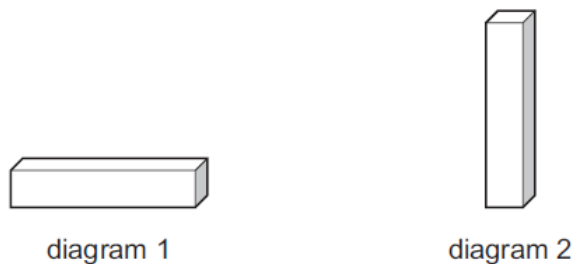# Pressure – 2020 IGCSE 0625

1. Nov/2020/Paper_11/No.12

A rectangular marble block has dimensions 1 m by 1 m by 5 m and weighs 125 000 N.

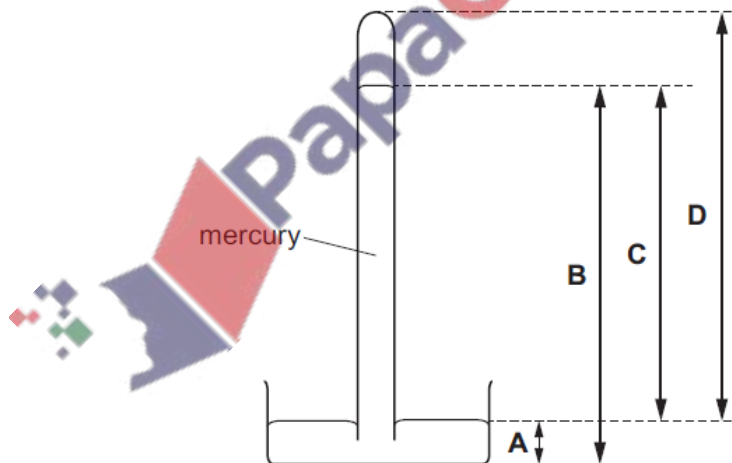The marble block is stored with the long side resting on the ground, as in diagram 1.

diagram 1   diagram 2

What is the change in the pressure on the ground due to the block when the block is stored as in diagram 2 rather than diagram 1?

A   a decrease of 25 000 Pa

B   an increase of 100 000 Pa

C   an increase of 125 000 Pa

D   no change

2. Nov/2020/Paper_11/No.13

The diagram shows a mercury barometer.

Which height is used as a measurement of atmospheric pressure?

3.

On a warm day, a driver checks the air pressure in a car tyre. At night, the temperature drops and the air pressure in the tyre decreases. There are no air leaks in the tyre.
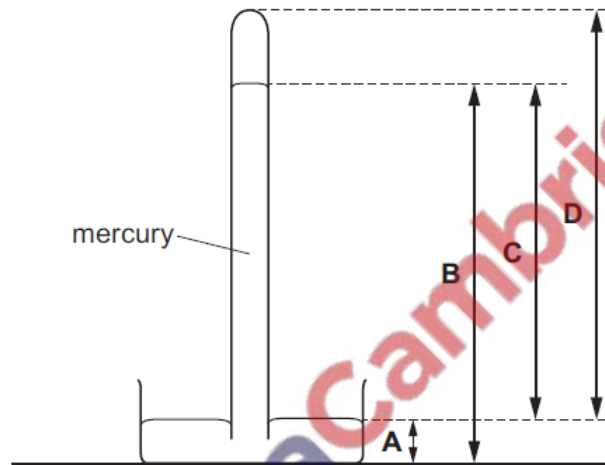
Why does the pressure decrease?

A The air molecules in the tyre move more slowly.

B The air molecules in the tyre stop moving.

C The volume of the air in the tyre decreases.

D The volume of the air in the tyre increases.

4.

The diagram shows a mercury barometer.

Which height is used as a measurement of atmospheric pressure?

5.

A man who weighs 540 N stands with both feet on the ground. The area of contact between one foot and the ground is 0.015 m².

What is the pressure exerted on the floor by the man?

A 1800 N/m²

B 3600 N/m²

C 18 000 N/m²

D 36 000 N/m²

6.

On a warm day, a driver checks the air pressure in a car tyre. At night, the temperature drops and the air pressure in the tyre decreases. There are no air leaks in the tyre.

Why does the pressure decrease?

A The air molecules in the tyre move more slowly.

B The air molecules in the tyre stop moving.

C The volume of the air in the tyre decreases.

D The volume of the air in the tyre increases.

