temperature, leave the engine running with the transmission selector lever in 'park' and check the dipstick.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Признак, направляющая клапана, затянуть гайку, изношенные поршневые кольца, указатель уровня масла, прокладка, осмотр, амортизатор, тормозная жидкость, колесный тормозной цилиндр, переполнять радиатор, тормозная педаль, проверить уровень жидкости, выхлопной патрубок

***5. Одно из подчеркнутых словосочетаний употреблено неверно. Укажите его.***

A brake system can leak from master cylinder (A), hoses (B), tank (C), lines (D).

***6. Укажите, соответствуют ли предложения тексту или нет).***

1. Fuel level in the master cylinder should be about 2 inches from the top.
2. Coolant evaporates rapidly.
3. Internal cracks in the block may result in leakage.
4. Shock absorber fluid is thick colorless liquid.

***7. Выберите правильный вариант окончания предложений.***

1. If the brake pedal gets low, one should check fluid level in…
   a) wheel cylinder. c) master cylinder.
   b) connection. d) hoses.
2. When radiator loses coolant, connection should be checked when the engine is …
   a) cold. c) shut off.
   b) idling. d) at full load.
3. The top of the coolant should be...
   a) about 0.5 inches from the top.
   b) 1 to 3 inches from the bottom of the radiator.
   c) 2 cm from the top of the filler neck.
   d) 1 to 3 inches from the top of the filler neck.
4. An engine may be using oil because of…
   a) leaking wheel cylinder. c) worn piston rings.
   b) low coolant level. d) high operating temperatures.

***8. Прочтите текст без словаря.***

choke – дроссель
linkage – соединение
rusty – ржавый
jammed – засоренный. забитый
to stick – заедать
solvent – растворитель
to alleviate – облегчить
relay – реле
corroded – корродированный
viscosity – вязкость

**Question:** My engine is hard to start when it's cold. What's wrong?

**Answer:** If your engine has a carburetor, the hard starting problem is most likely choke related. If the engine cranks normally and the spark plugs are not worn or dirty, the choke probably needs to be repaired or adjusted.The choke may be set too rich or too lean. Either way can cause hard starting. Inside the choke housing there is a bimetal spring that regulates the tension on the choke according to temperature. If this spring is broken, the choke will not operate. If the choke linkage is rusty or jammed with varnish deposits or dirt, it may stick or not operate smoothly. Cleaning with carburetor spray or solvent may help alleviate a sticking problem.

On older fuel injected engines, a separate "cold start" injector is used to spray additional fuel into the intake manifold when a cold engine is first started. If this injector is not working, the engine can be hard to start. The injector is controlled by a timer and relay, so if either of these components is

defective it can prevent the cold start injector from doing its job, too.If your engine cranks slowly, your cold starting problem is not fuel related, but may be due to a weak battery, loose or corroded battery cables, or a weak starter.

Check for obvious problems first. Remove, clean and inspect the battery cables (both ends). Then check battery charge and condition. If the battery charge is low, recharging the battery may temporarily solve your problem. But there's a reason why your battery is low. You probably have a charging system problem that requires further diagnosis. If your battery is more than four or five years old, it is probably near the end of its service life and needs to be replaced. A "load test" will tell you if it still has sufficient cranking capacity to provide reliable cold starting. Slow cranking during cold weather (below freezing) can also be caused by oil that is too thick. A high viscosity oil such as straight 30 or 40 weight oil in the crankcase can make an engine very difficult to crank when the temperature drops. Switching to lighter multiviscosity oil such as 10W-30 or 10W-40 should solve this problem.

***9. Выберите правильный вариант окончания предложений.***

1. In engine with carburetor the hard starting problem may be …
   a) compression related.
   b) fault ignition.
   c) choke related.
   d) fuel related.
2. Inside the choke housing there is …
   a) a filter.
   b) a bimetal spring.
   c) a plate.
   d) steel spring.
3. A sticking problem may be alleviated by ….
   a) cleaning with a solvent.
   b) replacing the choke.
   c) changing oil.
   d) repairing the spring.
4. The injector is controlled by,
   a) special plates
   b) a spring and a bearing
   c) a timer and relay
   d) copper wires
5. Slow cranking during cold weather can be caused by ….
   a) bad gasoline.
   b) oil that is too thick.
   c) improper oil additives.
   d) leakage.

# UNIT IX

**Text: Burnt Valves**

**Grammar: Gerund. Forms and Functions.**

***1. Прочтите и переведите слова без словаря.***

Mechanic, limit, diagnosis, compression, condition, cylinder, start, normal, mile, thermal, erosion, metal, area, contact, process, emission, hydrocarbon, indicator, clearance, compression, elevate, problem, detonation, eliminate, gasoline, antique, classic

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

A leak-free seal, run much hotter, the valve seat, pin(v), reface, replace, failure, buildup, cam follower, valve recession, pounding, valve lash, retard, fuel additive, lubricant

***3. Прочтите и переведите текст.***

## Burnt Valves

**Question:** My mechanic says my engine has a "burnt valve". What does that mean?

**Answer:** A "burnt valve" is a valve that has overheated and lost its ability to hold a leak-free seal. Valve burning is usually limited to exhaust valves because they run much hotter than intake valves.

The diagnosis of a burnt valve is usually the result of a compression test. If a cylinder shows little or no compression, it frequently means the exhaust valve is not sealing. The valve may or may not be actually burnt (melted), but have other physical damage such as cracks or areas where pieces of metal are missing or eroded away from the valve face.

The cure for this condition is to remove the cylinder head, replace the bad valve and reface (or replace) the valve seat. As a rule, the head is usually given a complete valve job at the same time because the rest of the valves and guides probably need attention, too. If one exhaust valve has failed, the rest are probably on the verge of failure if they haven't already started to leak.

**Why valves burn**

There are several reasons why valves burn. One is normal wear. As an engine accumulates miles, the constant pounding and thermal erosion wears away the metal on the face of the valve and seat. The exhaust valve sheds most of its heat through the seat, so when the face and seat become worn and the area of contact is reduced, the valve starts to run hot. Eventually the buildup of heat weakens the metal and pieces of it start to break or flake

away. Once this happens, it forms a hot spot that accelerates the process all the more. The valve begins to leak and compression drops. The result is a weak or dead cylinder and a noticeable drop in engine power, smoothness and performance.

A bad exhaust valve will also increase exhaust emissions significantly because it allows unburnt fuel to leak into the exhaust. High hydrocarbon (HC) emissions, therefore, may also be an indicator of a burnt valve.

An exhaust valve can also burn if the valve lash closes up for some reason (improper lash adjustment, cam or lifter wear, a bent push rod, worn rocker arm or cam follower, etc.). The lack of lash (clearance) in the valvetrain prevents the valve from closing fully, which causes it to leak compression and overheat.

Valve burning can also be caused by any condition that makes the engine run hot or elevates combustion temperatures. This includes cooling problems, abnormal combustion like detonation or preignition, loss of exhaust gas recirculation (EGR), retarded ignition timing or lean fuel mixtures.

**Valve recession**

A condition known as "valve recession" can allow the valves to recede or sink into the head because of excessive seat wear. This causes the valve lash to be lost which allows the valves to leak and burn. It occurs primarily in older engines (mostly those built prior to 1975) that were not designed to run on unleaded gasoline. When leaded gasoline was still around, lead acted like a lubricant to reduce valve seat wear. But when lead was eliminated, it meant engines had to be made with harder seats. These older engines didn't have hard seats, so many began to experience valve wear problems when switched to unleaded fuel. If you're driving an antique or classic car, therefore, you should either use some type of lead substitute fuel additive to protect the valves or have the seats replaced with hard seats when the engine is overhauled.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Нормальный износ, перегреваться, испытание на сжатие, физическое повреждение, еще больше ускорить процесс, погнувшийся толкатель, неэтилированный бензин, выделение продуктов сгорания с выхлопными газами, клапанное коромысло, преждевременное воспламенение, бедная топливная смесь

***5. Прочитайте текст без словаря.***

to refurbish – счищать ржавчину
to involve – включать в себя
to warn – предупредить
to skip – пропустить
to sprinkle – насыпать

to disrupt – разрушать
welding – сварка
warpage – коробление. деформация

**Question:** What is a "valve job" and when is it necessary?

**Answer:** A valve job is removing the cylinder head(s) from the engine so the valves, guides and seats can be refurbished to restore compression and oil control. A valve job may be necessary by the time an engine has 80,000 or more miles on it, or to fix a "burnt valve", compression or oil burning problem.

Before we describe all the steps that a typical valve job involves, we should warn you that some shops don't necessary do all the steps. In other words, you get what you pay for. A "cheapie" valve job might skip a lot of things that saves you a few dollars in the short run, but may end up costing you a lot more in the long run. So look for a shop or service facility that does quality work.

A valve job typically begins by disassembling, cleaning and inspecting the cylinder head. Cast iron heads are "Magnafluxed" to check for hairline cracks. This involves applying a strong magnetic field to the head and sprinkling iron powder on it. Cracks disrupt the magnetic field and attract the iron powder, making invisible cracks easy to see.

Cracks are bad news because they can leak coolant into the combustion chamber damaging the cylinders and/or causing the engine to lose coolant and overheat. If cracks are found in any critical areas of the head, the head must either be repaired or replaced. Cracks in cast iron heads are most often repaired by "pinning" (installing a series of overlapping threaded pins). Cracks in aluminum heads are very common and can often be repaired by welding.

If a head has been repaired (pinned or welded), most shops will usually pressure test the head afterward to make sure there are no leaks. Some may also apply a sealer compound to the inside of the water jackets as added insurance against future leaks.

Once the head passes this point, it is also checked for flatness. The surface of the head must be flat to seal the head gasket against the block. Excessive warpage, roughness or any damage can cause the head gasket to fail. If the head exceeds the maximum allowable out-of-flatness specs, it must be resurfaced or replaced.

### *6. Ответьте на вопросы*

1. When is a valve job necessary?
2. How does a valve job begin?
3. What are cast iron heads checked for?
4. How are cracks made easy to see?
5. Why are cracks bad news?
6. How are cracks in cast iron heads and aluminum heads repaired?
7. Where is a sealer compound applied?
8. What can excessive warpage cause?

# UNIT X

**Text: General Engine Difficulties**

**Grammar: Gerundial Constructions.**

***1. Прочтите и переведите слова без словаря.***

General, indicate, diagnosis, identify, professional, mechanic, oscilloscope, companion, momentarily, distributor, terminal, carbon, electrode, type, injector, check, vibration, defective, signal, voltmeter, connector, indicate, computer, identify, nature, minimal, lifter

***2. Переведите слова и словосочетания из текста с помощью технического словаря.***

An ignition raster pattern, multipoint fuel injected engines, hood, grille, distributorless ignition system, the injector wiring connector, a voltage reading, a blown head gasket, fouling, "power balance" test, the plug terminal, coil pack

***3. Прочтите и переведите текст.***

## General Engine Difficulties

**Question:** My engine has a steady miss and gets terrible fuel mileage. What's wrong?

**Answer:** A steady miss indicates one of three things: a cylinder that isn't firing because of an ignition problem, a cylinder that isn't firing because it isn't receiving fuel (multipoint fuel injected engines only), or a cylinder that has lost compression.

The first step in diagnosing this kind of problem is to identify the dead cylinder. A professional mechanic can do this quickly by hooking the engine up to an ignition oscilloscope and displaying an ignition raster pattern. The dead cylinder will show a firing voltage that is significantly higher or lower than its companions depending on the nature of the problem. He might also do a "power balance" test and/or a compression test to find the dead cylinder. One way you can find a weak or dead cylinder is to momentarily disconnect each of your engine's spark plug wires one at a time while the engine is running. When the plug wire is removed from the spark plug, there should be a big drop in idle speed and idle smoothness. When you pull a wire and there's little or no change in idle speed or quality, you've found the bad cylinder.

It makes no difference whether you remove each plug wire from the spark plug or the distributor (or coil pack on distributorless ignition systems). The idea is to simply disconnect each cylinder for a moment to see if it makes any difference in the way the engine runs. The one that makes no difference is the problem cylinder.

**Ignition diagnosis**

If you disconnect the plug wire from the spark plug and hold the end of the wire close to the plug terminal or other metal surface, you should see a spark and/or hear a crisp snapping noise if voltage is getting through the wire. No spark would tell you the plug wire is bad, voltage is arcing inside the distributor cap (remove and inspect the cap for cracks and carbon tracks – replace if any are found) or a dead coil on a distributorless ignition system (*Note*: on most distributorless ignition systems, each coil fires two cylinders. So if both cylinders are dead, you know for sure the coil is not working. If only one cylinder is dead, however, it's not the coil).

