

## TWO-STROKE AND FOUR-STROKE ENGINES

### 3.1. Vocabulary

*Ex. 1. Match the words to their Russia equivalents.*

- |                        |                                |
|------------------------|--------------------------------|
| 1. exhaust             | a. зажигать (топливо)          |
| 2. four-stroke engine  | b. выпускной клапан            |
| 3. two-stroke engine   | c. оборот                      |
| 4. fuel                | d. двухтактный двигатель       |
| 5. inlet               | e. прессование                 |
| 6. head gasket         | f. прокладка головки цилиндра  |
| 7. exhaust stroke      | g. впускной клапан             |
| 8. mix two-stroke oil  | h. давление                    |
| 9. compressing         | i. смешивать двухтактное масло |
| 10. ignite             | j. ход впуска                  |
| 11. power stroke       | k. цикл                        |
| 12. cycle              | l. топливо                     |
| 13. exhaust valve      | m. крышка цилиндра             |
| 14. pressure           | n. четырехтактный двигатель    |
| 15. compression stroke | o. ход выпуска                 |
| 16. revolution         | p. рабочий ход                 |
| 17. cylinder head      | q. соотношение топливо:масло   |
| 18. intake valve       | r. входное отверстие           |
| 19. intake stroke      | s. выхлопной шум               |
| 20. fuel-to-oil ratio  | t. такт сжатия                 |

*Ex. 2. Translate the sentences from Russian into English.*

1. У моей машины двухтактный двигатель.
2. Вам необходимо смешать двухтактное масло с бензином для двигателя.
3. Бензин - это тип топлива, обычно используемый в автомобилях.
4. Правильное соотношение топлива и масла важно для работы двигателя.
5. Двигатель проходит серию циклов для выработки мощности.
6. Воздух поступает в двигатель через впускное отверстие.
7. Когда поршень движется вверх, он сжимает воздушно-топливную смесь.
8. Выхлоп у моего мотоцикла довольно громкий.
9. Двигатель совершает тысячи оборотов в минуту.
10. У моей машины четырехтактный двигатель.
11. Во время такта впуска топливовоздушная смесь втягивается в камеру сгорания.
12. Впускной клапан открывается, позволяя топливовоздушной смеси поступать в камеру сгорания.
13. Такт сжатия сжимает топливовоздушную смесь.
14. Если есть проблема с прокладкой головки блока цилиндров, в вашем автомобиле может протекать масло или охлаждающая жидкость.
15. Головка блока цилиндров является важной частью двигателя.
16. Топливовоздушная смесь сжимается до высокого давления во время цикла.
17. Рабочий ход - это когда топливная смесь воспламеняется, создавая энергию для приведения автомобиля в движение.
18. Свечи зажигания воспламеняют топливо в двигателе.

19. Выпускной клапан открывается во время такта выпуска.
20. Такт выпуска выталкивает отработанные газы из двигателя.

### **3.2. Reading**

*Ex. 1. Read the text.*

#### **Two-Stroke and Four-Stroke Engines**

There are two main types of internal combustion engines: the two-stroke and the four-stroke. The two-stroke engine is simpler and lighter, but it has certain disadvantages compared to the four-stroke engine. In a four-stroke engine, the piston completes four separate strokes during two revolutions of the engine: intake, compression, power, and exhaust. In a two-stroke engine, the piston makes just two passes in each cylinder. These engines are typically found in smaller vehicles like motorcycles, mopeds, scooters, and small outboard motors.

The first stroke, called the intake stroke, begins when the piston is at top dead center (TDC) and moves downward, drawing a charge of air or mixture into the cylinder through the open intake valve. This charge consists of fuel vapour and air in gasoline-powered engines, while diesel engines use only air. The second stroke, called the compression stroke, starts when the piston moves back up to compress this charge. Both valves are closed during this stage, and the spark plug is not firing. At the end of this stroke, the air/fuel mixture is compressed into a very small area. The third stroke, called the power stroke, begins just before the piston reaches TDC as the compressed air/fuel mixture is ignited by a spark plug. The resulting explosion drives the piston downward, creating mechanical work. Finally, the fourth stroke, called the exhaust stroke, allows the piston to move back up to force the spent gases out of the cylinder through the open exhaust valve.

In a two-stroke engine, the end of the combustion stroke and the beginning of the compression stroke happen simultaneously, with the intake and exhaust (or scavenging) functions occurring at the same time. As the piston moves upward after the power stroke, it compresses the fuel/air mixture in the crankcase, which is then transferred to the combustion chamber through ports in the cylinder wall. The incoming

charge of fresh mixture pushes out the remaining exhaust gases through a separate set of ports, and the cycle repeats.

The main advantages of two-stroke engines over four-stroke engines are their simplicity, light weight, and high power-to-weight ratio. These characteristics make them ideal for use in small vehicles that require a lot of power, like motorcycles and scooters. However, they have certain disadvantages as well. Two-stroke engines tend to be less fuel-efficient and produce more pollution than four-stroke engines because some of the fuel/air mixture escapes through the exhaust port before it can be burned. They also require a special oil to be added to the fuel to lubricate the engine, and this oil must be replenished regularly. Four-stroke engines, on the other hand, are typically more reliable, last longer, and require less maintenance.

*Ex. 2. Answer the questions.*

1. What are the two main types of internal combustion engines?
2. How many strokes does a piston complete in a four-stroke engine? What are these strokes called?
3. Where are two-stroke engines typically found?
4. Describe the intake stroke in a four-stroke engine.
5. What happens during the compression stroke in a four-stroke engine?
6. How do two-stroke engines handle the intake and exhaust functions?
7. What are the advantages and disadvantages of two-stroke engines compared to four-stroke engines?

### **3.3. Communication**

*Ex. 1. Make sentences using the following words:*

1. difference/between/two-stroke
2. using/two-stroke/dirt
3. fuel/efficient/two-stroke
4. explain/concept/power

5. four-stroke/diesel/car
6. commonly/used/chainsaws
7. mix/oil/gas
8. maintenance/compared/two-stroke
9. ridden/motorcycle/two-stroke
10. quieter/smooth/four-stroke