7.

The diagram shows a mercury barometer.

Which height is used as a measurement of atmospheric pressure?

8.

A large box has a weight of 700 N. The box is placed on the floor.

70 cm

50 cm

What is the pressure on the floor due to the box?

A 0.20 N/m²   **B** 10 N/m²   **C** 245 N/m²   **D** 2000 N/m²

3

9.

On a warm day, a driver checks the air pressure in a car tyre. At night, the temperature drops and the air pressure in the tyre decreases. There are no air leaks in the tyre.
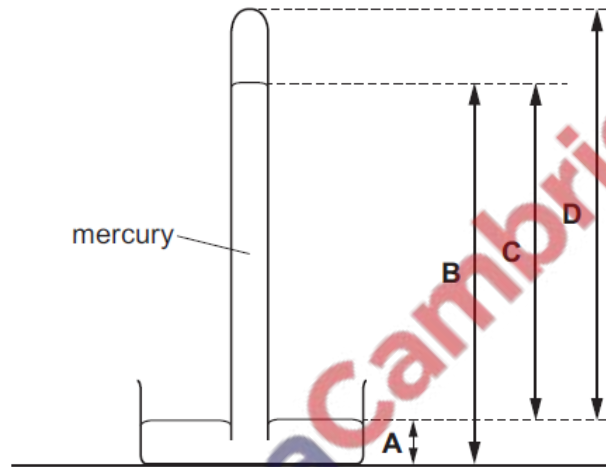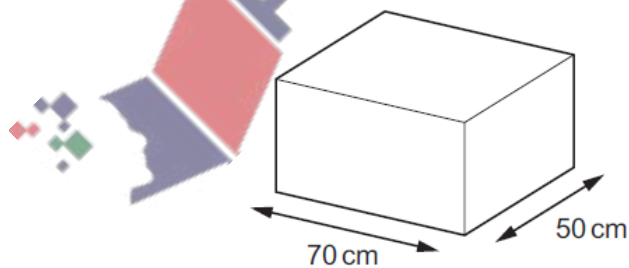
Why does the pressure decrease?

A The air molecules in the tyre move more slowly.

B The air molecules in the tyre stop moving.

C The volume of the air in the tyre decreases.

D The volume of the air in the tyre increases.

10.

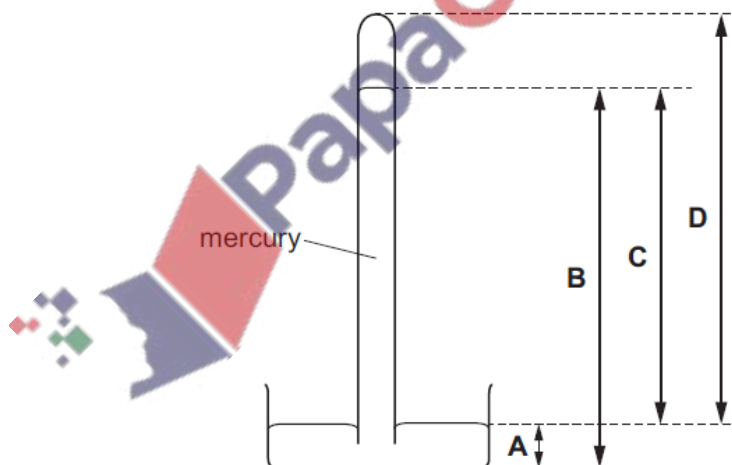A barometer reads 780 mm Hg. Mercury has a density of $1.36 \times 10^4 \, kg/m^3$.

What is the pressure of the atmosphere in N/m^2?

A $1.1 \times 10^4 \, N/m^2$

B $1.1 \times 10^5 \, N/m^2$

C $1.1 \times 10^7 \, N/m^2$

D $1.1 \times 10^8 \, N/m^2$

11.

The diagram shows a mercury barometer.

Which height is used as a measurement of atmospheric pressure?

12.

A research submarine is at a depth of 10 000 m below the surface of the sea.

The average density of the water above the submarine is 1030 kg/m³.