If all of the plug wires seem to be sparking okay, the next step would be to remove the spark plug in the problem cylinder. Fouling is a common cause of ignition misfire. Examine the end of the plug. If the electrode is covered with deposits, clean or replace the spark plug. Also, note the type of deposits on the plug. Thick, black, wet or oily-looking deposits would tell you the cylinder is burning oil (probably due to worn valve guides, rings and/or cylinder wall). If the deposits are a powdery black, the cylinder is running too rich (probably due to a leaky injector on a multipoint fuel injected engine). If the deposits are brown or gray, it indicates a normal buildup. However, the plug may be fouled because it hasn't been changed for a long time, because it is the wrong "heat range" for your engine application (you need a hotter plug), or because of frequent short trip stop-and-go driving. In any event, if the plug is fouled you should probably remove, inspect and clean or replace all of the spark plugs.

**Fuel diagnosis**

If the dead cylinder is receiving spark through the plug wire and the spark plug itself appears to be okay (not wet or fouled), and your engine has multipoint fuel injection you may have a dead fuel injector.

To check for this kind of problem, start the engine and place your finger on the injector. You should feel a buzzing vibration if the injector is working. No buzz means the injector is either defective or it is not receiving a voltage signal through its wiring harness. You can check for the presence of voltage with a 12 volt test light or voltmeter. Disconnect the injector wiring connector and attach the test light or voltmeter between the injector and connector. If the light doesn't flash or you don't see a voltage reading when the engine is running, it indicates a wiring or computer problem that will require further diagnosis. If voltage is getting through but the injector isn't working, then the injector is defective and needs to be replaced.

Sometimes the injector will appear to be working but really isn't. It will be receiving voltage and buzzing as normal, but because it is clogged up with varnish deposits little or no fuel is actually being squirted into the cylinder. If ignition and compression are both okay in the bad cylinder, therefore, it would tell you the injector is clogged. On-car cleaning may reopen the

clogged injector is the varnish isn't built up too thick. But a completely clogged injector usually doesn't respond well to this type of cleaning. It either has to be removed for off-car cleaning (which may or may not succeed in reopening it) or be replaced.

**Compression diagnosis**

If the dead cylinder is getting spark and fuel, the only thing that's left is a compression problem. The most likely causes here would be a leaky valve (probably an exhaust valve since they run much hotter than intake valves and usually fail or "burn" first), a blown head gasket (this usually involves two adjacent cylinders, however), or a rounded or badly worn cam lobe.

A compression check will verify if the cylinder is developing its normal compression. Little or no compression would verify any of the above problems. A leakage test could also be used to further diagnose and identify the nature of the problem (valves, head gasket or cam). Air leakage through the exhaust port would indicate a bad exhaust valve. Air leakage back through the intake manifold would indicate a bad intake valve. Air leaking into an adjacent cylinder would indicate a blown head gasket. Minimal leakage would indicate a rounded cam lobe.

Leaky valves would require removing the cylinder head and having a valve job performed. A leaky head gasket would require removing the head and replacing the gasket (and probably resurfacing the head to restore flatness). A cam problem would require removing and replacing the camshaft and lifters (old lifters should never be reused with a new cam).

*CAUTION*: Disconnecting spark plug wires while the engine is running is dangerous because you risk getting shocked. You can minimize this danger one of several ways. One is to wear rubber gloves and use insulated spark plug wire pliers to momentarily disconnect each plug wire. Another is to make sure no part of your body is touching or leaning against any metal surface on the vehicle (the fender, hood, grille, etc.). Or, you could turn the engine off, remove a plug wire, restart the engine, note any change in idle, then repeat for each of the remaining spark plugs.

***4. Найдите в тексте эквиваленты слов и словосочетаний.***

Давать перебои, неработающий цилиндр, впускной коллектор, пробег в милях на галлон израсходованного топлива, провод к свече зажигания, крышка прерывателя-распределителя зажигания, неработающая топливная форсунка, пучки проводов, крыло, два соседних цилиндра, выступ кулачка, повторная обработка поверхности

***5. Прочитайте текст без словаря.***

battery-and-coil ignition system – система зажигания от батареи через катушку

low-tension primary circuit – первичная цепь системы зажигания низкого напряжения

source of supply – источник питания

ignition coil – катушка зажигания

electrical discharge – электрический разряд

the current – ток

capacitor – конденсатор

arcing – искрение, образование электрической дуги

rotor arm – ручка распределителя зажигания

to incorporate – включать

## Components of the Coil Ignition System

The non-electronic battery-and-coil ignition system comprises the following units:

*Battery and charging system.* This is the source of supply of electrical energy for the low-tension primary circuit of ignition system.

*Ignition switch.* The purpose of this is to connect and disconnect ignition system from the battery and charging system so that the engine can be started and stopped by the driver.

*Ignition coil.* The purpose of this is to transform voltage from a low-tension source, that is battery and charging system, into a high-tension tension voltage sufficient to promote electrical discharge across a fixed air gap at the spark plug.

*Ballast resistor.* This may be added to the ignition coil for the purpose of improving the life of contact breakers points, since except under starting conditions the resistor reduces the current flowing through the ignition coil primary circuit.

*Contact breaker.* This is a cam-actuated interrupter switch contained in the ignition distributor, its function being to open and close the ignition coil primary circuit.

*Capacitor.* This is connected across the contact breaker points and provides temporary storage for electric energy as they open, thereby minimizing arcing that would otherwise shorten their life.

*Rotor arm and distributor cap.* In combination these provide a rotary switch that receives the high-tension current from the ignition coil each time the primary circuit is interrupted, and then distributes it to the appropriate cylinder spark plug.

*Ignition distributor.* Apart from including the contact breaker, rotor arm and distributor cap, it must also incorporate a mechanism for automatically varying the ignition timing in accordance with engine operating requirements.

*Ignition leads.* These are heavily insulated cables conveying the high-tension current from the coil to the distributor and thence to the spark plugs.

*Spark plugs***.** Their purpose is to conduct the high-tension current from the ignition system into combustion chambers of engine cylinders, wherein they promote an electric discharge across a fixed gap between their electrodes to ignite the combustible charge.

***6. Скажите, соответствуют ли данные предложения тексту. Если нет, опровергните их. Используйте фразы: That's (not) true, That's (not) right, I (don't) agree.***

1. Battery and charging system is the source of supply of electrical energy for the high-tension primary circuit of ignition system.
2. Ignition coil is to transform voltage.
3. The resistor can't alter the current flowing through the ignition coil primary circuit.
4. Contact breaker opens and closes the ignition coil primary circuit.
5. Ignition distributor incorporates a mechanism for automatically varying the ignition timing.
6. The purpose of spark plugs is to open and close valves.

# UNIT XI

**Text: Honda Cars**

**Grammar: The Verbals. Revision.**

***1. Прочтите и переведите слова без словаря.***

Specification, separate (adj), distance, revolution, horizontal, double, center, control, version, model, standard

***2. Прочтите и переведите текст.***

## Honda Cars

**Key to Specification**

Notchback – coupe or sedan with a separate truck
Hatchback – coupe or sedan with a rear liftgate
Wheelbase – distance between the centers of the front and rear wheels
Curb weight – weight of base models, not including optional equipment
Engines: ohv – overhead valve
ohc – overhead cam
dohc – double overhead cam
I – inline cylinders
V – cylinders in V configuration
flat – horizontally opposed cylinders
Engine size, l/cu.in – liters/cubic inches
Fuel delivery: bbl. – barrel (carburetor)
TBI – throttle-body (single-point) fuel injection
PFI – port (multi-point) fuel injection
RPM – revolutions per minute
Brakes: ABS – anti-lock braking system
NA – not available

## Honda Prelude (Built in Japan)

***SPORTS COUPE***

A new high-performance version on this front-drive sport coupe is the most powerful *Honda* passenger car ever. *Prelude* is otherwise little changed. The new model is called the VTEC, for Variable Valve Timing and Lift Electronic Control. This *Honda* engine system is applied to a new twin-cam version of the overhead-cam 2.2-liter 4-cylinder used in the base Prelude S. It furnishes 190 horsepower, 55 more than the base *Prelude* S and 30 more than the twin-cam 2.3-liter *Prelude* Si. VTEC also gets inch-larger wheels and tires than other *Preludes*. All models have a standard driver-side air bag. VTEC and Si 4WS (4-wheel-steering) models add a standard passenger-side air

bag. Anti-lock brakes (ABS) are standard on all but the S. For '93, the center rear-seat glovebox / armrest has been revised to provide more rear-seat space. We haven't tried the VTEC yet, but it should make Prelude more performance-competitive with the likes of the V-6 *Ford Probe* GT and *Mazda* MX-6 LS. Otherwise, *Prelude* remains a sporty 2+2 for those who value finesse more than features – and are willing to pay for it. This is about the costliest car in the sporty coupe class. Still, *Prelude* engines run turbine-smooth, and the Si is both quick and fairly frugal (in our test, 8.4 seconds 0-60 mph and 22.5 mpg overall with manual transmission). Handling is poised and responsive, though we don't think the 4WS adds enough to justify its extra cost. Herky-jerky automatic-transmission shift action, an odd mechanical/electronic instrument layout, a very tight aft cabin and trunk are negatives. We admire the Prelude in most key respects except outright dollar value.

**Specifications**

| | |
|---|---|
| Body type..... | 2-door notchback |
| Wheelbase (in.)..... | 100.4 |
| Overall length (in.)..... | 74.8 |
| Overall width (in.)..... | 69.5 |
| Overall height (in.)..... | 50.8 |
| Curb weight (Ibs.)..... | 2866 |
| Seating capacity..... | 4 |
| Front head room (in.)..... | 38.0 |
| Max. front leg room (in.)..... | 44.2 |
| Rear head room (in.)..... | 35.1 |
| Min. rear leg room (in.)..... | 28-1 |
| Cargo volume (cu. ft.)..... | 7.9 |
| Engine type..... | dohc 1-4 |
| Engine size (l/cu. in.)..... | 2.3/138 |
| Fuel delivery..... | PFI |
| Horsepower @ rpm..... | 160 @ 5800 |
| Torque @ rpm..... | 156 @ 4500 |
| Transmission..... | man/5-sp. |
| Drive wheels..... | front |
| Brakes, F/R..... | disc/disc (ABS) |
| Tire size..... | 205/55VR15 |
| Fuel tank capacity (gal.)..... | 15.9 |
| EPA city/highway mpg..... | 22/26 |
| Test mileage (mpg)..... | 22.5 |

**Warranties**

The entire car is covered for 3 years/36,000 miles. Body perforation rust is covered for 3 years/unlimited miles.

## HONDA ACCORD (Built in Japan and Marysville, Ohio)

**MID-SIZE**

Honda's front-drive intermediate gets a new-top-of-the-line Special Edition coupe and sedan – the latter with a passenger's side air bag. *Accord* is otherwise unchanged as it heads into the last year of its current design. Both SEs come with leather upholstery, specific-design alloy wheels, and premium Bose audio system as standard.-The coupe also sports a rear spoiler with integral center stoplamp, while the sedan gets a standard passenger air bag to match the driver-side air bag made standard for all *Accords* last year. Otherwise, coupe and sedan return in DX, LX, and EX guise, 5-door wagons in LX and EX trim. All use a 2.2-liter 4-cylinder engine with either a 5-speed manual transmission or a 4-speed automatic..SE and EX models have 140 horsepower, other *Accords* have 125. Anti-lock brakes (ABS) are standard on EX and SE, unavailable elsewhere. Accord has good performance even without a V-6 match that of the *Toyota Camry* and *Ford Taurus*. Virtues include a fine ride, sensible controls, airy cabin, and standard air bag. We'd like to see the SE sedan's passenger air bag available on lesser models. And ABS shouldn't be exclusive to the most expensive models. Accord's rear seat isn't spacious for a mid – size car, head room isn't generous for tall folks, and the wagon is lacking in cargo volume compared to the *Taurus* wagon. Fuel economy is good but not great and the automatic occasionally shifts harshly. But pluses still far outnumber minuses, so *Accord* should remain on.the| must-see list again in '93. Your best dollar buy is one of the LX models, but dealers should be willing to negotiate on any *Accord*.

**Specifications**

| | |
|---|---|
| Body type.....…… | 4-door notchback |
| Wheelbase (in.)..... | 107.1 |
| Overall length (in.)..... | 185.2 |
| Overall width (in.)..... | 67.1 |
| Overall height (in.)..... | 54.7 |
| Curb weight (lbs.)..... | 2987 |
| Seating capacity..... | 5 |
| Front head room (in.)..... | 38.9 |
| Max. front leg room (in.)..... | 42.6 |
| Rear head room (in.)..... | 37.5 |
| Min. rear leg room (in.)..... | 34.3 |
| Cargo volume (cu. ft.)..... | 14.4 |
| Engine type..... | ohc 1-4 |
| Engine size (l/cu. in.)..... | 2.2/132 |
| Fuel delivery..... | PFI |
| Horsepower @ rpm.....…… | 140 @ 5600 |

| | |
|---|---|
| Torque @ rpm.....…… | 142 @ 4500 |
| Transmission.....……. | auto/4-sp. |
| Drive wheels..... | front |
| Brakes, F/R.....…… | disc/drum |
| Tire size.....……. | 195/60HR15 |
| Fuel tank capacity (gal.)..... | 17.0 |
| EPA city/highway mpg..... | 22/28 |
| Test mileage (mpg)..... | 21.5 |

**Warranties**

The entire car is covered for 3 years/36,000 miles. Body perfora-tion rust is covered for 3 years/unlimited miles.

