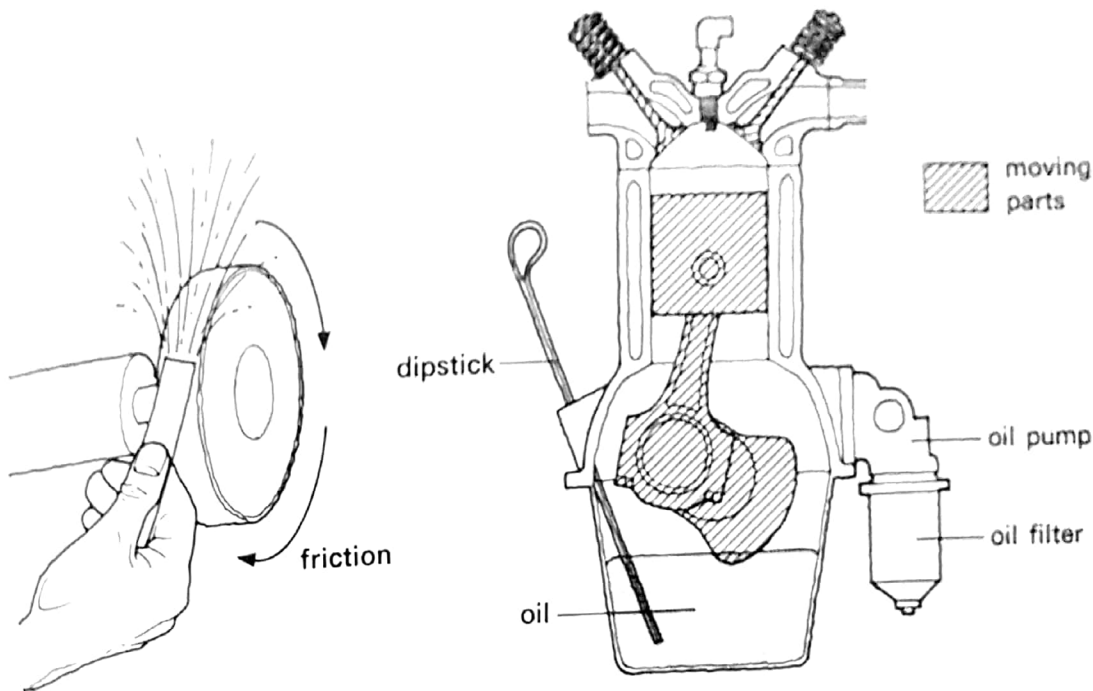


UNIT SIX

Motor Vehicle Maintenance

SECTION A: LUBRICATION



Friction causes heat and wear. In an engine, oil lubricates the moving parts and reduces the heat and the wear. The oil also collects any small particles of dirt or metal and carries them to the oil filter.

Some of the oil will leak out of the engine when it is used. The amount of oil in the engine will need checking regularly. The dipstick is used for checking the amount of oil. If there is not enough oil in the engine, friction between the moving parts will increase and the engine will quickly become damaged.

The oil in the engine will need changing about once every 5000 km. If it is not changed, it will become thin and full of impurities and it will not lubricate efficiently. The oil filter will also need changing regularly. If it is not changed, it will become blocked by particles of dirt and metal. If the filter becomes blocked, the oil will not flow around the engine and heat and wear will increase very rapidly.

Some parts of a car need greasing – usually about once every six months. Fifty years ago cars needed greasing every week. Modern vehicles need much less greasing. They only need greasing about twice a year. Cars in the future will probably need no greasing.

Exercise 1 Are these statements true or false? Rewrite them if they are false.

1. Oil lubricates and collects dirt.
2. The oil filter is used for changing the oil.
3. Particles of dirt and metal will damage the moving parts of an engine.
4. The amount of oil in an engine does not change.
5. If the amount of oil in an engine decreases, the friction will increase.
6. The dipstick shows the amount of damage in an engine.
7. The oil in an engine needs changing regularly but the oil filter does not need changing.
8. Grease lubricates.
9. Early cars needed more greasing than modern cars.
10. Cars in the future will need more greasing.

Exercise 2 Often, *will* does not refer to the future but indicates something that always happens. For example:
Friction will cause heat and wear.

Rewrite this paragraph using *will* in each sentence.

Friction causes heat and wear. In an engine, oil lubricates the moving parts and reduces heat and wear. The oil also collects any small particles of dirt and metal and carries them to the oil filter.

Now rewrite these sentences using *will*.