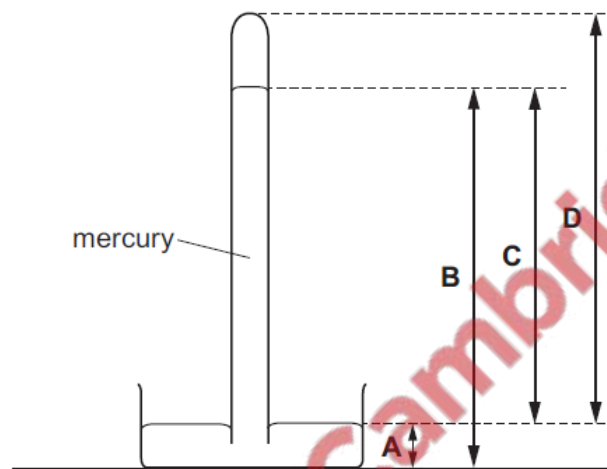The atmospheric pressure at the surface of the sea is 103 000 Pa.

How many times greater is the pressure due to the sea water than the atmospheric pressure?

A	10	B	100	C	1000	D	100 000

13.

The diagram shows a mercury barometer.

Which height is used as a measurement of atmospheric pressure?

14.

A student calculates the pressure due to the liquid at point X.

The student takes four measurements.

1　density of the liquid

2　temperature of the liquid

3　depth of point X below the surface of the liquid

4　surface area of the liquid

Which measurements must the student use in her pressure calculation?

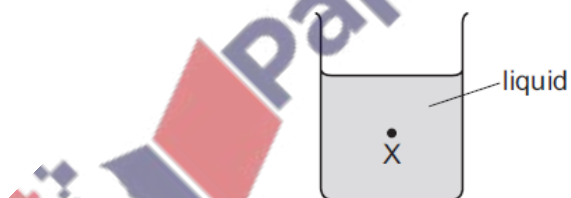| A	3 and 4	B	1 and 3	C	1 and 2	D	2 and 3

15.
   The diagram shows a mercury barometer.

   Which height is used as a measurement of atmospheric pressure?

16. Nov/2020/Paper_31/No.5(a)
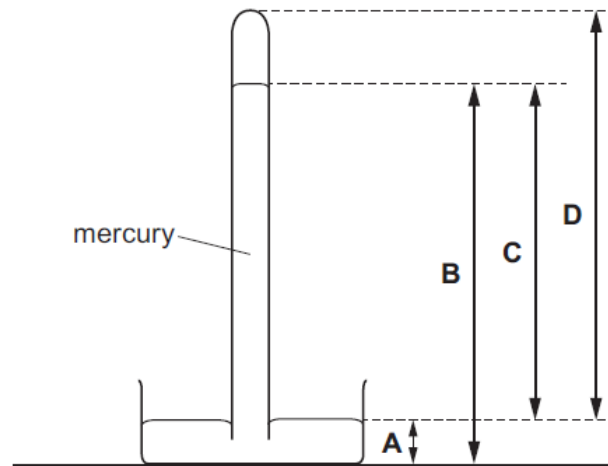
Fig. 5.1 shows a steel container fitted with a liquid manometer. There is a gas in the container.
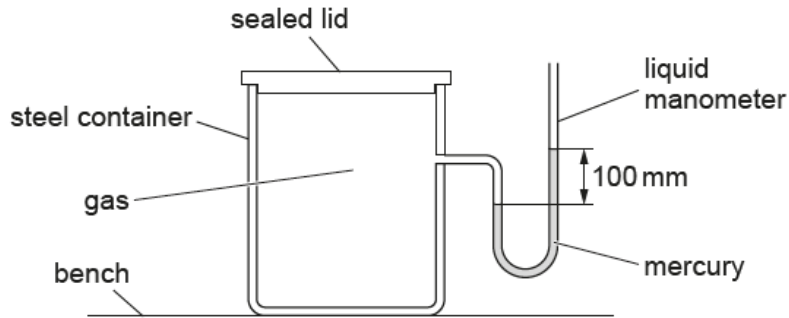
Fig. 5.1

(a) (i) The area of the steel container in contact with the bench is $80\,cm^2$. The total weight of the steel container and its contents is 60 N.

Calculate the pressure that the steel container exerts on the bench.

pressure on the bench = ... N/cm^2 [3]

(ii) Atmospheric pressure is equal to 760 mm of mercury (mm Hg).