***1. Прочтите и переведите слова без словаря.***

driver-side air bag, front-drive, front-drive sport coupe, Anti-lock brakes, Variable Valve Timing and Lift Electronic Control, twin-cam version of the overhead-cam 2.2-liter 4-cylinder used in the base Prelude S, inch-larger wheels, 4-wheel-steering, rear-seat, glovebox, automatic-transmission, leather upholstery

***2. Подберите синонимы к словам.***

1. frugal
   a) economic
   b) heavy
   c) fast
   d) expensive
2. virtue
   a) advantage
   b) disadvantage
   c) cargo volume
   d) space

3. Выберите правильный вариант окончания предложений.

1. Wheelbase is the distance between the centers of...
   a) the front wheels
   b) the rear wheels
   c) the front and the rear wheels
2. Curb weight is the weight of...
   a) a base model without optional equipment
   b) a base model with full trunk.
   c) a base model including optional equipment.
3. One of disadvantages of Honda Prelude is...
   a) rather low power output.
   b) herky-jerky automatic – transmission shift action.

c) four wheel steering system.
d) a new twin-cam version of ohc.

4. Honda Prelude is...
   a) a sedan hatchback.
   b) a coupe notchback.
   c) a sedan notchback.
   d) a coupe hatchback

5. Что обозначает буква T в сокращении VTEC?
   a) torque
   b) transmission
   c) timing
   d) tappet

***4. Укажите, соответствуют ли предложения тексту (True) или нет (False).***

1. Honda Prelude is a car of 4WD type.
2. The power output of VTEC model is higher than that of Honda Prelude S.
3. All Honda Prelude models have standard driver-side air bag.
4. Honda Prelude has a rear liftgate.
5. Tall people can feel very comfort on rear seats in Honda Accord.
6. Honda Accord has a separate trunk.
7. Anti-lock brakes are standard on all models.
8. Honda Accord sedan SE has no passenger-side air bag.

***5. Выберите правильный ответ на вопрос.***

1. What type of body does Honda Accord have?
   a) A coupe notchback
   b) A coupe hatchback
   c) A sedan notchback
   d) A sedan hatchback
2. How does automatic behave in Honda Accord?
   a) It shifts smoothly.
   b) It sometimes shifts harshly.
   c) It always shifts harshly
   d) It has herky-jerky shift.
3. What brakes does Honda Accord have?
   a) Drum/drum
   b) Drum/disc
   c) Disc/disc
   d) Disc/drum
4. What is a special feature of Honda Accord SE coupe?
   a) A standard passenger-side air bag.

b) A rear spoiler.
c) 4WD system.
d) 4 speed manual transmission

***6. Сравните модели по следующим параметрам***

мощность двигателя, безопасность, комфорт.

***7. Прочтите текст без словаря.***

## Road Safety

Every year several thousand people are killed on the roads in Great Britain. Every year between one and two hundred thousand people are injured. Those people are killed or injured in road accidents.

If you are in England and if you listen to the eight o'clock news from BBC, you will often hear news of road accidents. You may hear something like this:"On Monday evening last, at about twenty minutes to ten. A cyclist was knocked down by a moor-van at the junction of Oak Road and High Street in Croydon, Surrey. The cyclist has since died from the injuries. Will anyone who saw the accident please communicate with New Scotland Yard, telephone number one, two, one, two."

Accidents are often caused by carelessness. There are rules that help to make the roads safe, but people do not always obey the rules. They are careless. If everybody obeys the rules, the roads will be much safer. How can we make the roads safer? Here are some examples of how accidents happened.In Great Britain traffic keeps to the left. Motor-cars, motor-vans, buses and cyclists must all keep to the left side of the roads. In most other countries traffic keeps to the right.

This story shows how an accident happened. The man was talking to the pretty woman sitting at his side. He was still talking when he stopped at the side of the street and opened the door of the car. The big heavy bus hit the open door. The door shut the man's leg He lost both his legs and nearly lost his life too. The man was usually careful. He usually looked back before opening the car door. But this time he opened the door without looking back to see whether there was anything behind him. Accidents sometimes happen to people who are usually careful. It was not enough to be careful sometimes. We must be always careful.

There are many things that motorists can do to make roads safer. They must take care at cross roads and bends. They must drive slowly when turning into another road. A motorist must not try to drive if he is tired or ill. A man who drives after drinking a lot of beer or wine is usually a dangerous driver. His own life and the lives of others may be in danger.

***8. Ответьте на вопросы.***

1. What happens to thousands of people on the roads in Great Britain every year?
2. Where are people killed or injured?
3. Why do accidents take place?
4. Do people always obey the rules?
5. What is a peculiarity of traffic in Great Britain?
6. How did the accident happen?
7. How can we make the roads safer?

## ADDITIONAL TEXTS

### PETROL ENGINE FUEL INJECTION

**Advantages of petrol engine fuel injection**

How can the use of a petrol injection system be justified in practice? The most convincing answers to this question were provided in a 1978 review of petrol injection systems by the Robert Bosch company in Germany. In this review it was pointed out that when the first passenger cars were fitted with fuel injection system in the 1950s the result was an increase in engine power, but since the end of the 1960s another feature of the fuel injection system had become more significant. This concerned the introduction of legislation to limit the maximum levels of toxic substances in the exhaust emission of the motor vehicles. Fuel injection systems lend themselves particularly well to meeting these legal requirements, which began in America and later were introduced in modified form in Australia, Canada, Europe and Japan. It was also pointed out that another particularly topical reason for the introduction of fuel injection system was the need to improve fuel economy.

In addition to the three advantages mentioned, namely those of increased engine power, reduced exhaust emission and improved fuel economy, it was further mentioned that the fuel injection system results in a substantial improvement in driveability, which is particularly reflected in the good cold starting behaviour and warm-up of the engine.

**Multipoint fuel injection**

The advantages usually associated with the multipoint fuel injection (MPI) system, where the fuel is sprayed into the inlet port for each cylinder, are a more uniform distribution of mixture to the engine cylinders, and absence of fuel wetting on the walls of the intake manifold, particularly when cold, and the need to design the manifold only for the most efficient flow of air rather than air and fuel. Another potential advantage is that port injectors can be used with intake manifold where the separate branches have been

timed in length, so as to exploit inertia ramcharging effects for maximum power.

**Single-point fuel injection**

It was earlier mentioned that the advantage sought with a single-point fuel injection (SPI) system were those of combining simplicity and reliability with low production cost. More specifically, the air-fuel ratio can be controlled to a greater degree of accuracy than is possible with conventional carburettor, while realizing a cost advantage over a multipoint fuel injection system. Another technical advantage of the SPI as compared with the MPI system is that the operating temperature of its electromagnetically actuated fuel injector assembly is reduced, thereby allowing the system to work at a lower pressure without the risk of petrol vaporizing in the nozzle. If the latter occurs in a fuel injection system there is less control over fuel metering, with consequent poor engine performance. The lower working pressure of the SPI system, which is typically in the range of 70 to105 $kN/m^2$ (10 to 15 $lbf/in^{2)}$, also permits the use of a non-positive displacement fuel pump of the impeller type, which is mounted inside the tank for quieter running. This type of pump incorporates a check valve at its outlet to keep the fuel supply system primed.

**Question:** How often should I replace the spark plugs in my engine?

**Answer:** The spark plugs are the working end of the ignition system. As such, they're responsible for reliable starting, low emissions, good fuel economy and performance. Thanks to the elimination of lead from gasoline that used to foul plugs in 10,000 to 15,000 miles, plug life today on unleaded gasoline is easily 30,000 miles (the typical factory recommended replacement interval). Even so, many plugs can go up to 45,000 miles or more in normal service before they cause any noticeable problems and have to be changed.

The only reason spark plugs have to be changed at all today is because of electrode wear – unless the plugs have been oil or carbon fouled, or damaged by abnormal combustion, in which case they may have to be replaced sooner than usual.

Electrodes wear because the flow of electrons across the electrode gap erodes away metal. Every time a plug fires, the high voltage surge burns a few atoms of metal off the electrodes. After millions of ignition cycles, the edges of the electrodes become rounded and worn. This increases the voltage required to fire the plug because of the increased distance across the electrode gap and because a spark jumps more easily between sharp edged electrodes than dull rounded ones. Consequently, the normal firing voltage of 7K to 10K volts starts to creep up. It may rise to 12K, 15K, 20K or higher depending on how badly the plugs are worn and other conditions that are present. Eventually the point is reached where the plug starts to misfire because the ignition system can't provide enough voltage to keep the fire lit under all conditions.

The engine may become hard to start, idle rough, use more fuel, lack power, hesitate or stumble when accelerating, or it may fail an emissions test.

Actually, all plugs (even new ones) misfire occasionally. But usually the misfires are unnoticed because they happen so infrequently. At 60 mph, the average plug is firing 22 times a second. So an occasional hiccup usually isn't noticed – or least it hasn't caused much concern until now.

But all 1996 cars are now equipped with a new “OBDII” onboard diagnostic system that monitors engine misfires. If enough misfires occur over a given period of time, the OBDII diagnostic system will set a fault code and possibly turn on the warning light depending on the severity of the misfire. Therefore, ignition reliability has become more important than ever before.

The electrodes in most standard spark plugs are made from a high temperature nickel-chrome alloy called Inconel. It's a good material, but for the above mentioned reasons doesn't last forever. After 30,000 to 45,000 miles, Inconel electrodes wear out. So most plug manufacturers now have a premium line of spark plugs with electrodes made of special wear-resistant alloys.

**Long-life plugs**

Electrodes made with nickel-silver alloys wear at about one third the rate of ordinary electrodes. But the two materials that are used in the majority of long life plugs are platinum (Bosch, AC & Autolite) and gold-palladium (Champion). Both can significantly extend plug life by almost eliminating electrode wear.

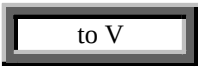
Platinum and gold-palladium plugs have the potential to go 60,000 to 100,000 miles or more in many applications. The plug manufacturers do not make specific mileage claims for these makers who use them as original equipment plugs in certain new engines do. They say the recommended replacement interval in most cases is 100,000 miles.

# GRAMMAR REFERENCES

## VERBALS

В отличие от личных форм глагола, неличные формы выражают действие без указания лица и числа и поэтому не могут быть в предложении сказуемым. Неличные формы сочетают свойства глагола со свойствами других частей речи и выполняют в предложении функции этих частей речи. К неличным формам глагола относятся инфинитив (Infinitive), причастие (Participle) и герундий (Gerund).

## THE INFINITIVE (ИНФИНИТИВ)




**Инфинитив (неопределенная форма глагола)** – неличная глагольная форма, которая только называет действие, не указывая ни лица, ни числа. Инфинитив отвечает на вопросы ***что делать? что сделать?***

**to** repair – ремонтирова**ть**, отремонтирова**ть**;

**to** buy – покупа**ть**, купи**ть**;

Инфинитив образует отрицательную форму с помощью частицы *not*:

to repair – *not* to repair

to buy – *not* to buy

Формальным признаком инфинитива является частица *to*, которая не имеет самостоятельного значения. Однако иногда частица *to* перед инфинитивом опускается.

**Инфинитив употребляется без частицы *to:***

1. После модальных глаголов ‘can (could), may (might), must, need, should’

I can ***drive*** a car.

2. После глаголов *to make* заставлять, *to let* разрешать, to help – помогать (*Ам*.)

He made me ***read*** the book.

I let him ***go*** there.

He helped us ***change*** the wheel.

***NB*** Если глаголы *to let*, *to make* и *to help* употреблены в страдательном залоге, следующий за ними инфинитив употребляется с частицей *to*

He was made ***to stop***.

3. В обороте «объектный падеж с инфинитивом» после глаголов *to see* видеть, *to watch* наблюдать, *to hear* слышать, *to feel* чувствовать и др.

I saw her ***leave*** the room.

I heard them ***speak***.

4. После выражений *had better* лучше бы, *would rather / sooner* – предпочел бы

You'd better ***clean*** the plugs.

She'd rather ***ride*** a car.

He would sooner ***buy*** a Rolls-Royce.

**Инфинитив имеет формы вида и залога**

| вид \ залог | ACTIVE | PASSIVE |
|---|---|---|
| INDEFINITE | to do<br>делать (обычно, всегда) | to be done<br>(делаться, быть делаемым) |
| CONTINUOUS | to be doing<br>делать (в какой-то определенный момент) | - |
| PERFECT | to have done<br>(сделать) | to have been done<br>(сделаться, быть сделанным) |
| PERFECT CONTINUOUS | to have been doing<br>(делать в течение какого-либо отрезка времени) | - |

Когда действие, выраженное инфинитивом, совершается лицом или предметом, к которому оно относится, то употребляется инфинитив в форме ***Active***:

**I want *to ask* about it. Я хочу *спросить* об этом.**

Когда действие, выраженное инфинитивом, совершается над лицом или предметом, к которому оно относится, то употребляется инфинитив в форме ***Passive.***

I don't want *to be asked* about it.

