Pressure – 2022 June O Level 5054

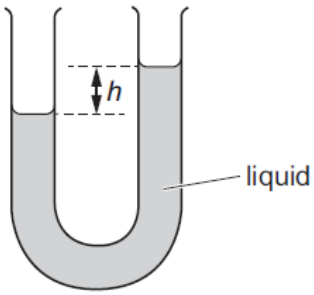
1. June/2022/Paper_12/No.11

A barometer is an instrument used to measure atmospheric pressure.

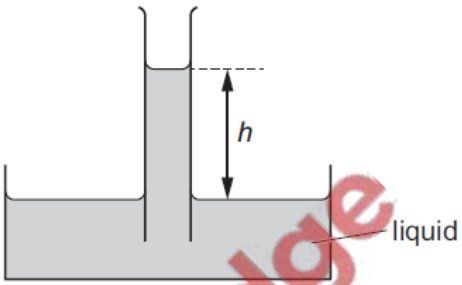
In one type of barometer the height of a liquid in a tube is measured.

In which diagram does the height *h* represent atmospheric pressure?

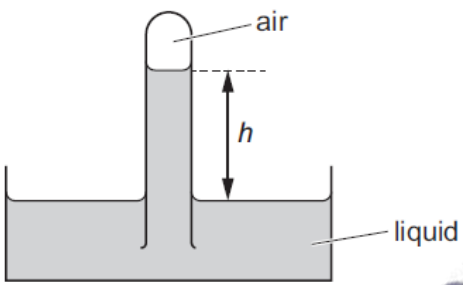
A



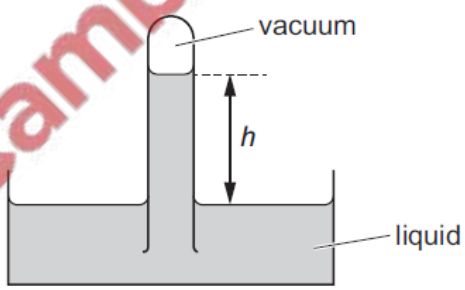
B



C



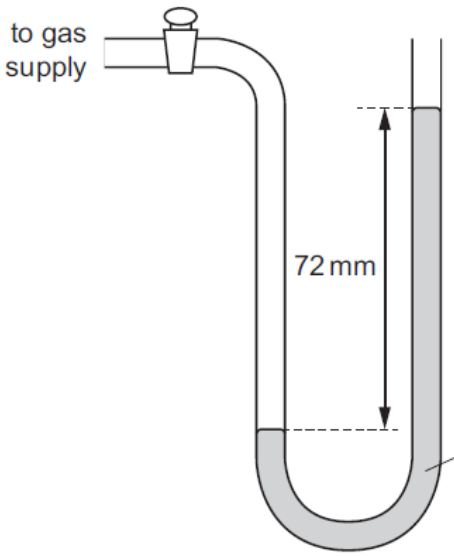
D



2. June/2022/Paper_12/No.12

A manometer contains mercury of density 14 000 kg / m^3. The manometer is connected to a gas supply and the difference in the height of the mercury levels is 72 mm. The atmospheric pressure is 100 kPa.

The gravitational field strength g is 10 N / kg.



What is the pressure of the gas supply?

A 90 kPa **B** 99 kPa **C** 110 kPa **D** 200 kPa

3. June/2022/Paper_21/No.8

Fig. 8.1 shows a water manometer.

When the water manometer is connected to a sealed container of gas and the tap is opened, the water levels change, as shown in Fig. 8.2.