Determine the pressure inside the container in mm Hg.

pressure = ... mm Hg [2]
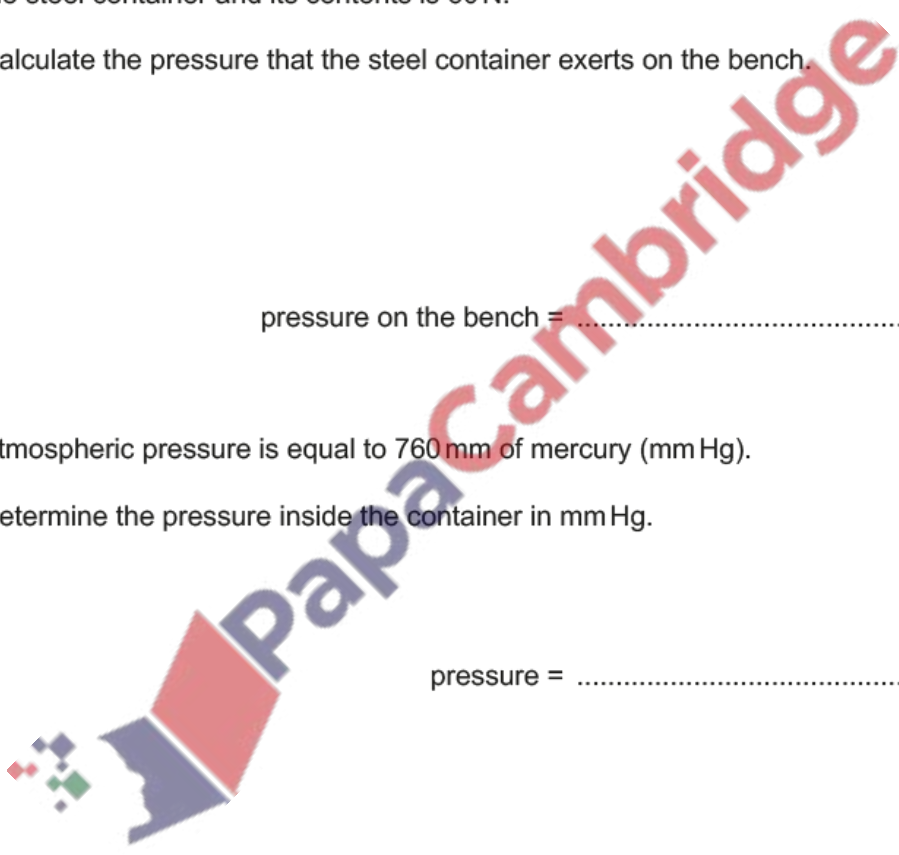
Fig. 3.1 shows a mercury barometer.
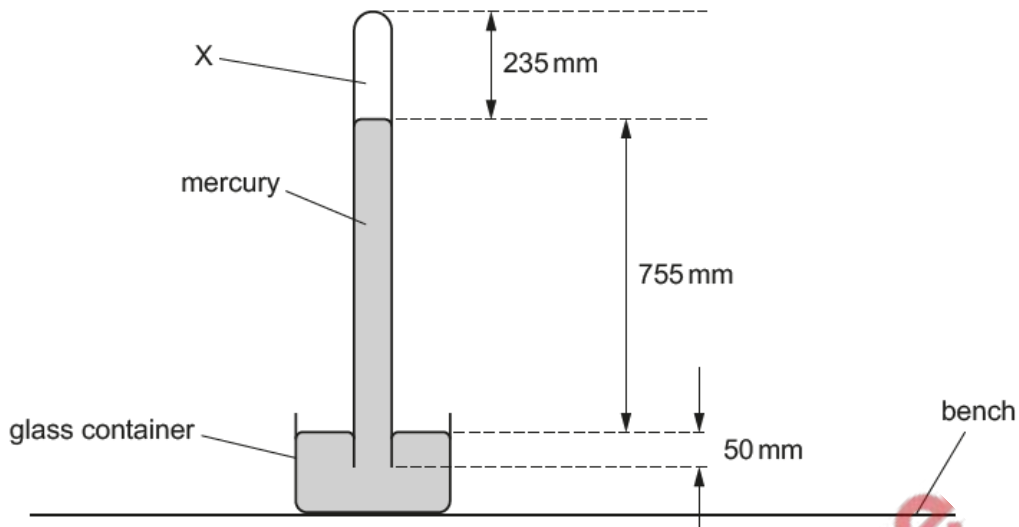
Fig. 3.1

(a) (i) Determine the atmospheric pressure indicated by the barometer. Include the unit.

atmospheric pressure = ... unit ....

[2]

(ii) State what is in the space labelled X above the mercury in the tube.