*Я* не хочу, *чтобы меня спрашивали* об этом.

Инфинитив в форме ***Indefinite*** употребляется, когда действие, которое он выражает: одновременно с действием, выраженным сказуемым; относится к будущему времени; безотносительно ко времени его совершения.

I am glad *to see* you.
Я рад вас *видеть*.

I hope *to see* him at the party next Sunday.
Я надеюсь *увидеть* его на вечеринке в следующее воскресенье.

We like *to dance*.
Мы любим *танцевать*.

Инфинитив в форме ***Continuous*** употребляется для выражения длительного действия, одновременного с действием, выраженным сказуемым.

I was glad *to be dancing* with her.
Я был рад, *что танцую* с ней.

Инфинитив в форме ***Perfect*** употребляется для обозначения действия, предшествовавшего действию, выраженному сказуемым:

He is happy not to have been asked.
Он счастлив, что его не спросили.

Инфинитив в форме ***Perfect Continuous*** употребляется для выражения длительного действия, совершавшегося в течение определенного периода, предшествовавшего действию, выраженному сказуемым.

He is known *to have been working* on this problem for many years.
Известно, что он *работает* над этой проблемой уже много лет.

## Функции инфинитива в предложении

**Подлежащее**

**Перевод** – неопределенная форма глагола.
*To read* is useful. *Читать* полезно.

**Часть составного глагольного сказуемого**

**Перевод –** неопределенная форма глагола, глагол в личной форме в составе придаточного предложения (если форма инфинитива состоит из 2 и более слов).

He can *drive* a car. Он умеет *водить* автомобиль.

I am happy *to have avoided* an accident.
Я счастлив, что *избежал* аварии.

**Дополнение**

**Перевод –** неопределенная форма глагола, глагол в личной форме в составе придаточного предложения.

He asked me *to help* him.
Он попросил меня *помочь* ему.
*или* Он попросил, чтобы я *помог* ему.

**Определение**

Инфинитив в функции определения всегда стоит после определяемого слова.

You have no reasons to worry.
У тебя нет никаких причин беспокоиться.

Сказуемое такого предложения часто выражает действие, которое может или должно произойти в будущем.

**Перевод** – придаточное определительное, вводимое союзом *который*, после которого часто употребляются слова *можно, надо*.

The car *to repair* is in the yard.
Машина, которую *надо отремонтировать*, находится во дворе.

Инфинитив в функции определения часто употребляется после порядковых числительных и слова the last.

**Перевод** – глагол в личной форме.

He was the last *to pass* the exam.
Он *сдал* экзамен последним.

**Обстоятельство цели**

Перед инфинитивом в этой функции могут стоять союзы *so as* или *in order*.

**Перевод** – неопределенная форма глагола, перед которой ставится союз *чтобы* или *для того чтобы*.

I went there (in order) to meet you.
Я пошел туда, (для того) чтобы встретить тебя.

**Обстоятельство следствия**

**Перевод** – неопределенная форма глагола, перед которой ставится союз *чтобы* или *для того чтобы*.

The temperature is high enough to ensure self-ignition of the fuel charge

Температура достаточно высока, чтобы обеспечить самовозгорание топлива.

It is too cold to bathe today.
Сегодня слишком холодно, чтобы купаться.

### Complex Object with the Infinitive

(…) S + Pr + N/Pn + (to)V (…)

Сложное дополнение состоит из имени существительного (N) или личного местоимения (Pn) в косвенном падеже и инфинитива с частицей *to* или без нее.

Перевод – придаточное дополнительное, вводимое союзами *что, чтобы, когда* и т.д., в котором имя существительное или личное местоимение является подлежащим, а инфинитив сказуемым, т.е. глаголом в личной форме.

**Употребляется, когда сказуемое выражено глаголами:**

I. to want – *хотеть*, to wish – *желать*, to hate – *ненавидеть, не выносить*, to like – *любить*, should/would like – хотел бы.

I wanted him. to come.
Я хотел, **чтобы** он пришел.

He hates her to say such things.
Он не выносит, **когда** она говорит такое.

I wouldn't like them to be invited.
Я не хотел бы, **чтобы** их приглашали.

II. to know – *знать*, to believe, to consider – *считать. полагать*, to think – *думать*, to suppose – *предполагать*, to expect – ожидать

We expected our team to win the races.
Мы ожидали, **что** наша команда выиграет гонки.

III. to see – видеть, to watch – *наблюдать*, to notice – *заметить*, to hear – слышать, to feel – чувствовать

*NB* После этих глаголов инфинитив употребляется без частицы *to*.

We saw them cross the street.
Мы видели, **что** он перешел улицу.

IV. to order, to command – *распорядиться, приказать*, to ask – *просить*, to allow – *разрешить*

*NB* После этих глаголов инфинитив употребляется только в страдательном залоге.

She asked the battery to be charged.
Она попросила, чтобы зарядили аккумулятор.

## Complex Subject

(…) N/Pn + Pr + to V (…)

Сложное подлежащее состоит из имени существительного (N) или личного местоимения (Pn) в именительном падеже и инфинитива, которые разделены сказуемым (Pr).

**Перевод** – сложноподчиненное предложение, в котором Pr становится главным, выраженным безличным оборотом, а остальная часть – придаточным, вводимым союзом *что*, где имя существительное или личное местоимение является подлежащим, а инфинитив сказуемым, т.е. глаголом в личной форме.

**Употребляется, когда сказуемое выражено глаголами:**

I. to say – *говорить*, to report – *сообщать*, to suppose – *предполагать*, to know – *знать*, to think – *думать*, to believe, to consider – *считать*, полагать, to expect – ожидать

*NB* Эти глаголы употребляются в страдательном залоге.

*Petrol* is known *to ignite* at low temperature as compared with fuel oil.

Известно, ***что*** *бензин воспламеняется* при более низкой температуре по сравнению с дизельным топливом.

II. to seem, to appear – *казаться*, to happen, to chance – *случиться*, to prove, to turn out – *оказаться*.

*NB* Эти глаголы употребляются в действительном залоге.

The car seems *to have suffered* an accident.
Кажется, *машина пострадала* в аварии.

III. to be sure, to be certain – *конечно. наверняка*; to be likely – вероятно, по-видимому; to be unlikely – маловероятно, вряд ли.

*They* are likely *to take* part in this rally.
Вероятно, *они примут* участие в этих гонках.

## For-to-Infinitive Construction

(…) for + N/Pn + to V

Этот оборот переводится на русский язык при помощи существительного или местоимения в косвенном падеже (в основном, дательном) и инфинитива или придаточного предложения, вводимого союзами *что, чтобы* и т.д.

It is necessary *for you to do* this work.
*Тебе* необходимо *сделать* эту работу.
*или* Необходимо, **чтобы** *ты сделал* эту работу.

The first thing *for him to do* is to read this letter.
Первое, **что** *он должен сделать*, это прочитать это письмо.
*или* В первую очередь *ему нужно прочесть* это письмо.

The box was too heavy *for the children to carry* it.
Ящик слишком тяжел, **чтобы** *дети его несли*.
или *Детям* слишком тяжело *нести* этот ящик

## PARTICIPLE (ПРИЧАСТИЕ)

**Причастие** – неличная форма глагола. сочетающая свойства глагола и прилагательного. Соответствует в русском языке причастию и деепричастию.

### PARTICIPLE I – действительное причастие.

Образуется с помощью окончания -ing, которое добавляется к инфинитиву без частицы to.

$V_4$ = V*ing*

to go – go*ing*
to stand – stand*ing*
*NB* to liv**e** – living to lim**i**t – limi**t***ing*
to st**o**p – sto**pp***ing* to d**ie** – d**y***ing*
to per'mi**t** – permi**tt***ing* to tr**y** – tr**y**ing

**Причастие I имеет формы вида и залога**

| вид \ залог | ACTIVE | PASSIVE |
|---|---|---|
| INDEFINITE | doing<br>(делающий, делавший, делая) | being done<br>(делающийся, делаясь) |
| PERFECT | having done<br>(сделавший, сделав) | having been done<br>(сделанный, сделавшись) |

Отрицательная форма образуется с помощью частицы not, которая стоит перед причастием.

not going
not having come
not being helped

Перевод на русский язык зависит от функции причастия в предложении.

## ФУНКЦИИ ПРИЧАСТИЯ В ПРЕДЛОЖЕНИИ

**Определение.**

**Перевод** – причастие, причастный оборот, придаточное предложение.

We looked at the *flying* birds. Мы смотрели на *порхавших* птиц.

*NB* Причастный оборот (причастие с зависимыми словами) и причастие, состоящее из 2 и более слов, стоят позади определяемого слова.

The girl sitting at the window is my sister
Девушка, сидящая у окна, моя сестра.
или Девушка, которая сидит у окна, моя сестра.
The question being discussed is very important.
Обсуждаемый вопрос очень важен.
или Вопрос, который сейчас обсуждается, очень важен.

**Обстоятельство времени (часто с союзами *when когда, while* пока, в то время, как*)*.**

**Перевод** – деепричастие, существительное с предлогом, придаточное предложение.

*(When) reading this book,* I found some interesting information.
*Читая эту книгу*, я нашел кое-что интересное.
или *При чтении этой книги* я нашел кое-что интересное
или *Когда я читал эту книгу*, я нашел кое-что интересное.

**Обстоятельство причины**

**Перевод** – деепричастие, придаточное предложение.

*Not knowing English well,* he couldn't translate the text.

Недостаточно зная английский язык, он не смог перевести текст.

*или* Он не смог перевести текст, так как недостаточно знал английский язык.

**Обстоятельство образа действия или сопутствующего действия.**

**Перевод** – деепричастие, глагол в личной форме

She looked at him *smiling*.
Она смотрела на него *улыбаясь*.
*или* Она смотрела на него *и улыбалась.*

He sat in the armchair *reading a book*.
Он сидел в кресле, *читая книгу*.
*или* Он сидел в кресле и *читал книгу*.

## PERFECT PARTICIPLE

Обозначает действие, предшествовавшее действию, обозначенному сказуемым. Употребляется в функции обстоятельства.

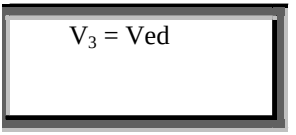
**Перевод** – деепричастие, придаточное предложение.

Having finished the work, they went home.
*Закончив работу*, они пошли домой.
или Так как (= После того как) они закончили работу, они пошли домой.

Having been posted to the wrong address, the letter was not received in time.
Так как письмо отправили по неверному адресу, оно не было получено вовремя.

## PARTICIPLE II – страдательное причастие

Образуется с помощью окончания, которое добавляется к инфинитиву без частицы




torepair – repair*ed*
to paint – paint*ed*

*NB* to receiv**e**- receiv*ed*
to sto**p** – sto**pp***ed*
den**y** – den**i***ed*
***но*** to pl*a***y** – pla**y***ed*
to **'**lim*i***t** – limi**t**ed
to per**'**m*i***t** – permi**tt**ed
*NB* Неправильные глаголы имеют собственную форму.

## Функции в предложении

**Определение**

**Перевод** – причастие, причастный оборот, придаточное предложение.

A *broken* cup lay on the floor.
*Разбитая* чашка лежала на полу.

*NB* Причастный оборот (причастие с зависимыми словами) и причастие, состоящее из 2 и более слов, стоят позади определяемого слова.

Books *taken from the library* must be returned next week.
Книги, *взятые в библиотеке*, должны быть возвращены на следующей неделе.
*или* Книги, *которые были взяты в библиотеке*, должны быть возвращены на следующей неделе.

**Обстоятельство**

**Перевод** – причастный оборот, придаточное предложение.
*Warned by his friends* he could escape arrest.
Предупрежденный своими друзьями, он сумел избежать ареста.
или Так а его предупредили друзья, он сумел избежать ареста.
*If asked* he will tell everything.
*Если его спросят*, он все расскажет.

## COMPLEX OBJECT WITH PARTICIPLE

(…) S Pr + N/Pn + P I/ P II (…)

Сложное дополнение состоит из имени существительного (N) или личного местоимения (Pn) в косвенном падеже и причастия. Употребляется, когда сказуемое выражено глаголами:

I. to see – *видеть*, to watch – *наблюдать*, to notice – *заметить*, to hear – слышать. С этими глаголами употребляются **Participle I** и **Participle II.**

**Перевод** – придаточное дополнительное, вводимое союзами *что*, *чтобы*, *как*, в котором **N/PN** становятся подлежащим. а **PI/PII** – сказуемым, т.е. глаголом в личной форме.

