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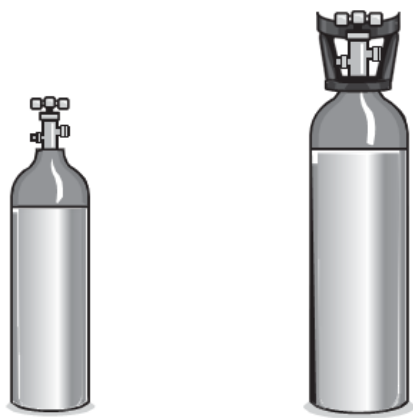
GCSE Physics B (Twenty First Century Science)

J259/01 Breadth in Physics (Foundation Tier)

Question Set 19

1

Hospitals store oxygen at high pressure in metal cylinders. The pictures show two cylinders, **A** and **B**. Both cylinders contain the same mass of gas and have the same temperature.



Cylinder **A**

Cylinder **B**

(a) Cylinder **A** contains oxygen at a pressure of 23 000 kPa.

The area of the base of cylinder **A** is 0.030 m².

Calculate the force exerted by the gas on the base of cylinder **A**.

Use the equation: force normal to a surface = pressure × area of that surface

Force =N [3]

(b) Cylinder **B** has a larger volume than cylinder **A**.

The pressure in cylinder **B** is smaller than the pressure in cylinder **A**.

(i) Explain, using ideas about **particles**, why storing the same mass of gas in a larger volume produces a smaller pressure. [2]

(ii) Both cylinders contain the same mass of gas and are at the same temperature.

	Pressure (kPa)	Volume (dm ³)
Cylinder A	23 000	15
Cylinder B	10 000	

Calculate the volume of gas in cylinder **B**.

Use the equation: pressure × volume = constant

Volume of gas =dm³ [2]

Total Marks for Question Set 19: 7

Resource Materials

Question Set No: 19

Equations in Physics

change in internal energy = mass × specific heat capacity × change in temperature

energy to cause a change in state = mass × specific latent heat

for gases: pressure × volume = constant

(for a given mass of gas and at a constant temperature)

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

energy stored in a stretched spring = $\frac{1}{2} \times \text{spring constant} \times (\text{extension})^2$

potential difference across primary coil × current in primary coil =

potential difference across secondary coil × current in secondary coil

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