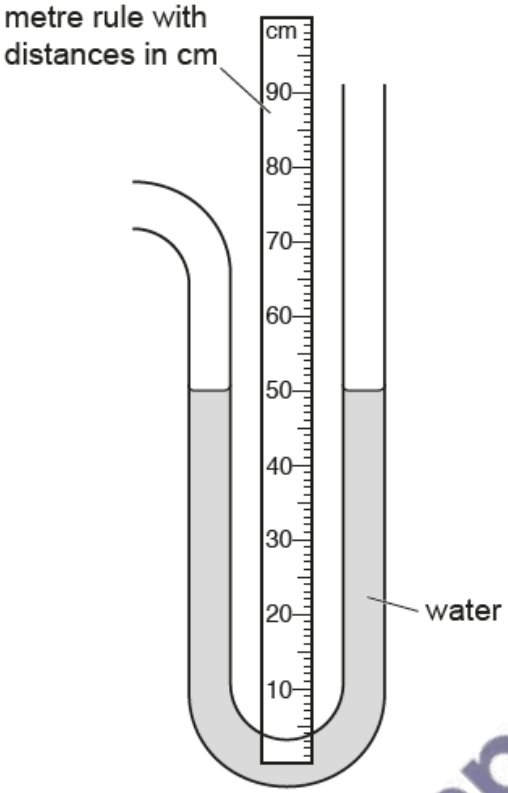


Fig. 8.1

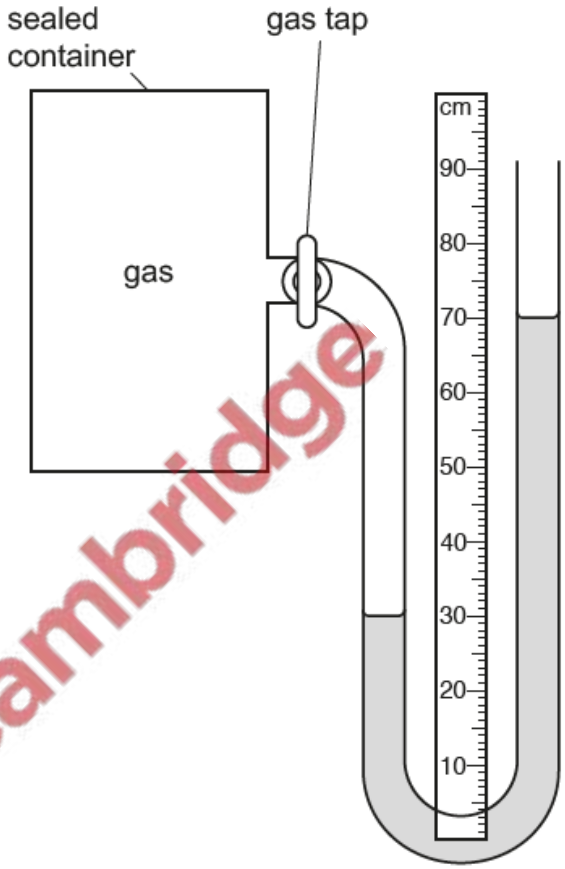


Fig. 8.2

(a) Define pressure.

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..... [1]

(b) **(i)** Explain why the water levels are the same on both sides of the manometer in Fig. 8.1.

.....

..... [1]

(ii) Explain why the water levels change when the gas tap is opened with the manometer connected as in Fig. 8.2.

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..... [1]

(iii) Explain why the water levels stop changing at the levels shown in Fig. 8.2.

.....

..... [1]

(c) The water in the manometer has a density of $1000\,kg/m^3$.

Atmospheric pressure is 1.00×10^5 Pa and the gravitational field strength g is $10\,m/s^2$.

Calculate the pressure of the gas inside the sealed container.

Give your answer to 3 significant figures.

pressure = ... [4]

(d) The temperature of the gas inside the sealed container increases.

Using ideas about molecules explain why the water levels change.

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..... [4]

(e) This manometer is not suitable for measuring a gas pressure of 2.5×10^5 Pa.

(i) Explain why.

.....

.....

..... [2]

(ii) State **one** change to this manometer that allows it to measure a gas pressure of 2.5×10^5 Pa in a normal school laboratory.

.....

..... [1]

[Total: 15]

4. June/2022/Paper_22/No.3

Fig. 3.1 shows a syringe mounted vertically in a block of wood and sealed at one end. A plunger is free to move inside the syringe.

There is trapped air in the syringe.

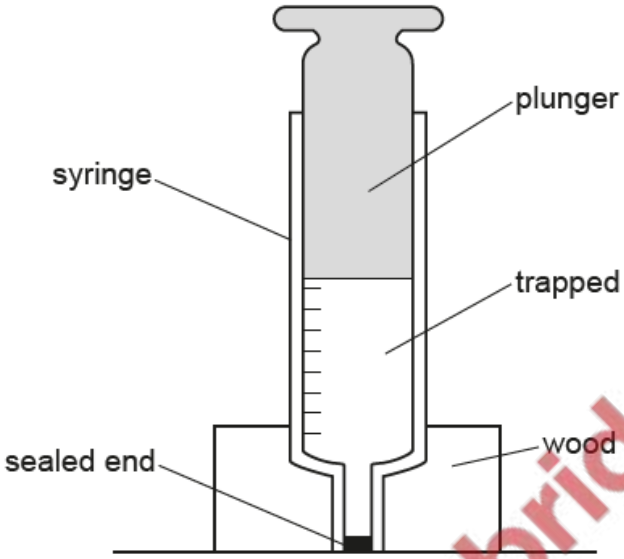

Fig. 3.1

The air inside the syringe exerts a pressure on the walls of the syringe.

(a) Define the term pressure.

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.....

..... [1]

(b) Explain how the air molecules in the cylinder of the syringe create a pressure.

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..... [3]

(c) A 10 N weight is placed on top of the plunger. The plunger moves down slowly so that the temperature of the air inside the syringe does not change.

Before the weight is placed on top of the plunger:

- the pressure of the air inside the syringe is 1.0×10^5 Pa
- the volume of the air is 50 cm^3.

The cross-sectional area of the plunger is 1.2×10^{-4} m^2.

(i) Calculate the pressure of the air in the syringe after the plunger stops moving.

pressure = ... [2]

(ii) Calculate the volume of air inside the syringe after the plunger stops moving.

volume = ... [2]

[Total: 8]