She watched them playing tennis.
Она наблюдала, как они играют в теннис.

I didn't hear your name mentioned.
Я не слышал, чтобы твое имя упоминалось.

С этими глаголами употребляется и сложное дополнение с инфинитивом. Причастие выражает действие в процессе его совершения, а инфинитив – законченное действие. Поэтому оборот с причастием переводится придаточным предложением с глаголом в настоящем времени или в прошедшем времени несовершенного вида (делает, делал), а оборот с инфинитивом – придаточным предложением с глаголом совершенного вида (сделал).

I saw him **crossing** the street.
Я видел, как он **переходит** улицу.

I saw him **cross** the street.
Я видел, что он **перешел** улицу.

II. to imagine – *представить*, to keep – *заставить*, to smell – почувствовать запах, to start – начать, to leave – покидать

С этими глаголами употребляется **Participle I**
**Перевод** – придаточное дополнительное, вводимое союзами *что*, *чтобы*, *как*, глагол в неопределенной форме, существительное с предлогом.

I can't imagine her washing the car.
Не могу представить себе, *чтобы она мыла машину*.

We smelt something burning.
Мы почувствовали (поняли по запаху), *что что-то горит*.

She kept *her guests waiting* for her for half an hour.
Она заставила гостей *ждать* ее полчаса.
*или* Она продержала гостей *в ожидании* полчаса.

He left her crying
Он оставил *ее в слезах*.

III. to want – *хотеть*, to have – *иметь*
С этими глаголами употребляется **Participle II.**
В этом случае подразумевается, что действие выполняется не лицом, обозначенным подлежащим, а кем-то другим для него, за него.

**Перевод** – с глаголом *to want* неопределенная форма глагола или придаточное дополнительное, вводимое союзом *чтобы*, с глаголом *to have* – глагол в личной форме.

She wants her car repaired.
Она хочет отремонтировать машину.
или Она хочет, чтобы ей отремонтировали машину.

I had my room whitewashed.
Я побелил свою комнату.
*или* Мне побелили комнату.

Если подразумевается, что лицо, обозначенное подлежащим, само выполнило какую-то работу, употребляется инфинитив.

I want **to check** the battery.
Я хочу проверить аккумулятор. (Я сделаю это сам)
I **want** the battery **checked**.
Я хочу проверить аккумулятор. (Это сделает кто-то вместо меня)

She **changed** the wheel.
Она поменяла колесо. (сама)
She **had** the wheel **changed.**
Она поменяла колесо. (Кто-то сделал это)

IV**.** to think, to consider. to know, to understand
С этими глаголами употребляется **Participle II.**
**Перевод** – придаточное дополнительное, вводимое союзами *что*, *чтобы*, *как*.

I thought *him left.*
Я думал, что он ушел

## Gerund (ГЕРУНДИЙ)

**Герундий –** неличная форма глагола выражающая название действия. Сочетает свойства глагола и имени существительного.

Соответствующей формы в русском языке не существует; по значению к герундию близки такие русские отглагольные существительные, как *чтение*, *вождение*, *ожидание*, и т. п.

Образуется с помощью окончания -ing, которое добавляется к инфинитиву без частицы to.


to go – go*ing*

to stand – stand*ing*

*NB* to live – living

to st***op*** – sto***pp****ing*
to lim***i*****t** – limi***t****ing*
to per'm***i*****t** – permi***tt****ing*
to d***ie*** – d***y****ing*
to tr***y*** – tr***y***ing

**Герундий имеет формы вида и залога**

| вид \ залог | ACTIVE | PASSIVE |
|---|---|---|
| INDEFINITE | doing | being done |
| PERFECT | having done | having been done |

Отрицательная форма образуется с помощью частицы *not*, которая стоит перед герундием.

*not* replacing
*not* having done
*not* being charged

Если действие, выраженное герундием, совершается лицом или предметом, к которому оно относится, то употребляется герундий в форме ***Active***:

I adore *driving* a car.
Я обожаю *водить* машину.

Если действие, выраженное инфинитивом, совершается над лицом или предметом, к которому оно относится, то употребляется инфинитив в форме ***Passive***:

She likes *being invited* to our parties.
Она любит, когда ее *приглашают* на наши вечеринки.

Герундий в форме ***Indefinite*** употребляется, когда действие, которое он выражает, одновременно с действием сказуемого, относится к будущему или безотносительно ко времени его совершения.

I was surprised at *hearing* this.
Я удивился, услышав это.
She thinks of *visiting* you next week.
Она думает навестить вас на следующей неделе.

*Swimming* is very useful.
Плавать очень полезно.

Герундий в форме ***Perfect*** употребляется, когда действие, которое он выражает, предшествовало действию сказуемого.

I don't remember *having seen* him there.
Не помню, чтобы я его там видел.

***NB*** После предлогов ***on (upon)*** и ***after*** обычно употребляется ***Indefinite Gerund,*** хотя действие, выраженное герундием, предшествовало действию сказуемого.

On *receiving* a letter I spoke to my friend.
Получив письмо, я поговорил с моим другом.

After *speaking* to him we left.
После разговора с ним мы ушли.

Также ***Indefinite Gerund***, а не ***Perfect Gerund*** употребляется тогда, когда нет необходимости подчеркивать предшествование.

Thank you for *coming*.
Спасибо, что *пришли*.
Перевод на русский язык зависит от функции герундия в предложении.

## ФУНКЦИИ ГЕРУНДИЯ В ПРЕДЛОЖЕНИИ

**Подлежащее.**

**Перевод –** неопределенная форма глагола, отглагольное существительное.

*Reading* is my favourite occupation.
*Чтение* – мое любимое занятие.
*или Читать* – мое любимое занятие.

**Часть составного глагольного сказуемого.**

**Перевод –** отглагольное существительное, неопределенная форма глагола.

He finished *repairing* my car.
Он закончил *ремонтировать* мою машину.
*или* Он закончил *ремонт* моей машины.

**Дополнение**

**Перевод –** отглагольное существительное, неопределенная форма глагола, глагол в личной форме в составе придаточного.

She is fond of *riding* a motorcycle
Она обожает *кататься/катание* на мотоцикле

I remember *seeing* him there
Я помню, что видел его там.

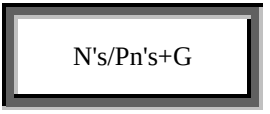
**Обстоятельство**

**Перевод –** деепричастии, имя существительное, глагол в личной форме в составе придаточного.

On *finding* that the engine was working badly, we had to stop.
*Обнаружив*, что мотор работает плохо, мы были вынуждены остановиться

After *changing* the wheel they continued their trip.
После того, как они *заменили* колесо, они продолжили путешествие.
*или* Они продолжили путешествие после *замены* колеса.

## GERUNDIAL CONSTRUCTION




Герундиальный оборот состоит из имени существительного в притяжательном падеже или притяжательного местоимения и герундия.
**Перевод –** отглагольное существительное или глагол в личной форме в составе придаточного предложения

His *having won* the race surprised us greatly.
То, что он выиграл гонку, очень удивило нас.

## EXERCISES

***I. Поставьте частицу to, где это необходимо.***

1. I like... drive a car.
2. My brother can't... repair his motorcycle.
3. It isn't easy... describe an engine.
4. They helped me... tighten the nut.
5. May I... use your nippers?
6. The engine should... continue... run without hesitation.
7. A professional mechanic can... make this test quickly.
8. He wanted... check the oil level.
9. Our present knowledge doesn't allow us... use direct injection.
10. You had better... change the tire.
11. I wanted... speak to my mechanic, but couldn't... find his telephone number.
12. It is high time for you... get the driver's license.
13, When a vehicle appeared in the street it was... be stopped.
14. The pedal starts... get low.
15. I was planning... do a lot of things yesterday.
16. What makes you... think your car is all right?
17. He was made... obey the rules.
18. I think I shall... be able... change the tyre.

***II. Вставьте Infinitive в нужной форме.***

1. Connecting-rod bolts must... quite tight. (to keep)
2. I remember... the oil some days ago. (to change
3. The function of a spark plug is... the mixture of gasoline and air. (to ignite)
4. All the plug wires seem... OK now. (to spark)
5. The engine design should acknowledge the need... servicing costs. (to reduce)
6. The depth of radiator must... in order... an equal area of the cooling surface. (to increase), (to maintain)
7. Nicolaus Otto was the first... the four-stroke cycle. (to introduce)
8. The next item... was a gearbox (to examine)
9. External examination was the first thing.... (to perform)
10. I am the last man... such a car. (to buy)
11. They were among the last... the car. (to repair)
12. He found that he was the only one... the difference. (to notice)
13. Who is the youngest pilot... the Formula I races? (to win)

***III. Измените предложения, используя Infinitive вместо подчёркнутых слов.***

1. French engineer Cugnot was the first who constructed a self propelled vehicle.
2. The number of parts which must be assembled should be minimized.
3. Here is the spanner with which it is possible to tighten the nut.
4. There was nothing that he could do except to shut down the engine.
5. I need some spare parts and tools with which I could repair my car.
6. We have already tested the engine which must be installed.
7. He is happy that he had avoided an accident.
8. You may do a compression test if you want to find a dead cylinder.

***IV. Объедините два предложения, используя Infinitive.***

***Например:*** **A.** *I entered the University. I wanted to study law.*
*I entered the University to study law.*
**B.** *He read very little. He didn't want to strain his eyes.*
*He read very little not to strain his eyes.*

1. I am buying a new windshield. I am going to repair my car.
2. You must clean the spark plugs. You may have problems with the ignition.
3. We had to move very slowly. We tried to avoid an accident.
4. I am saving up (коплю деньги). I want to buy a car.
5. He rushed into the burning lorry. He wanted to save the driver.
6. He needed a jack. He wanted to change a wheel.

***V. Объедините два предложения, используя слова "enough" или "too" и Infinitive.***

***Например:***
**A.** *She is thin. She can wear this dress. – She is thin enough to wear this dress.*
**B.** *He is very ill. He can't work today. – He is too ill to work today.*
1. The mechanic was very experienced. He detected a leakage.
2. It was very dark. We couldn't see anything on the road.
3. Our present knowledge is rather poor. We can't use direct injection.
4. The stuffing boxes of water pumps are not very tight. They can't prevent leaking.
5. He was very nervous. He couldn't start the engine.
6. Jim was so tired. He couldn't wash the car.

***VI. Поставьте частицу "to", где это необходимо.***

1. I tried to induce him not... drive a car.
2. The family wanted him... take part in car races.

3. Did you hear the engine... knock?
4. I saw him... put the luggage into the car.
5. The designer expected the output of his new model.. be higher.
6. I watched him... check the oil level.

***VII. Замените сложные предложения или группы предложений простыми предложениями с инфинитивным оборотом.***

**Например:** *I looked out of the window. He crossed the street.*
*I saw him cross the street.*
1. Inefficient lubrication has caused the engine breakdown. I think so.
2. The brake pedal hit the floor. He heard it.
3. Aluminium alloys have good bearing properties. Specialists know it.
4. They expected that solar batteries would be used in cars.
5. The car ran at a very high speed. The policeman saw it.

***VIII. Переведите предложения с русского языка на английский, используя Objective Infinitive Construction***

1. Мы знали, что различные типы двигателей имеют разный выхлоп.
2. Я полагал, что машину уже отремонтировали.
3. Он распорядился, чтобы машину перекрасили.
4. Мы не видели, чтобы она ездила на мотоцикле.
5. Я хочу, чтобы вы использовали шинный герметик.
6. Он не хотел, чтобы его жена водила машину.
7. Мы предположили, что он использовал какую-то новую присадку.

***IX. Замените группы предложений простыми предложениями с инфинитивным оборотом.***

**Например:** *He won't catch the six fifteen train. It's impossible.*
*It is impossible for him to catch the six fifteen train.*
1. Here is the spanner. You can loosen the nut with it.
2. You must charge the battery. It's necessary.
3. He changed the oil himself. It was not difficult.
4. The driver must use proper oil additives. It's very important.
5. I couldn't understand the reason of the accident. It was impossible.
6. Everybody must observe traffic rules. It's obligatory.
7. Valves should be checked after 4500 hours of work. It's necessary.
8. You really ought to use a hoist. It will be best.

***X. Вставьте "for", где необходимо.***

1. There is no need... you to change the tyre yourself.
2. It's quite a time... you to change the plugs.
3. He was not allowed... to ride a motorcycle.

4. I can't find a place... us to park the car.
5. Don't forget to buy spare parts... you happen to be in a car
6. I want... you not to forget to fasten the safety belt.
7. It was necessary... him to check the oil level.
8. This is not proper oil... them to use.

***XI. Закончите следующие предложения, используя "for-to-Infinitive Construction".***

**Например:** *It would be better (you; to stay in bed).*
*It would be better for you to stay in bed.*
1. It is high time (she; to get the driver's license).
2. It was quite an effort (he; to start the car).
3. It is necessary (a driver; to have spare parts).
4. It was easy (a professional mechanic; to make this test).
5. It would be better (you; to use rubber gloves).
6. It's necessary (the fuel; to be mixed with air).
7. It is not (women; to drive cars).