1. At normal pressure, water boils at 100°C. It freezes at 0°C.
2. Lead melts at 327°C.
3. An electric current flows from negative to positive.
4. Non-ferrous metals do not corrode easily.
5. A hacksaw cuts metal.
6. Low pressure decreases the boiling point of water.
7. In an open container, a liquid evaporates slowly.
8. A dry cell supplies 1.5 V.

Exercise 3 Look at this example:

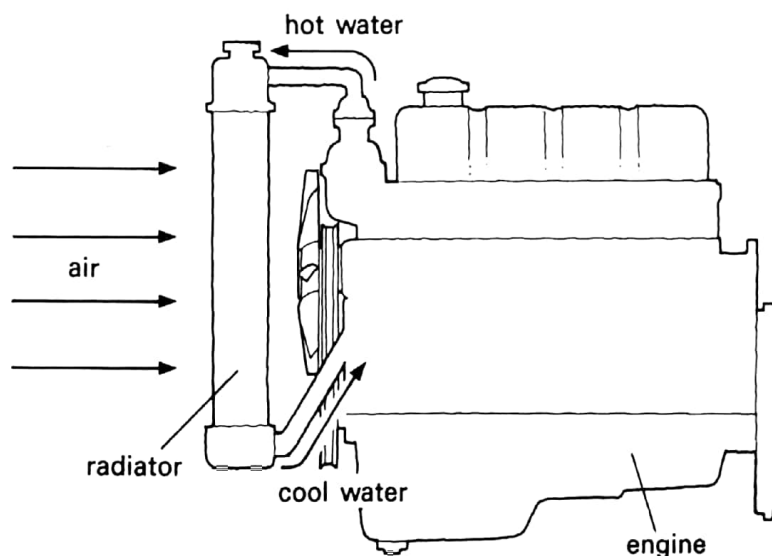
- a) Modern cars need greasing twice a year.
- b) Modern cars need greasing once every six months.

Now rewrite these sentences in the same way.

- 1. Early cars needed greasing four times a month.
- 2. The amount of oil in an engine needs checking seven times a week.
- 3. The amount of liquid in a fire extinguisher needs checking at least four times a year.
- 4. In some early steam engines, the boiler needed filling four times an hour.
- 5. In these steam engines, the piston moved only twenty times a minute.
- 6. The windscreen wipers on most modern cars operate approximately sixty times a minute.
- 7. In modern vehicles, the water in the radiator only needs checking about twice a month.

Exercise 4 Look at the diagram below and then complete the paragraph from the wordlist.

4.11

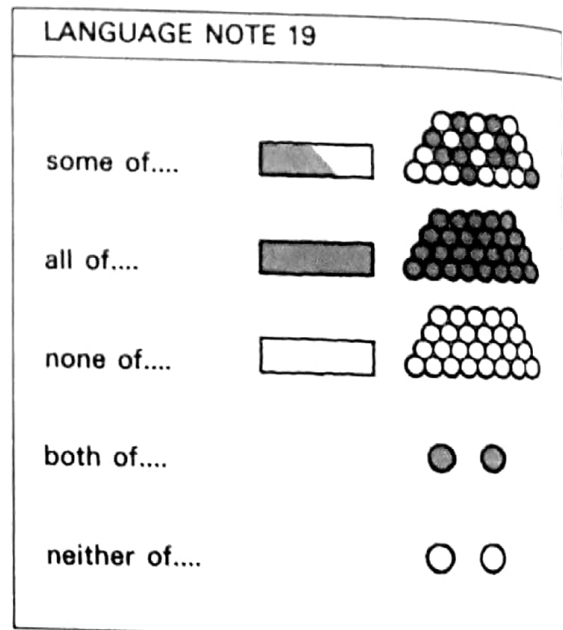
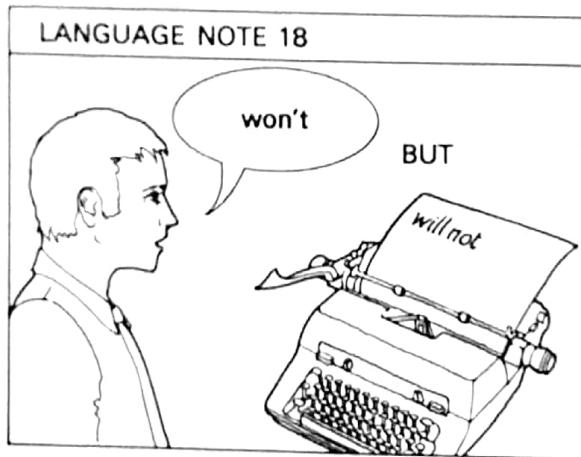