.... [1]

(b) The total weight of the mercury barometer is 38 N.
The area of the glass container in contact with the bench is 200 cm².

Calculate the pressure of the mercury barometer on the bench.

pressure = ... N/cm² [3]

[Total: 6]

(a) Some vehicles have wide tyres so that they can drive over soft mud.

Explain why the wide tyres enable these vehicles to drive over soft mud.

....

....

....

.... [3]

(b) Fig. 4.1 shows a mercury barometer.

Y —

mercury —

glass tube —
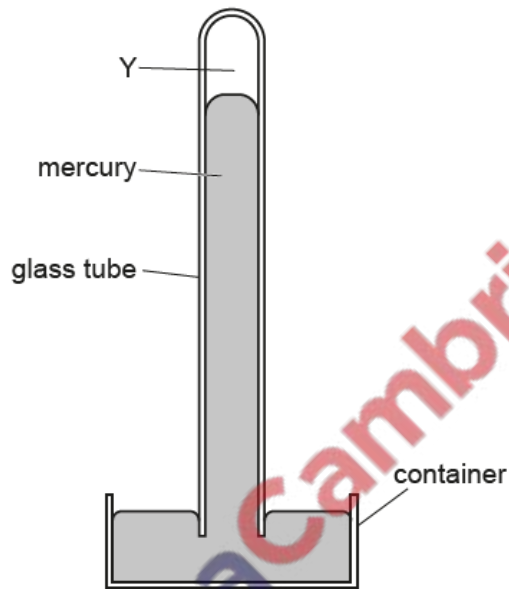
container

Fig. 4.1

(i) State what is in the space at Y above the mercury.

.... [1]

(ii) Complete the following statement to describe the use of a mercury barometer.

A mercury barometer measures ....

.... [2]

(c) The diagram in Fig. 4.2 shows a tall can containing water.

The can has three identical holes 1, 2 and 3 on one side, one above the other in a vertical line, as shown in Fig. 4.2.

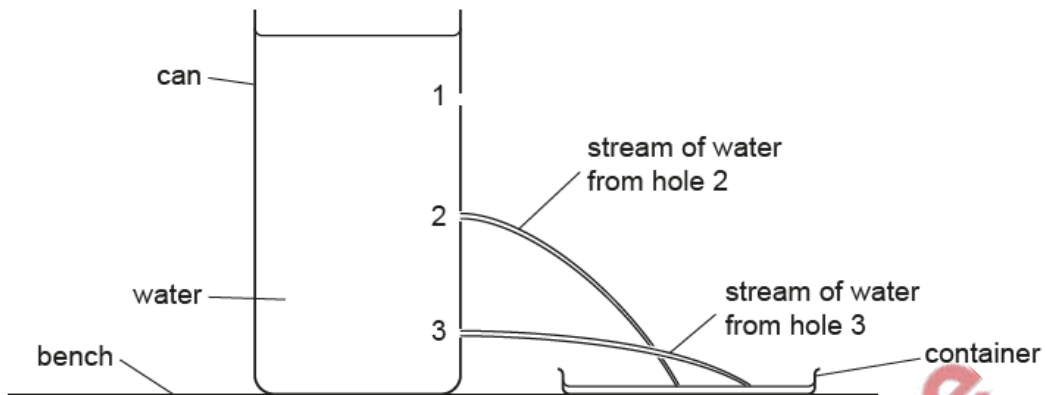Water is shown flowing out of hole 2 and hole 3.

Fig. 4.2

(i) State how the pressure of the water at hole 2 compares with the pressure of the water at hole 3.

.... [1]

(ii) Draw on Fig. 4.2 to show the stream of water flowing from hole 1. [1]

[Total: 8]

A U-shaped tube of constant cross-sectional area contains water of density $1000\,kg/m^3$. Both sides of the U-tube are open to the atmosphere.

