

**GCSE Physics A (Gateway)**

**J249/03 Physics A P1-P4 and P9 (Higher Tier)**

**Question Set 15**

1

A student investigates four gases.

Look at her data.

Gas	Pressure (Pa)	Volume (m <sup>3</sup> )
A	5	0.5
B	10	0.4
C	20	0.2
D	40	0.2

Two readings are for the same mass of the same gas at a constant temperature.

- (a) Which two readings are for the **same mass** of the **same gas** at a constant temperature?

Use calculations in your answer.

[3]

- (b) The student investigates another gas at **constant volume**.  
Explain, using ideas about particles, how temperature affects gas pressure.

[3]

- (c) Calculate the pressure at the bottom of a 0.5 m tall measuring cylinder filled with a liquid.

Density of the liquid = 1100 kg / m<sup>3</sup>.

Pressure = ..... Pa

[3]

**Total Marks for Question Set 15: 9**

## Equations in physics

$$(\text{final velocity})^2 - (\text{initial velocity})^2 = 2 \times \text{acceleration} \times \text{distance}$$

$$\text{change in thermal energy} = \text{mass} \times \text{specific heat capacity} \times \text{change in temperature}$$

$$\text{thermal energy for a change in state} = \text{mass} \times \text{specific latent heat}$$

$$\text{energy transferred in stretching} = 0.5 \times \text{spring constant} \times (\text{extension})^2$$

$$\text{potential difference across primary coil} \times \text{current in primary coil} = \text{potential difference across secondary coil} \times \text{current in secondary coil}$$

### Higher tier only –

$$\text{force on a conductor (at right angles to a magnetic field) carrying a current} = \text{magnetic flux density} \times \text{current} \times \text{length}$$

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