*air
amount
below
boil
causes
checking*

*cooled
flows
leak
needs*

*out of
radiator
reduces
stroke
unless
will*

The friction inside an engine heat. Too much heat damage the engine and so it cooling. Generally, engines are by water but some engines are cooled. Four- engines are usually water-cooled. The water around the inside of the engine and the temperature. The water then flows to the and is cooled by the air flow. Then it comes the radiator and runs through the engine again. Some of the water will out of the engine when it is used. The heat of the engine will sometimes cause the water to and evaporate into steam. Therefore, the of water in the radiator will need regularly. In cold conditions (. . . . 0°C), the water in the radiator will freeze *anti-freeze* is added to it.



a dipstick
a moving part

friction
wear
damage
lubrication
grease

the future
anti-freeze

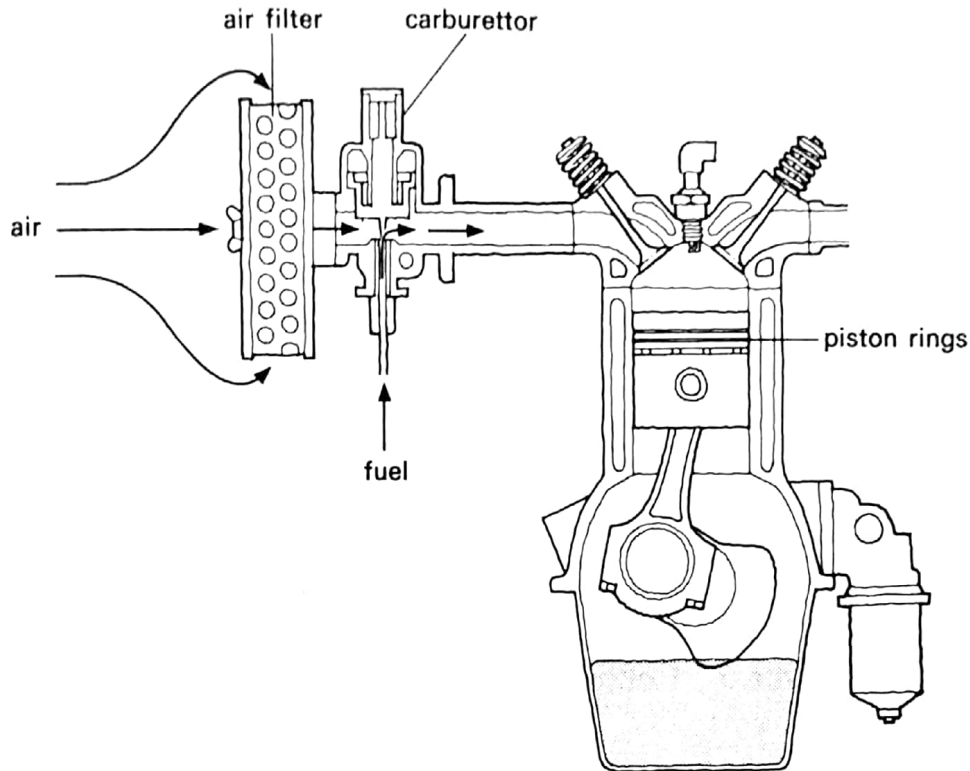
collect
leak
damage
block
flow
grease
lubricate

future
every

regularly
efficiently
once

out of

SECTION B: FILTERS



Although it is very simple, the air filter is a very important part of an engine. It may be made of paper or it may contain oil. A paper filter will need changing regularly. An oil filter will not need changing but it will need cleaning and the oil will need changing. Filters will become blocked unless they are cleaned or changed. If they become blocked, the engine may be damaged.

Air passes through the air filter before it goes into the carburettor. The filter removes dirt, dust and other impurities from the air. In the carburettor, the air is mixed with fuel (usually in the ratio of about 10:1) and this mixture passes to the cylinders. If the air filter becomes blocked, the air flow to the carburettor will be decreased. If the air flow decreases, the amount of fuel in the mixture will increase. The amount of fuel in the mixture may increase by 30% or 40%. Then the engine will not operate efficiently and considerable damage may be caused inside the cylinders.

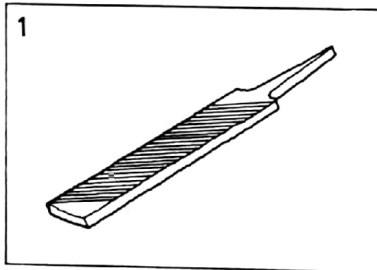
Never operate an engine if the air filter is not in place. Dust and dirt may enter the engine and damage the cylinders, pistons and piston rings. If the piston rings become damaged, oil from the sump will flow past the pistons and will enter the cylinders above the pistons.

This oil may cover the spark plugs. The spark plugs *will* not give a spark if they are covered with oil and the engine will stop.