***XII. Вставьте сказуемое в нужной форме.***

1. Diesel engine is heavy. It... to be its disadvantage. (to consider)
2. The torque exerted by the crankshaft of the diesel engine... to be greater. (to believe)
3. The petrol engine... to have less thermal efficiency.(to prove)
4.A brake system... to be leaking. (to seem)
5. The purpose of a radiator... to dissipate the engine heat rejected to the coolant. (to know)
6. The journal... to have been re-centered. (to suppose)
7. The accident... to have taken place on this highway. (to report)
8. This model of Toyota... to be a bestseller. (to turn out)

***XIII. Вставьте Infinitive в нужной форме.***

1. This car seems.. in an accident. (to suffer)
2. She seems.. her car since she came here. (to repair)
3. Unburnt hydrocarbon is known.. to atmospheric smog. (to contribute)
4. There are spots on the sidewall of the tyre. The cylinder is likely... (to leak)
5. Excessively high operating temperatures are supposed … in undue wear. (to result)
6. The bolts happened.. constructed of low class materials. (to construct)

***XIV. Измените следующие предложения, используя Complex Subject.***

*Например:* It seemed *that* <u>*he knew*</u> the subject well.
<u>*He*</u> *seemed* <u>*to know*</u> *the subject well.*

1. It is known that KAMAZ lorries won the Paris – Dakar rally some years ago.

2. They consider that noise level is a drawback with air-cooled engines.

3. It seems that a new car has made a deep impression on him.

4. It is known that the internal pressure in the plenum chamber is higher than that in the atmosphere.

5. It appears that the ignition quality is a matter of selection of oil.

6. It happened that this oil additive was very effective.

7. It seemed that we were riding a car for quite a time.

8. The say that modern fuel filters reduce the risk of rapid wear of the equipment.

***XV. Переведите слова в скобках, выбрав нужную форму инфинитива, и вставьте их в предложения вместо пропусков.***

1. He is thought... a very good mechanic. (был)

2. The application of turbosupercharging is known... some time ago. (началось)

3. Petrol is known... at low temperature as compared with fuel oil. (воспламеняется)

4. The diesel is believed... from 30 to 40 per cent of the energy of fuel into power. (преобразует)

5. She is known... in car races. (интересовалась)

***XVI. Определите, какой инфинитивный оборот употреблён в предложении.***

1. _ 3. Complex Subject
2. Complex Object 4. for-to-Infinitive Construction

1. The quick warming up is considered to be essential to economical cylinder life.

2. It is a job for a qualified mechanic.

3.There is a special production line for cylinder blocks and heads.

4. Many people considered it necessary to limit the speed of cars.

5. It was necessary for drivers to carry large cans of fuel.

6. We know different types of engines to show different exhaust.

7. The time for water to rise through a given temperature range is longer than for air.

8. The ignition quality appears to be a matter of selection of oil.

9. We know diesel engine to have better fuel economy.

10. Many cars broke for transmission were unreliable.

***XVII. Определите, какой инфинитивный оборот необходимо употребить при переводе предложений на английский язык.***

1. _ 3. Complex Subject

2. Complex Object 4. for-to-Infinitive Construction

1. Вряд ли он устранит эту неисправность самостоятельно.
2. Мой механик думает, что клапан сгорел.
3. Считается, что эта модель Хонды экономичнее.
4. Вот присадка, которую тебе надо использовать.
5. Мы видели, что машина шла на очень высокой скорости.
6. У меня есть запасное колесо, которое я могу одолжить.
7. Дора купила набор инструментов, чтобы Джон пользовался им.
8.Водителю ничего не оставалось делать, как заплатить штраф.
9. Ученые полагают, что выхлопные газы наносят вред окружающей среде.
10. Известно, что в некоторых странах принято левостороннеедвижение.

***XVIII. Выберите правильный вариант перевода подчёркнутых слов.***

1. The usage of shorter strokes seems to have resulted in higher maximum speeds.

1. кажется 6. привести
2. казаться 7. приведет
3. кажутся 8. привело
4. казались 9. приводит
5. казалось 10. приводить

2. The gasoline engine proved to lose 80 – 84 per cent of energy in the exhaust gases.

1. оказалось 5. теряет (обычно)
2. оказывается 6. терял
3. доказал 7. будет терять
4. оказаться 8. теряет (в настоящий момент)

3. A brake system turned out to be leaking.

1. оказаться 5. текла
2. оказывается 6. течет
3. окажется 7. потечет
4. оказалось 8. течь

4. Unwanted opposition to the vehicle movement is known to arise from rolling friction.

1. известно 6. возникло
2. было известно 7. возникает
3. знает 8. возникнет
4. узнает 9. возникать
5. станет известно

5. Small variations in exhaust temperatures were found to have caused large variations in exhaust-passage deposits.

1. обнаружить 5. быть причиной

2. обнаружится 6. были причиной
3. обнаружилось 7. станут причиной
4. обнаружат 8. бывают причиной

6. In the modern compression-ignition engine the piston is regarded to be a critical component.

1. считать 5. быть
2. считается 6. является
3. считался 7. будет
4. считает 8. являлся

7. A natural circulation of water is known to have been used up to the late 1930's.

1. знать 5. пользоваться
2. известно 6. используется
3. было известно 7. использовалась
4. знает 8. пользовалась

8. The engine {was considered) (to have passed) all the tests.

1. рассчитывать 5. проходить
2. считается 6. проходит
3. считалось 7. пройдет
4. считает 8. прошел

***XIX. Выберите русский эквивалент английского предложения.***

1. To carry out this test was useful.
   A. Тест, который надо было провести, был полезен.
   B. Провести этот тест было полезно.
2. Fuel filters were found to reduce wear of the ignition equipment.
   A. Обнаружилось, что топливные фильтры снижают износ оборудования впрыска.
   B. Были найдены фильтры, которые снижают износ оборудования впрыска.
3. It was necessary for the engine to be repaired.
   A. Было необходимо отремонтировать двигатель.
   B. Для ремонта был необходим двигатель.
4. He can be expected to carry out the experiment in time.
   A. Можно ожидать, что он окончит эксперимент вовремя.
   B. Его могут ожидать, чтобы окончить эксперимент вовремя.
5. The first question to be considered is the efficiency of new lubrication.
   A. Первый вопрос, который нужно рассмотреть – эффективность новой смазки.
   B. Считается, что первый вопрос – эффективность новой смазки.
6. We know the bodies to expand when heated.
   A. Мы знаем тела, которые расширяются при нагревании.

B. Мы знаем, что тела при нагревании расширяются.

***XX. Переведите предложении на русский язык.***

*1. The first to perfect* gasoline engine was N. Otto who introduced the four-stroke cycle of operation

2. In 1896 a procession of motor cars took place from London to Brighton to show how reliable the new vehicles were.

3. Motorists had to carry large cans of fuel and separate spare tyres, for there were no repair or filling stations to serve them.

4. Lord Montague's father was the first person in England to be fined by the police for speeding.

5. Since the term "energy" implies the capacity to perform work, the engine is thus able to propel the vehicle along the road

6. To facilitate this process the engine is combined with a transmission system.920

7. The vast majority of car engine are of the reciprocating piston type and utilize spark ignition to initiate the combustion project in the cylinders.

8. With modern advances in engine design it is not particularly difficult to obtain sufficient power to give the car a high top speed,

9. The overall aim of improving the fuel economy of cars is to minimize the amounts of crude oil used to provide petrol for their engines,

10. Since the late 1960s increasingly stringent legislation has been applied to limit the levels of atmospheric pollutants emitted from car engines. In general, legislation is concerned with carbon monoxide, which has toxic effects; unburned hydrocarbons, which contribute to atmospheric smog; and nitrogen oxides, which cause irritation to eyes and lungs, and also combine with water to produce acid rain that destroy vegetation.

11. To reduce these harmful emissions, not only very careful control of the combustion process is required in modern engine design.

12. To monitor the required enrichment of the air and fuel mixture for cold starting, increasingly sophisticated controls are now being applied to carburetor automatic choke.

13. An important owner requirement of a car is that its engine design should acknowledge the need to reduce servicing costs.

14. The cost of material will be reduced in building a smaller engine, and the construction should be as simple as possible to minimize the number of parts to be assembled and thereby farther reduce manufacturing costs.

15. The first internal combustion engine to operate successfully on the four-stroke cycle was constructed in 1876 by Nicolaus August Otto.

16. Kinetic energy is a term used to express the energy possessed by a body due to its mass and motion.

17. The compression stroke, in which the advancing piston compresses the air into very small volume of the combustion chamber and raises the temperature high enough to ensure self-ignition of the fuel charge.

***XXI. Переведите предложении на русский язык.***

1. Most troubles in modern engines arise from too high crankcase temperatures, resulting from poor ventilation.
2. One of the most serious problems arising in the use of cooling water is that of corrosion.
3. Opposed-cylinder construction is adopted for almost all horizontal industrial engines having more than 6 cylinders.
4. Most experiments currently being carried out are concerned with detail design improvements.
5. The purpose of cooling is to carry off heat while maintaining the required temperature of cylinder walls.
6. Factors determining power consumption are the quantity and pressure of cooling air and efficiency of cooling fan.
7. Development of the motor car lagged because of the restrictions resulting from legislative acts.
8. Motorists had to carry large cans of fuel and separate spare tyres, for there were no repair or filling stations to serve them.
9. Motor vehicle engine is classified as an internal combustion engine by virtue of its energy conversion taking place within the engine cylinders.

***XXII. Переведите предложении на русский язык.***

1. An engine may be using oil because of an internal problem, such as worn piston rings or valve guides.
2. A "burnt valve" is a valve that has overheated and lost its ability to hold a leak-free seal.
3. When leaded gasoline was still around, lead acted like a lubricant to reduce valve seat wear.
4. An exhaust valve can also burn if the valve lash closes up for some reason (improper lash adjustment, cam or lifter wear, a bent push rod, worn rocker arm or cam follower, etc.).
5. The heat of combustion of fuel is the amount of energy liberated when the fuel combines with oxygen.
6. The overall thermal efficiency is the ratio of the useful work performed to the mechanical equivalent of the heat supplied during a given period of working.

***XXIII. Переведите предложении на русский язык.***

1. To monitor the required enrichment of the air and fuel mixture for cold starting, increasingly sophisticated controls are now being applied to

carburettor automatic choke and fuel injection auxiliary supply systems, these controls forming part of what are now termed "engine management systems".

2. To maintain uniform temperatures, the air is forced to circulate around the entire circumference of each cylinder and its cylinder head, the direction of flow being along the cooling fins.

3. It was provided with a lower inlet and an upper outlet connection, the latter sometimes being called the header pipe.

4. In most carburettor fuel-supply systems the pump is of the diaphragm type and operated either mechanically or electromagnetically, the latter usually being described simply as electric pumps.

5. This is a cam-actuated interrupter switch contained in the ignition distributor, its function being to open and close the ignition coil primary circuit

***XXIV. Выберите необходимую неличную форму глагола: Infinitive, Participle or Gerund.***

1.Check the coolant level... (чтобы определить) if the cooling system is leaking. ***(to determine)***

**2.** The fuel mixture is compressed by the... (поднимающимся) piston to rise.

**3.** The partly... (разобранный) engine passes to a tunnel wash. ***(to dismantle)***

**4.** They expected solar batteries... (будут использоваться) in cars. ***(to use).***

**5.** We supposed him... (попробовал) some new oil additives. ***(to try)***

**6.** You may do a compression test... (чтобы найти) a dead cylinder. ***(to find).***

**7.** All usable parts are passed through a number of... (чистящие) solutions and solvents. ***(to clean)***

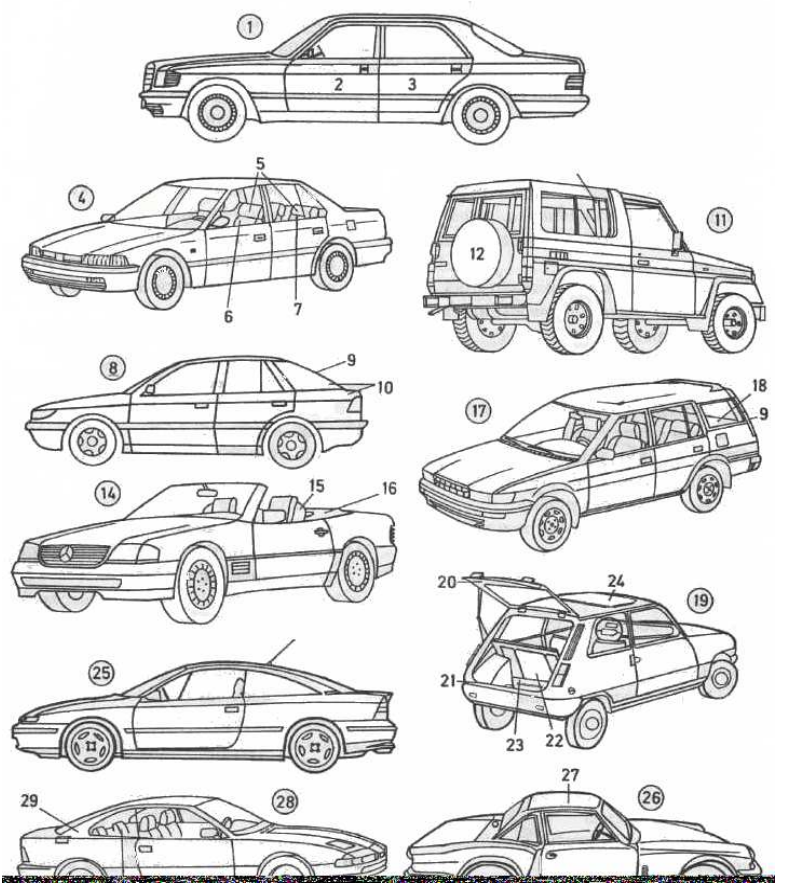
**8.** Leaky valves would require... (замена) the cylinder head. ***(to remove)***

