Q1. Calculate the osmotic pressure in pascals exerted by a solution prepared by dissolving 1.0 g of polymer of molar mass 185,000 in 450 mL of water at 37°C.

Answer :

It is given that:

Volume of water, V= 450 mL = 0.45 L

Temperature, T = (37 + 273)K = 310 K

Number of moles of the polymer, $n = \frac{1}{185000}\ \text{mol}$

We know that:

Osmotic pressure, $\pi = \frac{n}{V}RT$

$$= \frac{1}{185000}\text{mol} \times \frac{1}{0.45\ \text{L}} \times 8.314 \times 10^{3}\ \text{Pa L K}^{-1}\text{mol}^{-1} \times 310\ \text{K}$$

= 30.98 Pa

= 31 Pa (approximately)