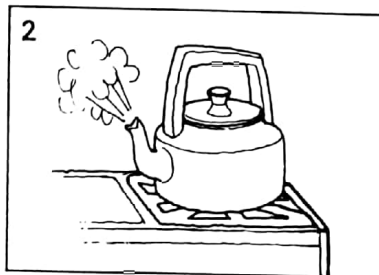
Exercise 5 Answer these questions.

1. What happens when air passes through an air filter?
2. What happens when this air passes to the carburettor?
3. What happens if the air flow is decreased?
4. What happens if the amount of fuel in the mixture is increased?
5. What happens if an engine is operated without an air filter?
6. What happens if the piston rings become damaged?
7. What happens if oil enters the cylinders?
8. What happens if the spark plugs become covered with oil?

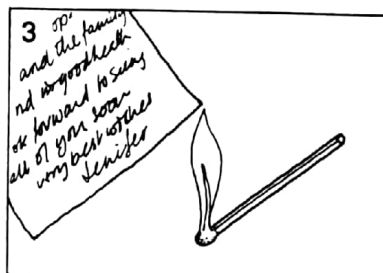
Exercise 6 Complete these sentences. Use *will* or *may*.



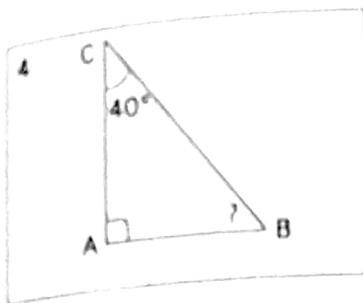
If a file has no handle you damage your hand.



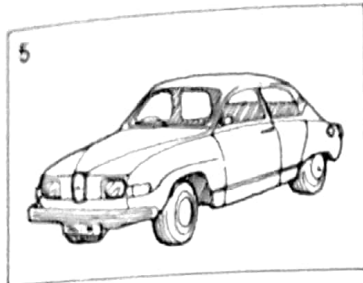
If the pressure is normal, the water boil at 100°C.



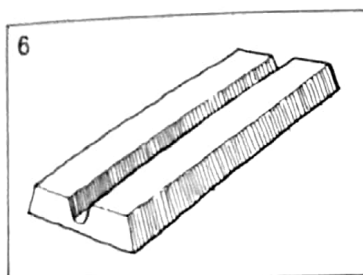
If the paper enters the flame, it burn.



If the angle ACB is 40° , the angle ABC be 50° .

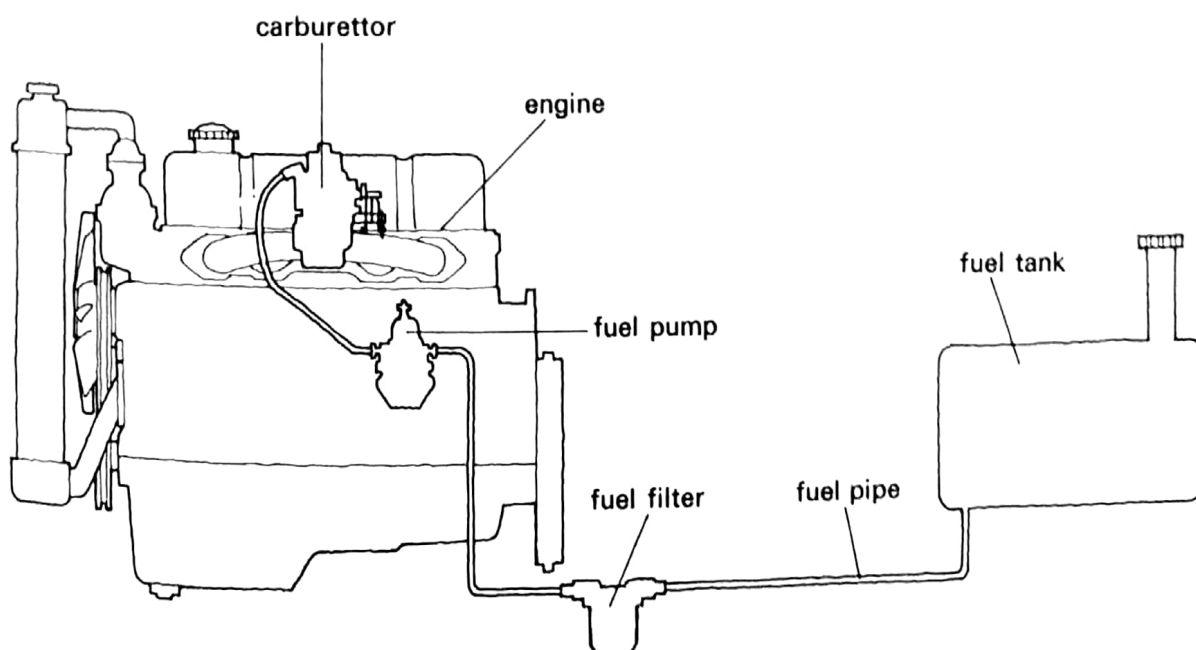


If this car has a two-stroke engine the fuel contain oil.



