



GAS LAWS AND THE KINETIC MODEL

Physics Revision and
exam-style questions

Conceptual Questions

1. State the relationship between Pressure, Force and Area.

_____ [1]

2. State (in degrees Celsius) the temperature at which atoms are completely still.

_____ [1]

3. Two guests of similar weights attend a wedding held outdoors on a slightly damp lawn. One is wearing flat shoes, the other is wearing stiletto heels. Explain why the guest in heels will find she sinks into the soft earth while her friend keeps her shoes clean.

_____ [3]

4. Describe the movement of atoms in a gas at room temperature

_____ [2]

5. Explain why the pressure exerted by a gas on its container increases when the gas is heated.

_____ [3]

More challenging:

6. Explain why a helium balloon will appear to deflate if you take it outside on a cold night

Calculations

1. Calculate the pressure exerted by a 2kg cube of side-length 10cm on a surface.

_____ [3]

2. A gas at 20°C has a pressure of 1 atmosphere. Roughly how many atmospheres of pressure would it exert when heated to 500°C?

_____ [3]

3. A gas has a pressure of 1×10^5 Pascals and a volume of 1 litre. If it was allowed to expand slowly so that its temperature stayed constant, would would its pressure be when its volume was 3 litres?

_____ [3]

4. A gas of volume 1 litre at room temperature is quickly compressed to 700ml, causing it to heat up. What is the new temperature of the gas? (use any reasonable estimate of room temperature).

_____ [3]

Exam Style Question

1. A mountaineer uses oxygen to assist them to climb Mt Everest. The cylinder has a volume of 10L and stores the oxygen gas at a pressure of 2×10^7 Pa.

a) Calculate the volume that a full cylinder worth of gas would take up at atmospheric pressure (1×10^5 Pa)

_____ litres [2]

b) At base camp, the gas is stored at 20°C . At the top of Everest, the temperature is -15°C .

i) Calculate the pressure of gas in a full cylinder on the summit.

_____ Pa [3]

ii) Explain using the kinetic model of gases, why the pressure of oxygen in the cylinder is lower on the summit of Mt Everest.

[3]

c) The gas in the cylinder is actually half-used by the time the mountaineer reaches the top. Suggest whether the pressure in the cylinder will be higher or lower than the value calculated in part b) i). Explain your reasoning

[3]