Practice Question Set For GCSE
Subject : Physics
Paper-2 Topic : 14_Particle Model

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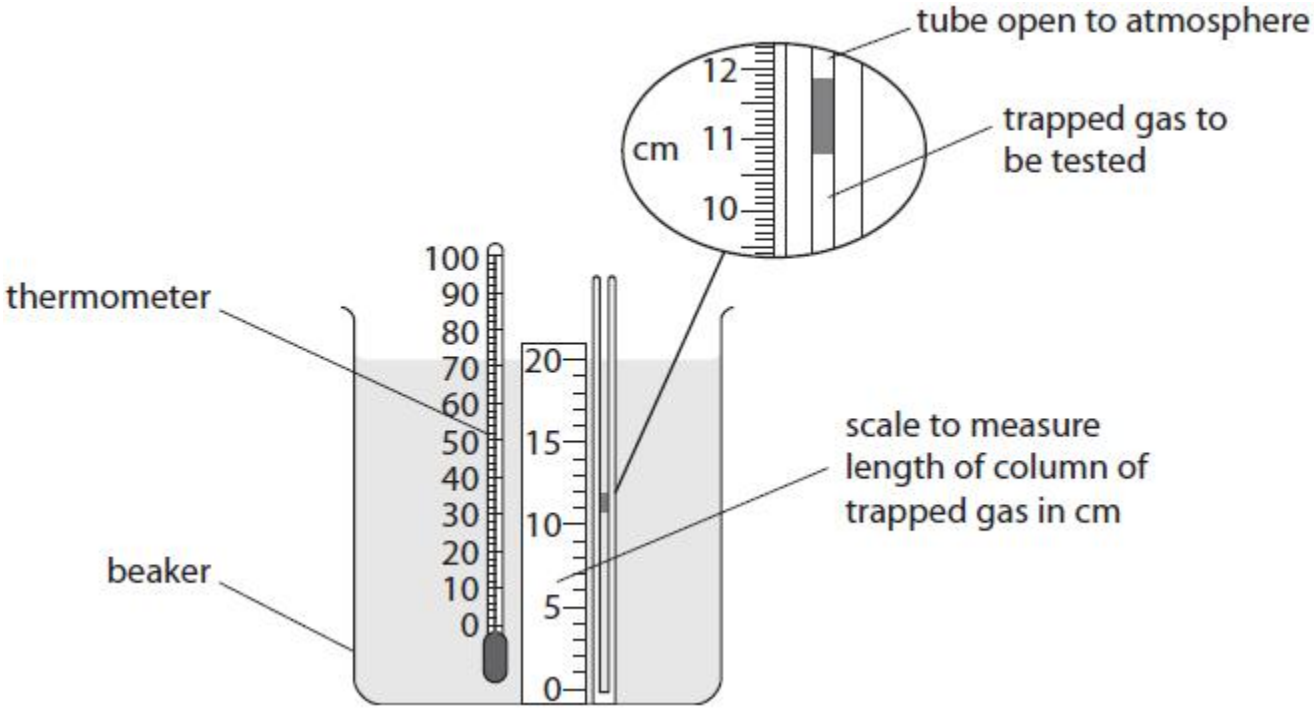
Name of the Student:_____
Max. Marks : 18 Marks **Time : 18 Minutes**

Q1.

A student investigates how the volume of a gas changes when its temperature increases.

The diagram shows the equipment used and the length of the trapped gas at 25°C.



(a) (i) Use the scale to estimate the length of the column of trapped gas.

(1)

length of column of trapped gas = ... cm

(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.
The cross-sectional area of the capillary tube is 1.94×10^{-3} cm^2.
The volume of the column of trapped gas at 25°C is about

(1)

- ☐ **A** $5.6 \times 10^{+3}$ cm^3
- ☐ **B** 2.1×10^{-2} cm^3
- ☐ **C** 2.1×10^{-3} cm^3
- ☐ **D** 5.6×10^{-4} cm^3

(iii) The gas is heated to 50°C.
The volume of the trapped gas at 50°C is 2.31×10^{-2} cm^3.

Calculate the volume of the trapped gas at 100°C.

(3)

volume of the trapped gas = ... cm^3

(b) Describe how the average kinetic energy of the particles of the gas changes as the temperature of the gas changes.

(3)

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Q2.

Kinetic theory describes the behaviour of gas particles.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

At −273 °C the particles in a gas are

(1)

- ☐ **A** moving rapidly
- ☐ **B** moving slowly
- ☐ **C** stationary
- ☐ **D** vibrating

(ii) The temperature of a gas changes from 300 K to 150 K.
State how the average kinetic energy of the gas particles changes.

(1)

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(b) The photograph shows a weather balloon filled with helium.
When released the balloon rises rapidly to a height of 30 000 m above the Earth.

Explain how the helium gas exerts a pressure on the balloon.

(3)

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(c) On the surface of the Earth the weather balloon has a volume of 9.1 m^3, when the temperature is 0 °C and the pressure inside the balloon is 101 kPa.

At 30 000 m above the Earth, the temperature is −46 °C and the pressure inside the balloon is 1.12 kPa.

(i) Show that −46 °C is 227 K.

(1)

(ii) Calculate the volume of the weather balloon when it is at a height of 30 000 m.

(3)

volume = ... m^3

(iii) Suggest what will happen to the balloon as it carries on rising above 30 000 m.

(1)

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(Total for Question = 10 marks)