If this alloy contains copper, it be brass or it be bronze.

Exercise 7 Study the diagram below carefully. Then complete the three paragraphs on the next page from the wordlist.



<i>becomes</i>	<i>contains</i>	<i>pump</i>
<i>between</i>	<i>from</i>	<i>needs</i>
<i>blocked</i>	<i>fuel</i>	<i>remove</i>
<i>cause</i>	<i>impurities</i>	<i>stop</i>
<i>clean</i>	<i>particles</i>	
<i>collect</i>	<i>passes</i>	

Every petrol engine needs a filter. As the petrol flows ~~from~~ the fuel tank to the carburettor, it through a filter. This filter removes any of dirt, dust, etc. in the fuel. Unless these are collected in the filter, they may eventually block the carburettor or enter the engine and considerable damage.

The fuel filter cleaning regularly. If it is not cleaned, it may become If it blocked, the fuel will not flow to the carburettor and the engine will

. . . . the carburettor and the filter, there is always a fuel pump. This pump usually another small filter. The filter in the fuel is usually made of wire. It will only comparatively large particles of dirt. It is possible to the filter from the pump and to it with a stiff brush.

Exercise 8 Look at this example:

Dirt and dust in the air may damage an engine.
An engine may be damaged by dirt and dust in the air.

Now change these sentences in the same way.

1. Dirt in the cylinders will damage the pistons and the piston rings.
2. Oil from the cylinders may cover the spark plugs.
3. A blocked air filter will increase the amount of fuel in the mixture.
4. Too much fuel in the mixture may cause considerable damage to an engine.
5. Lubrication will decrease friction between moving parts.
6. Impurities will change the density of a liquid.

Now look at this example:

An engine may *be* damaged if the filters *become* blocked.

Now complete these sentences using *be* and *become*.

7. If an air filter blocked, the air flow will decreased.
8. If an oil filter blocked, the flow of oil around the engine will considerably decreased.
9. If there is not enough oil in an engine, the friction between moving parts will increased and they will quickly damaged.
10. The lubrication of the moving parts will also decreased if the oil in the engine thin and impure.

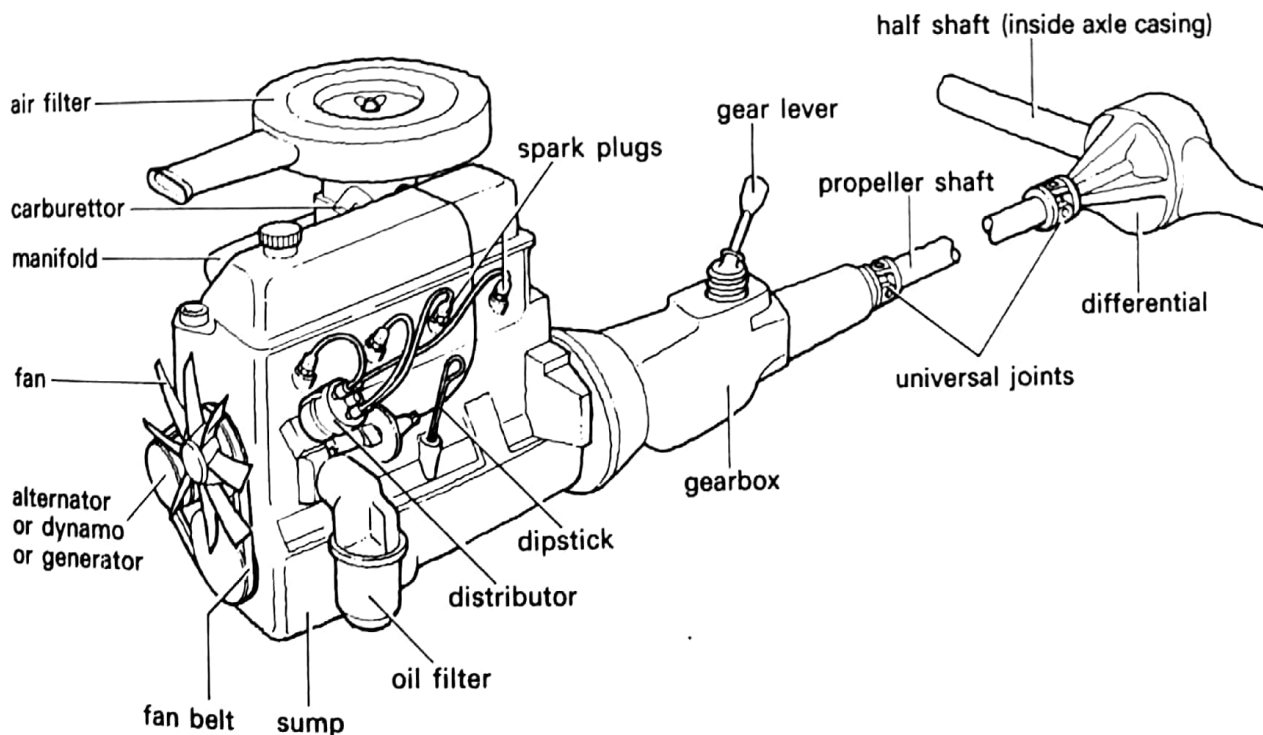
the carburettor
a piston ring
a spark
a flame

