

- Calculate the osmotic pressure of a solution of 1.0 g of glucose ( $C_6H_{12}O_6$ ) in 1500 mL of water at 37 °C.

The osmotic pressure  $\pi = cRT$  where  $c$  is the concentration.

The molar mass of glucose is:

$$(6 \times 12.01 \text{ (C)}) + (12 \times 1.008 \text{ (H)}) + (6 \times 16.00 \text{ (O)}) = 180.156$$

$$1.0 \text{ g of glucose corresponds to } \frac{\text{mass}}{\text{molar mass}} = \frac{1.0}{180.156} = 0.0056 \text{ mol}$$

The concentration when this amount is dissolved in 1500 mL = 1.5 L is:

$$c = \frac{\text{number of moles}}{\text{volume}} = \frac{0.0056}{1.5} = 0.0037 \text{ M}$$

$$\text{Hence, } \pi = cRT = (0.0037) \times (0.08206) \times (273 + 37) = 0.094 \text{ atm.}$$

Answer: **0.094 atm**

Explain why a drip for intravenous administration of fluids is made of a solution of NaCl at a particular concentration rather than pure water.

**Blood plasma is isotonic with cells (same osmotic pressure). Using saline drip of same osmotic pressure as blood prevents haemolysis or crenation of red blood cells.**