

Gas pressure, volume and the kelvin scale

Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · Test

Name: _____ Date: _____ Class: _____ Mark: ____ / 20

Answer all questions in the spaces provided. Show your working and include units. Use $T = \theta + 273$ and assume the gas does not leak. A calculator is allowed. The test is out of 20 marks.

Level: Physics grades 9-10 (GCSE · IGCSE · O Level · Class 9-10) · **Curriculum:** IGCSE 2.1, HS-PS3-2

Time: 45 minutes · 8 questions · Total: 20 marks · Calculator allowed

Question 1 Temperature scale (2 marks)

- State the value of absolute zero in °C. (1 mark)
- Convert 37 °C to kelvin. (1 mark)

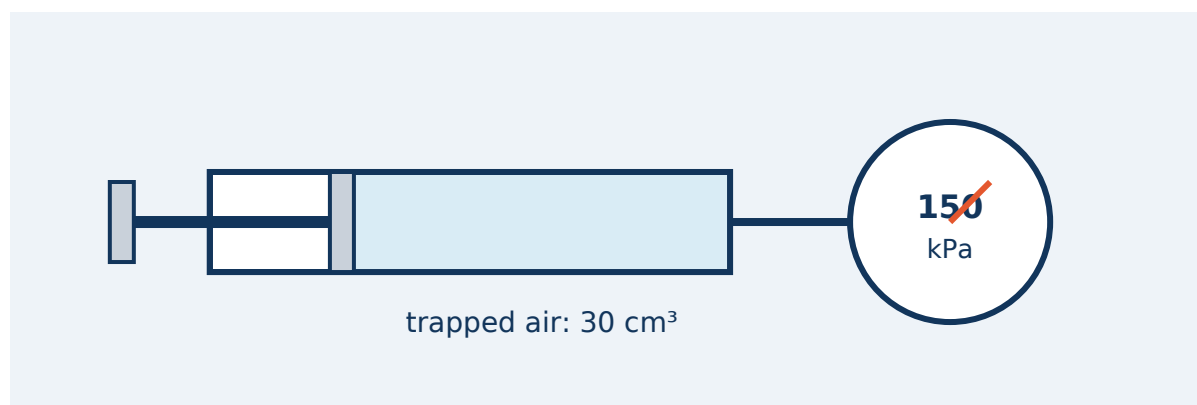
Question 2 How gas creates pressure (3 marks)

Explain, using the kinetic theory, how a gas exerts pressure on the walls of its container. (3 marks)

Question 3 Pump (3 marks)

A pump holds 250 cm³ of air at 100 kPa. All of it is pushed into a container of volume 40 cm³ at constant temperature. Calculate the pressure. (3 marks)

Question 4 Syringe and gauge (4 marks)



Syringe and gauge for Question 5.

- Calculate $p \times V$ for the trapped air. (1 mark)

- b. The plunger is pushed slowly to 18 cm^3 . Calculate the new gauge reading. (2 marks)
- c. Name the quantity that must stay constant for your calculation to be valid. (1 mark)

Question 5 Heating a cylinder (3 marks)

A sealed rigid cylinder contains gas at 200 kPa and 15°C . Calculate the pressure at 75°C . (3 marks)

Question 6 Pressure rise on heating (2 marks)

Explain why heating a gas in a rigid container raises the pressure. (2 marks)

Question 7 Lowest temperature (2 marks)

Explain why no object can be cooled below -273°C . (2 marks)

Question 8 Condition for Boyle's law (1 mark)

State one condition needed for $p \times V$ to be constant for a gas. (1 mark)