operate

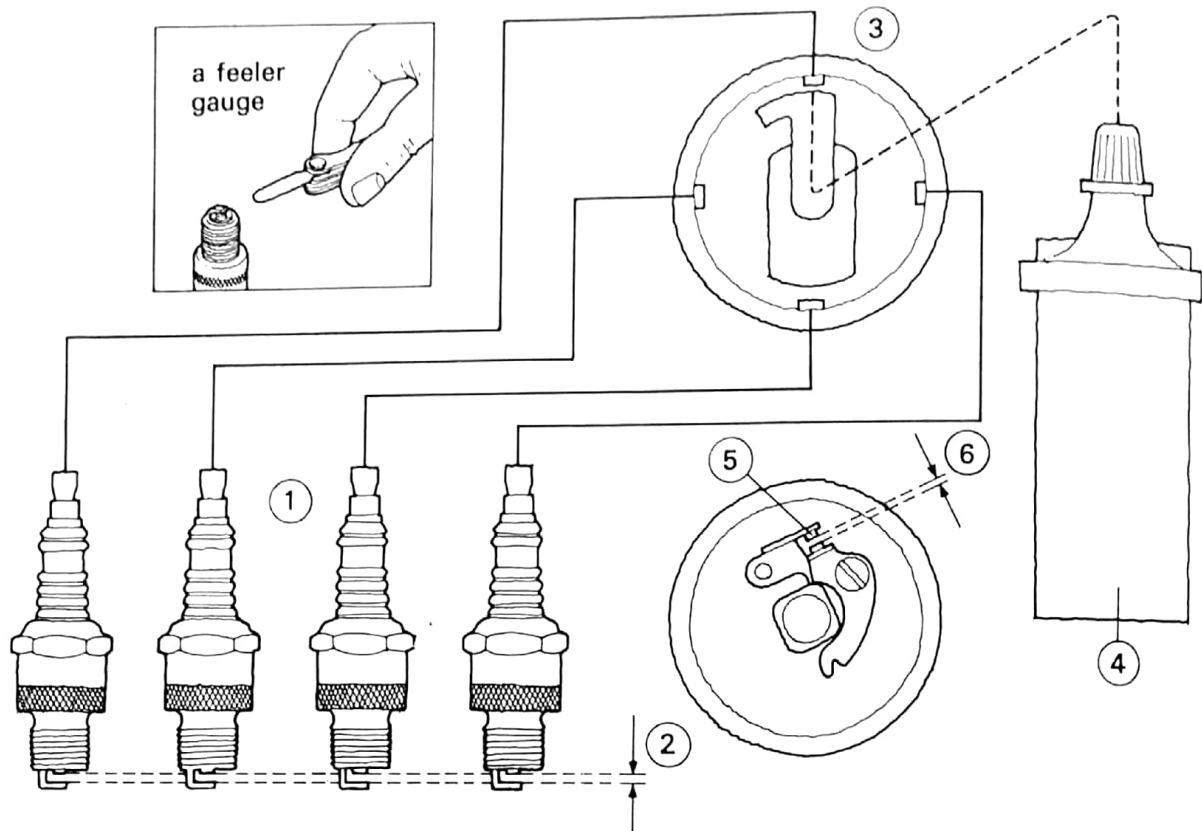
considerable

in place

MOTOR VEHICLE TERMINOLOGY (1) EXTERNAL PARTS



SECTION C: SERVICING



Modern motor vehicles can be very reliable. They can also be very unreliable unless they are serviced regularly. Most vehicles need servicing every 10 000 km. If they are not serviced, faults can occur and the vehicle will become unreliable.