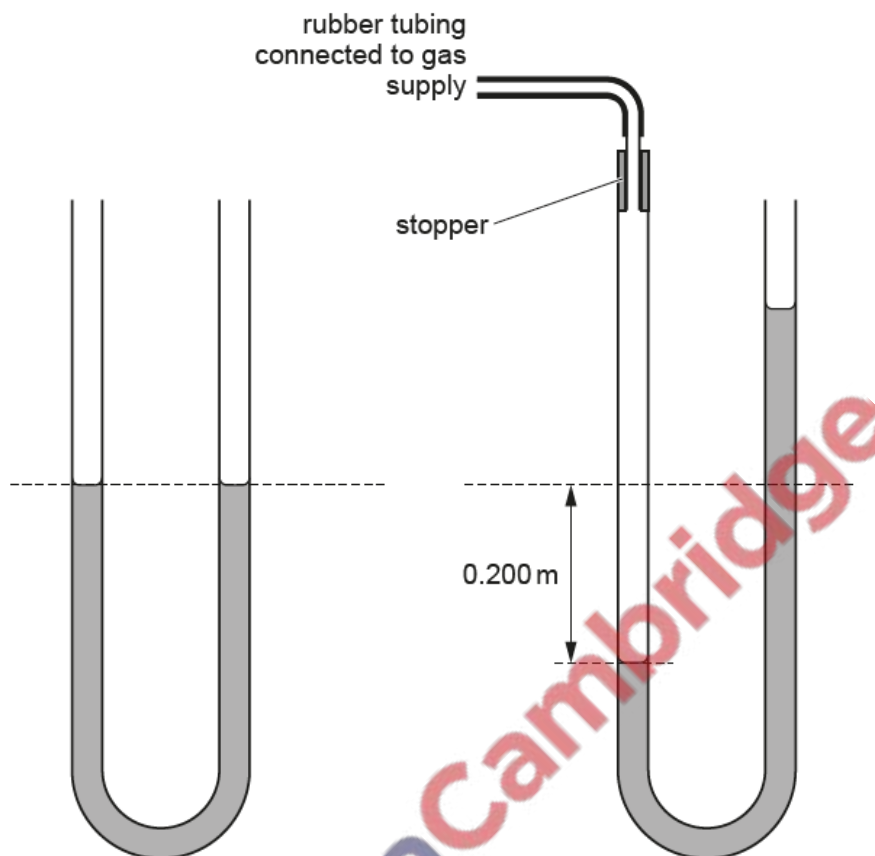Fig. 3.1 shows that the water levels in the two sides of the tube are equal.

rubber tubing
connected to gas
supply

stopper

0.200 m

Fig. 3.1   **Fig. 3.2**

The atmospheric pressure is 1.00×10^5 Pa.

The left-hand side of the tube is now connected to a gas supply using a length of rubber tubing. This causes the level of the water in the left-hand side of the tube to drop by 0.200 m, as shown in Fig. 3.2.

(a) Calculate the pressure of the gas supply. Give your answer to 3 significant figures.

pressure = ... [3]

(b) Fig. 3.3 shows that the gas supply is now connected to a cylinder that contains a piston.

cylinder

rubber tubing
connected to
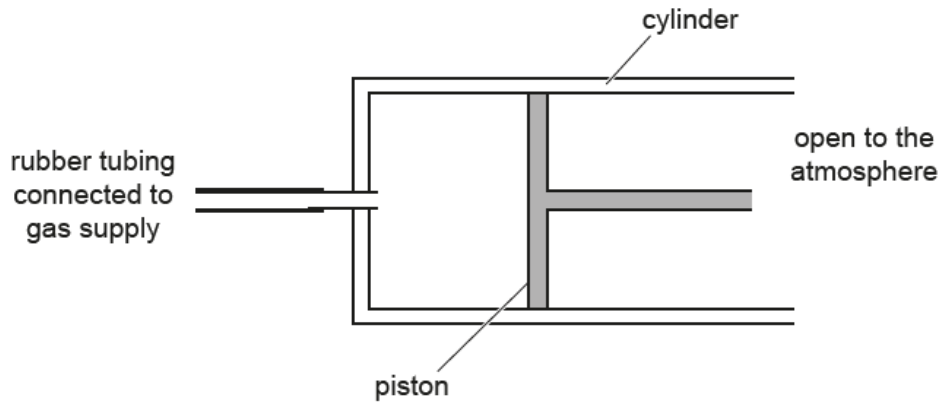gas supply

open to the
atmosphere

piston

Fig. 3.3

The pressure of the gas moves the piston to the right.

(i) The area of the piston in contact with the gas is $0.025\,m^2$.

Calculate the resultant force on the piston.

resultant force = ... [2]

(ii) The pressure of the gas causes the piston to move a distance of $0.50\,m$ to the right.

Calculate the work done by the gas from the supply on the piston.

work done = ... [2]

[Total: 7]