

- Calculate the osmotic pressure of a 0.25 M aqueous solution of sucrose, $C_{12}H_{22}O_{11}$, at 37 °C.

The osmotic pressure for strong electrolyte solutions is given by:

$$\Pi = i \times (cRT)$$

where i is the amount (mol) of particles in solution divided by the amount (mol) of dissolved solute. For 0.25 M sucrose, $c = 0.25 \text{ mol L}^{-1}$ and $i = 1$. Hence,

$$\begin{aligned}\Pi &= (0.25 \times 1 \text{ mol L}^{-1}) \times RT \\ &= (0.25 \text{ mol L}^{-1}) \times (0.08206 \text{ L atm K}^{-1} \text{ mol}^{-1}) \times ((37 + 273) \text{ K}) = 6.4 \text{ atm}\end{aligned}$$

Answer: 6.4 atm