The spark plugs (1) will need regular checking. As the plugs become worn, the gap (2) between the electrodes will increase. This gap can increase by 0.1 mm every 5000 km. The electrodes can also become dirty. If they are dirty, or if the gap is too large, the spark between the electrodes will be weak and the engine will operate badly. The electrodes can be cleaned with a small file and then adjusted to the correct gap. A feeler gauge is generally used to check the gap.

Electricity is supplied to the spark plugs by the distributor. The rotor arm (3) rotates and supplies high voltage from the coil (4) to each spark plug in turn. As the rotor arm rotates, the distributor points (5) open and close. These points will need checking because the gap (6) between them can change. If the gap is not correct, the engine will not run well. The gap can be adjusted with a

screwdriver but the points cannot normally be cleaned. If the points are in poor condition, they will need changing. Some modern cars have electronic distributors and have no points.

The electrolyte in the battery consists of a mixture of distilled water and sulphuric acid. As the vehicle is used, some of the water in the electrolyte will evaporate. This can be replaced with distilled water. Never use acid to replace electrolyte. Never use tap water either. Tap water contains impurities and can damage the lead plates inside the battery.

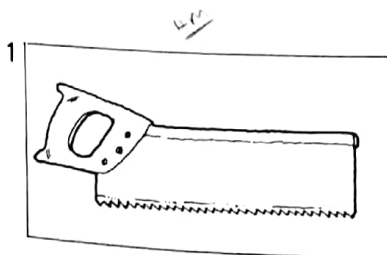
Exercise 9 Look at these instructions. Are they correct or incorrect?

Every 10 000 km:

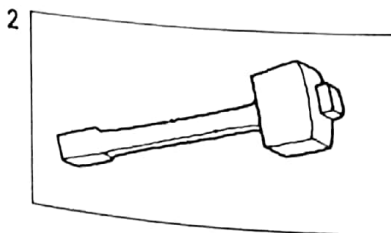
1. Check the spark plugs. ✓
2. Clean the plugs with a small file. ✓
3. Clean the points with a small file. ✓
4. Check the gap between the points. ✓
5. Fill the battery with tap water or acid. ✓
6. Change the oil in the radiator. ✓
7. Change the paper air filter. ✓
8. Check the oil in the sump but do not change it. ✓

Now rewrite a correct set of servicing instructions.

Exercise 10 Look at these examples:

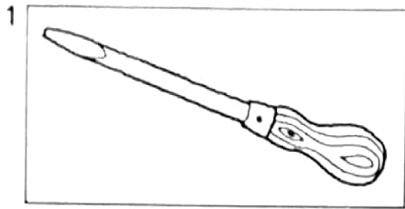


This tool can be used for cutting wood.

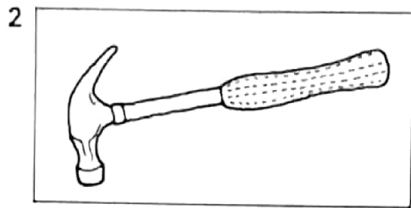


This tool can't be used for cutting metal.

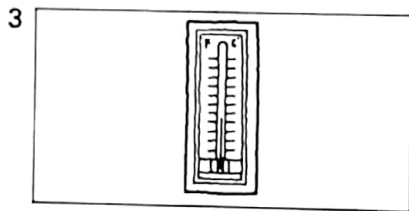
Now complete these sentences in the same way.
Use *can be used* or *can't be used*.



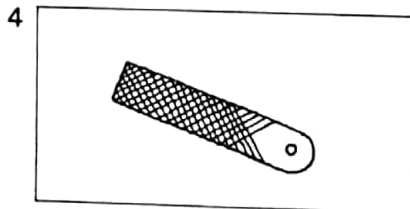
This tool for turning screws.



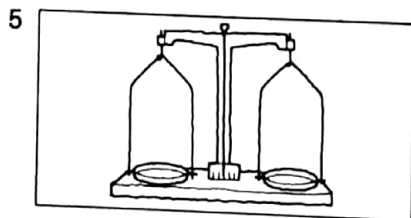
This tool for turning bolts.



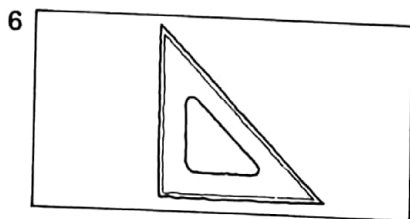
This instrument for measuring pressure.



This file for cleaning spark plugs.