**9.** Inspect the system for leaks by... (проверка) connections and hoses. ***(to examine).***

**10.** Radiator dissipates the engine heat... (отраженное) to the coolant. ***(to reject).***

**11.** On... (выходя) from the tunnel wash, the unit is laced on a monorail. ***(to emerge).***

**12.** It was twin-cylinder engine... (запатентованный) by Daimler.




**1-37. car models *(Am.* automobile models)** – *типы автомобилей (типы легковых автомобилей)*

**1. four-door touring saloon *(Am.* four-door sedan) in the upper-middle range** – *четырёхдверный седан*

**2. driver's door** – *дверь водителя*

**3. rear door** – *задняя дверь*

**4-10. four-door saloon *(Am.* four-door sedan) and four-door hatch-back in the middle range** –*четырёхдверный седан среднего*класса

**4. saloon *(Am.* sedan)** – *автомобиль*

**5. headrests (head restraints)** – *подголовники*

**6. front seat** – *переднее сиденье*

**7. rear seat (back seat)** – *заднее сиденье*

**8. fastback saloon *(Am.* fastback sedan) (stubback saloon, *Am.* stubback sedan)** – *фастбэк*

**9. tailgate** – *дверь задка*

**10. fastback (stubback)** – *задок кузова фастбэк (тип кузова легкового автомобиля)*

**11. cross-country vehicle with all-wheel drive (four-wheel drive)** – *полноприводной автомобиль повышенной проходимости*

**12. spare wheel** – *запасное колесо*

**13. roll bar** – *дуга безопасности*

**14. cabriolet sports coupe (cabriolet sports car) –** *спортивный закрытый двухместный автомобиль (купе-кабриолет)*

**15. integral seat** – *встроенное сиденье*

**16. automatic hood *(Am.* top) (power-operated hood, *Am.* top)** – *складной тент с электроприводом*

**17. estate car (estate, shooting brake,** Am. **station wagon)** – *автомобиль с кузовом универсал» (легковой автомобиль с грузопассажирским кузовом)*

**18. boot space (luggage compartment)** – *грузовое отделение*

**19. small three-door car** – *трёхдверный автомобиль малого класса*

**20. back (tailgate)** – *дверь задка*

**21. sill –** *погрузочный кант*

**22. folding back seat** – *заднее сиденье с откидной спинкой*

**23. boot (luggage compartment, *Am.* trunk)** – *багажник (багажное* отделение)

**24. (sliding) sunroof (steel sliding sunroof)** – *сдвижная панель крыши,* люк

**25. three-door hatchback** – *трёхдверный хетчбек (автомобиль-фургон с задней откидной дверью)*

**26. roadster (sports cabrio, sports cabriolet), a two-seater** – *двухместный автомобиль с кузовом типа «родстер»*

**27. hard top** – *жёсткая крыша*

**28. sports coupe, a two-plus-two (two-seater with occasional seats) –** спортивное купе (спортивный закрытый двухместный автомобиль)

**29. fastback** – *кузов «фастбэк»*

**30. occasional seat** – *дополнительный ряд сидений*

**31. low-profile tyre *(Am.* tire) (wide wheel)** – *широкопрофильная шина (широкое колесо)*

**32. gran turismo car (GT car)** – *автомобиль с кузовом «гран-туризм» (купе)*

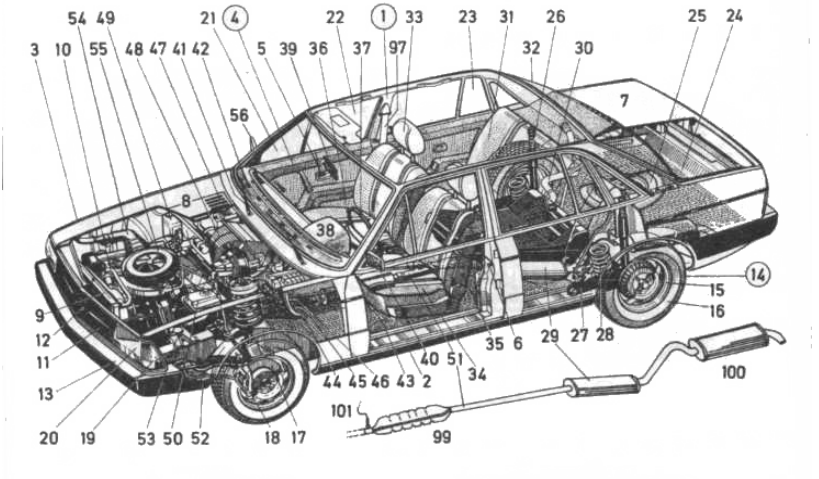
**33. integral bumper *(Am.* integral fender) –** *цельный бампер*

**34. rear spoiler** – *задний спойлер*

**35. back –** *спинка*

**36. front spoiler** – *передний спойлер*

**37. Porsche Boxster** – *бокстер фирмы «Порше»*




**1-56. motor car (car, *Am.* automobile, auto), a passenger vehicle –** *автомобиль, легковой автомобиль*

**1. monocoque body (unitary body)** – *несущий (безрамный) кузов*

**2. chassis, the understructure of the body** – *шасси (основание кузова)*

**3. front wing *(Am.* front fender)** – *переднее крыло*

**4. car door** – *дверь автомобиля*

**5. door handle** – *ручка двери*

**6. door lock** – *замок двери*

**7. boot lid** *(Am.* **trunk lid**) – *крышка багажника*

**8. bonnet** (*Am.* **hood**) – *капот двигателя*

**9. radiator** – *радиатор*

**10. cooling water pipe** – *трубопровод системы охлаждения*

**11. radiator grill** – *решётка радиатора*

**12. badging** – *фирменный знак*

**13. rubber-covered front bumper *(Am.* front fender)** – *передний бампер с резиновой накладкой*

**14. car wheel, a disc (disk) wheel** – *колесо автомобиля, дисковое колесо*

**15. car tyre** *(Am.* **automobile tire**) – *автомобильная шина*

**16. rim (wheel rim)** – *обод колеса*

**17-18. disc (disk) brake** – *дисковый тормоз*

**17. brake disc (disk) (braking disc)** – *тормозной диск (диск тормоза)*

**18. calliper (caliper)** – *скоба дискового тормоза*

**19. front indicator light (front turn indicator light)** – *передний указатель поворота*

**20. headlight (headlamp) with main beam (high beam), dipped beam (low beam), sidelight (side lamp, *Am.* side-marker lamp)** – *фара дальнего и ближнего света с габаритными огнями*

**21. windscreen *(Am.* windshield), a panoramic windscreen** – *ветровое стекло, панорамное ветровое стекло*

**22. crank-operated car window** – *опускное стекло двери*

**23. quarter light (quarter vent)** – *боковое заднее окно*

**24. boot *(Am.* trunk)** – *багажник*

**25. spare wheel** – *запасное колесо*

**26. damper (shock absorber)** – *амортизатор*

**27. trailing arm** – *продольный рычаг подвески*

**28. coil spring** – *цилиндрическая пружина*

**29. silencer (**Am. **muffler)** – *(промежуточный) глушитель*

**30. automatic ventilation system –** *автоматическая вентиляционная система*

**31. rear seats** – *задние сиденья*

**32. rear window –** *стекло заднего окна*

**33. adjustable headrest (head restraint)** – *регулируемый подголовник*

**34. driver's seat, a reclining seat** – *сиденье водителя, сиденье с откидываемой спинкой*

**35. reclining backrest** – *спинка сиденья, откидываемая назад*

**36. front passenger seat, a reclining seat** – *переднее сиденье пассажира, сиденье с откидывающейся назад спинкой*

**37. steering wheel** – *рулевое колесо*

**38. centre *(Am.* center) console containing speedometer *(coll.* speedo), revolution counter (rev counter, tachometer), clock, fuel gauge *(Am.* gage), water temperature gauge, oil temperature gauge** – *приборная панель со спидометром, тахометром, часами, указателями уровня топлива, температуры охлаждающей жидкости и масла*

**39. inside rear-view mirror** – *внутреннее зеркало заднего вида*

**40. left-hand wing mirror** – *левое наружное зеркало заднего вида*

**41. windscreen wiper (Am. windshield wiper)** – *стеклоочиститель ветрового стекла*

**42. defroster vents** – *сопла дефростера*

**43. carpeting –** *ковровый настил (пол кузова)*

**44. clutch pedal (*coll.* clutch)** – *педаль сцепления (разг.сцепление)*

**45. brake pedal (*coll.* brake)** – *педаль тормоза (разг. тормоз)*

**46. accelerator pedal *(coll.* accelerator)** – *педаль газа (педаль акселератора) (разг. газ)*

**47. inlet vent** – *отверстие воздухозаборника*

**48. blower fan** – *нагнетательный вентилятор*

**49. brake fluid reservoir –** *бачок тормозной системы*

**50. battery** – *аккумуляторная батарея*

**51. exhaust pipe** – *выпускной трубопровод*

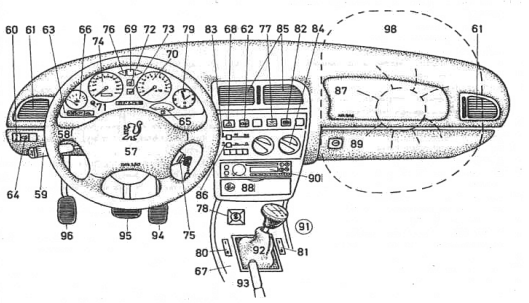
**52. front running gear with front wheel drive** – *ходовая часть с передним приводом*

**53. engine mounting** – *кронштейн опоры двигателя*

**54. intake silencer *(Am.* intake muffler)** – *глушитель шума впуска*

**55. air filter (air cleaner)** – *воздушный фильтр*

**56. right-hand wing mirror –** *правое наружное зеркало заднего вида*




**57. steering wheel with airbag** – *рулевое колесо с надувной подушкой безопасности*

**58. steering wheel spoke** – *спица рулевого колеса*

**59. multi-function control stalk for indicators, wipers, washers, main beam *(Am.* high beams) and horn** – *комбинированный подрулевой переключатель указателей поворота, стеклоочистителя, стеклоомывателя дальнегосвета фар, звукового сигнала*

**60. lights: sidelights (side- and tail lighter), dipped beam (dipped headlights, *Am.* low beam)** – *выключатель освещения: габаритные огни, ближний свет фар*

**61. air duct for the side window** – *дефростер бокового окна*

**62. rear fog lamp switch with integral on/off indicator light** – *выключатель задних противотуманных фонарей (фар) со встроенным выключателем*

**63. (front) fog lamp indicator light** – *сигнализатор включения передних противотуманных фар*

**64. (front) fog lamp switch** – *выключатель передних противотуманных фар*

**65. fuel gauge (**Am**. gage)** – *указатель уровня топлива*

**66. water temperature gauge** (Am. gage) – *указатель температуры охлаждающей жидкости*

**67. centre *(Am.* center) console** – *центральная консоль*

**68. hazard warning [light] switch (hazard flasher system switch)** – *выключатель аварийной световой сигнализации*

**69. main beam indicator light *(Am.* high beams indicator)** – *сигнализация включения дальнего света*

**70. revolution counter** *(coll.* rev counter), **tachometer** – *тахометр*

**71. trip (mileage) recorder reset knob** – *кнопка обнуления суточного счётчика пути*

**72. handbrake warning light** – *сигнализатор выключения стояночного (ручного) тормоза*

**73. oil pressure warning light** – *сигнализатор аварийного давления масла*

**74. speedometer light** – *лампа спидометра*

**75. ignition switch lamp** – *лампа подсветки замка зажигания*

**76. direction indicator warning light** – *сигнализатор включения указателей поворота*

**77. interior light switch (courtesy light switch) –** *выключатель внутреннего освещения (в салоне)*

**78. switch for the electrically adjustable exterior mirror** – *выключатель электропривода регулируемого наружного зеркала заднего вида*