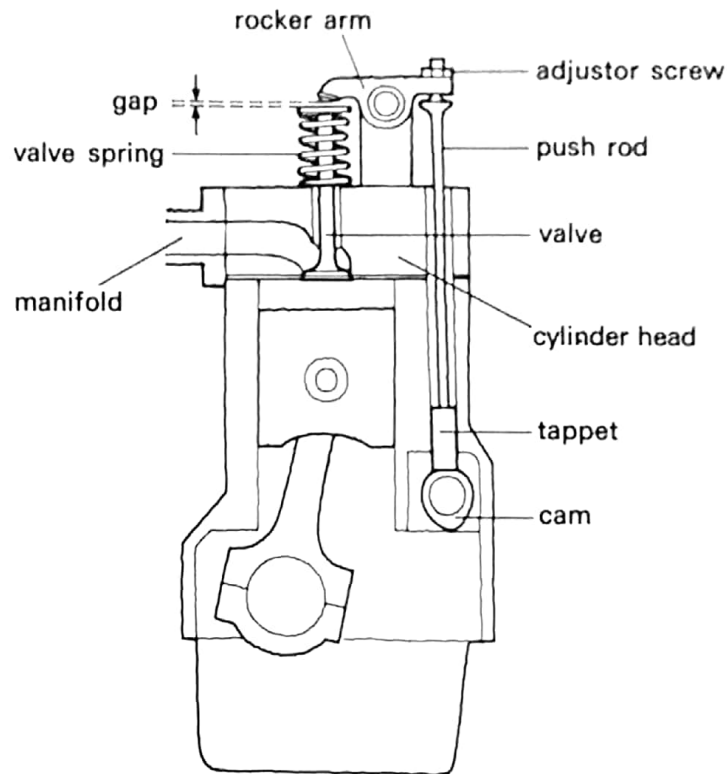


This instrument for measuring weight.



This instrument for drawing circles.

Exercise 11 Study the diagram below and then complete the two paragraphs from the wordlist.



adjusting
be
because
cannot
check

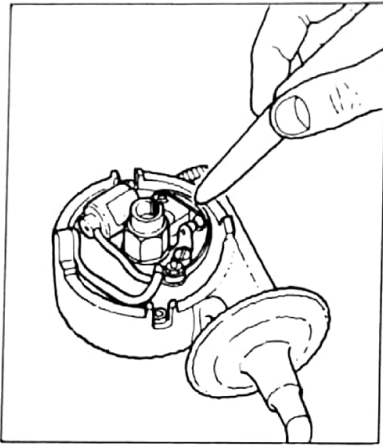
each
efficient
eight
less
may

valves
worn

A car engine *may* have four, six or even eight cylinders. Eight-cylinder engines are not very common they are expensive to make. Most modern cars only have four cylinders but these smaller engines are much more than earlier, larger engines.

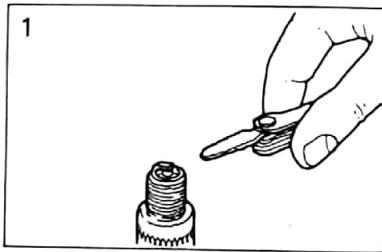
In most four-stroke engines there are two valves in cylinder. Therefore, a four-cylinder engine has valves. After a long time the valves may become You change one or two valves. *All* the will need changing at the same time. The gap between the valve and the rocker arm will also need It can adjusted easily with a spanner and a screwdriver. Also the condition of the valve springs. After continuous use, they may become elastic or they may break.

Exercise 12 When servicing a motor vehicle there are many things to check; for example:

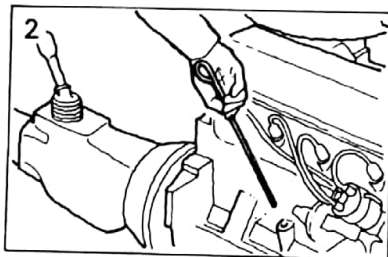


Check the gap between the distributor points.

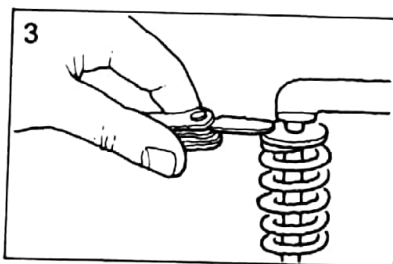
Study these pictures carefully and then complete the instructions for servicing a motor vehicle.



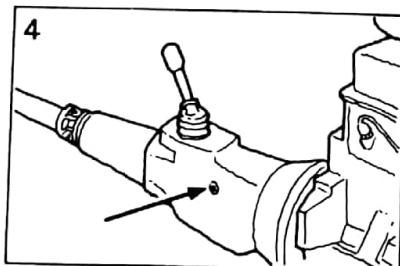
Check the between the



Check the amount the sump.



Check between the and the



Check the of oil in the