**79. clock** – *часы*

**80. switch for the electric window** *(Am.* power window) – **on the driver's side** – *выключатель электропривода стеклоподъёмника со стороны водителя*

**81. switch for the electric window** *(Am.* power window) **on the passenger's side** – *выключатель электропривода стеклоподъёмника со стороны пассажира*

**82. switch for the heated rear window** *(*Am. rear window heating **switch)** – *выключатель обогрева заднего стекла*

**83. fan control** – *выключатель вентилятора*

**84. individual temperature controls for driver and passenger** – *регулятор температуры отдельно для водителя и для пассажира*

**85. fresh air inlets** – *впуск свежего воздуха в салон*

**86. fresh air regulator** – *регулятор поступления свежего воздуха*

**87. airbag cover** – *накладка подушки безопасности*

**88. ashtray with integral cigarette lighter** – *пепельница со встроенным прикуривателем*

**89. glove compartment lock (glovebox lock)** – *замок вещевого ящичка (разг. бардачка)*

**90. car radio** – *автомобильный радиоприёмник*

**91. gear lever (gearshift lever), a floor-type gear-change** – *рычаг переключения передач*

**92. leather gaiter –** *кожаный чехол*

**93. hand brake lever** – *рукоятка ручного тормоза*

**94. accelerator pedal** – *педаль акселератора*

**95. brake pedal** – *педаль тормоза*

**96. clutch pedal** – *педаль сцепления*

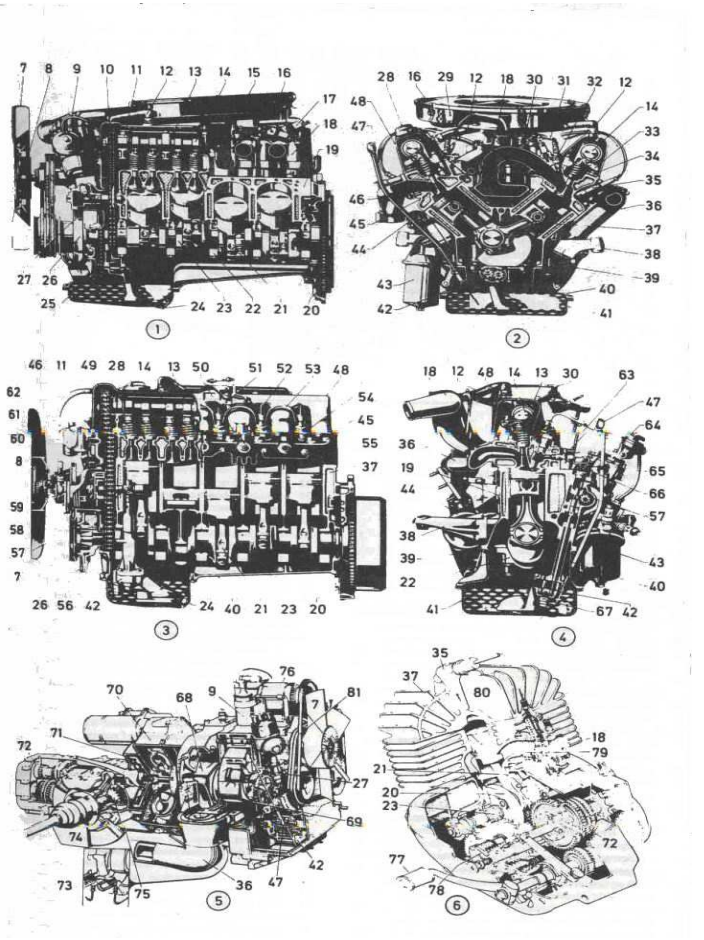
**97. seat belt (safety belt)** – *ремень безопасности*

**98. passenger airbag (indicated by broken line) –** *(надувная) подушка безопасности пассажира (обозначена пунктирной линией)*

**99**. **catalytic converter** – *каталитический нейтрализатор отработавших газов*

**100. rear silencer** *(Am.* rear muffler) – *глушитель шума отработавших газов*

**10l. lambda probe (oxygen sensor)** – *кислородный датчик*



**1. eight-cylinder V (vee) fuel-injection spark-ignition engine (Otto-cycle engine)** – *восьмицилиндровый V-образный двигатель с впрыском топливаи искровым зажиганием (продольный разрез)*

**2. cross-section of spark-ignition engine (Otto-cycle internal combustion engine)** – *поперечный разрез двигателя с искровым зажиганием (двигателя внутреннего сгорания, работающего по циклу Отто)*

**3. sectional view of five-cylinder in-line diesel engine** – *продольный разрез пятицилиндрового однорядного дизельного двигателя*

**4. cross-section of diesel engine** – *поперечный разрез дизельного двигателя*

**5. two-rotor Wankel engine (rotary engine)** – *двухроторный двигатель Ванкеля (роторно-поршневой двигатель)*

**6. single-cylinder two-stroke internal combustion engine** – *одноцилиндровый двухтактный двигатель внутреннего сгорания с искровым зажиганием*

**7. fan** – *вентилятор*

**8. fan clutch for viscous drive** – *вязкостная муфта привода вентилятора*

**9. ignition distributor (distributor) with vacuum timing control** – *распределитель зажигания (распределитель) с вакуумным автоматом опережения зажигания*

**10. double roller chain** – *двухрядная роликовая цепь*

**11. camshaft bearing** – *подшипник распределительного вала*

**12. air-bleed duct** – *трубка системы вентиляции*

**13. oil pipe for camshaft lubrication** – *масляный насос для смазки распределительного вала*

**14. camshaft, an overhead camshaft** – *распределительный вал, верхний распределительный вал*

**15. venturi throat** – *диффузор с дросселем*

**16. intake silencer** (absorption silencer, Am. Absorption muffler) – *глушитель шума впуска*

**17. fuel pressure regulator** – *регулятор давления топлива*

**18. inlet manifold** – *впускной (всасывающий трубопрово)*

**19. cylinder crankcase** – *блок цилиндров*

**20. flywheel** – *маховик*

**21. connecting rod (piston rod)** – *шатун*

**22. cover of crankshaft bearing** – *крышка подшипника коленчатого* вала

**23. crankshaft** – *коленчатый вал*

**24. oil bleeder screw (oil drain plug)** – *пробка маслосливочного отверстия для слива масла*

**25. roller chain of oil pump drive** – *роликовая цепь привода масляного насоса*

**26. vibration damper** *демпфер колебаний*

**27. distributor shaft for the ignition distributor (distributor)** – *валик привода распределителя зажигания*

**28. oil filler neck** – *маслоналивная горловина*

**29. diaphragm spring** – *пружина диафрагмы*

**30. control linkage** – *рычажный механизм управления*

**31. fuel supply pipe** *(Am.* fuel line) – *топливопровод*

**32. fuel injector (injection nozzle)** – *форсунка*

**33. rocker arm** – *коромысло клапана*

**34. rocker arm mounting** – *опора клапанного коромысла*

**35. spark plug (sparking plug) with suppressor –** *свеча зажигания с помехоподавляющим наконечником*

**36. exhaust manifold** – *выпускной коллектор*

**37. piston with piston rings and oil scraper ring** – *поршень с поршневыми кольцами и маслосъёмным кольцом*

**38. engine mounting** – *кронштейн опоры двигателя*

**39. dog flange (dog)** – *промежуточный фланец*

**40. crankcase** – *картер двигателя*

**41. oil sump (sump)** – *масляный поддон*

**42. oil pump** – *масляный насос*

**43. oil filter** – *масляный фильтр*

**44. starter motor (starting motor)** – *пусковой двигатель (стартер)*

**45. cylinder head** – *головка блока цилиндров*

**46. exhaust valve** – *выпускной клапан*

**47. dipstick –** *указатель уровня масла*

**48. cylinder head cover –** *прокладка головки цилиндров*

**49. double bushing chain** – *двухрядная втулочная цепь с распоркой*

**50. warm-up regulator –** *регулятор прогрева двигателя*

**51. tapered needle for idling adjustment** – *конусная игла для регулировки холостых оборотов*

**52. fuel pressure pipe (fuel pressure line)** – *трубопровод подачи топлива от насоса*

**53. fuel leak line (drip fuel line)** – *трубопровод слива топлива*

**54. injection nozzle (spray nozzle)** – *впрыскивающее привода вентилятора сопло (форсунка)*

**55. heater plug** – *запальная свеча*

**56. thrust washer** – *балансировочный противовес*

**57. intermediate gear shaft for the injection pump drive** – *промежуточный вал зубчатой передачи для привода топливного насоса*

**58. injection timer unit** – *муфта опережения впрыска*

**59. vacuum pump (low-pressure regulator)** – *вакуумный* насос

**60. cam for vacuum pump –** *эксцентрик привода вакуумного насоса*

**61. water pump (coolant pump)** – *водяной насос (насос системы охлаждения)*

**62. cooling water thermostat** – *термостат системы охлаждения*

**63. thermo time switch** – *термореле*

**64. fuel hand pump** – *ручной насос для подкачки топлива*

**65. injection pump** – *топливный насос высокого давления*

**66. glow plug** – *свеча накаливания*

**67. oil pressure limiting valve** – *предохранительный клапан масляного насоса*

**68. rotor** – *ротор*

**69. seal** – *уплотнительная пластина*

**70. torque converter** – *гидротрансформатор*

**71. single-plate clutch** – *однодисковое сцепление*

**72. multi-speed gearing (multi-step gearing)** – *многоступенчатая коробка передач*

**73. port liners in the exhaust manifold for emission control** – *вкладыши в выпускном трубопроводе для уменьшения токсичности отработавших газов*

**74. disc (disk) brake** – *дисковый тормоз*

**75. differential gear (differential)** – *межколёсный дифференциал*

**76. generator** – *генератор*

**77. foot gear change (**Am**. *foo*t gear shift)** – *педаль управления переключением передач*

**78. dry multi-plate clutch** – *сухое многодисковое сцепление*

**79. cross-draught** *(*Am. cross-draft) c**arburetor** *(Am.* carburetor) – *карбюратор с горизонтальным потоком*

**80. cooling ribs** – *рёбра охлаждения*

**81. V-belt (fan belt)** – *клиновой ремень*

# ТАБЛИЦА ПЕРЕВОДА МЕТРИЧЕСКИХ И НЕМЕТРИЧЕСКИХ / АНГЛО-АМЕРИКАНСКИХ / ЕДИНИЦ ИЗМЕРЕНИЙ

| Наименование единиц | Коэффициент перевода | Наименование единиц |
|---|---|---|
| **Линейные меры** | | |
| Дюймы | x 25,4 | = Миллиметры (мм) |
| Футы | x 0,305 | = метры (м) |
| Мили | x 1,609 | = километры (км) |
| **Меры массы (веса)** | | |
| Унции | x 28.35 | = Граммы (Г) |
| Фунты | x 0.454 | = Килограммы (кг) |
| **Меры объема (емкости)** | | |
| Кубические дюймы | x 16.387 | Кубические сантиметры ($см^3$) |
| Британские пинты | x 0.568 | = Литры (л) |
| Британские кварты | x 1.137 | = Литры (л) |
| Американские кварты | x 0.946 | = Литры (л) |
| Британские галлоны | x 4.546 | = Литры (л) |
| Американские галлоны | x 3.785 | = Литры (л) |
| **Единицы измерения мощности** | | |
| Американская лошадиная сила (л.с.) | x 746 | = Ватт (Вт) |
| Британская лошадиная сила (л.с.) | x 745.7 | = Ватт (Вт) |
| Российская лошадиная сила (л.с.) | x 735.5 | = Ватт (Вт) |
| **Единицы измерения скорости** | | |
| Мили в час (миля/час) | x 1.609 | = Километры в час (км/ч) |
| **Единицы измерения расхода топлива** | | |
| Мили на британский галлон | x 0.354 | = километры на литр (км/л) |
| Мили на американский галлон | x 0.425 | = километры на литр (км/л) |
| **Единицы измерения температуры** | | |
| Градус Цельсия (°C) = (Градус Фаренгейта – 32) x 0.56<br>Градус Фаренгейта (°Ф) = (Градус Цельсия x 1.8) + 32 | | |

# CONTENTS

Учебное издание

**Мазур** Елена Антоновна

# ИНОСТРАННЫЙ ЯЗЫК (ЕВРОПЕЙСКИЙ)

Практикум

В авторской редакции
Компьютерная верстка М.А. Портновой

Подписано в печать 23.10.14. Формат 60×84/16.
Бумага писчая. Печать офсетная. Усл. печ. л.5,6.
Уч.-изд. л. 6,5 Тираж 200 экз. Заказ

---

Издательство Владивостокского государственного университета
экономики и сервиса
690014, Владивосток, ул. Гоголя, 41
Отпечатано в типографии ВГУЭС
690014, Владивосток, ул. Гоголя, 41

96