

Home work # 3

(1.) Laplace pressure

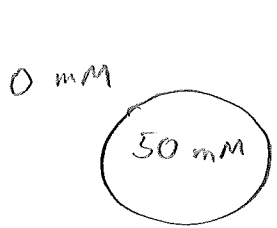
$$\Delta p = \frac{2\zeta}{R} = \frac{2 \times 10^{-3} \text{ N m}^{-1}}{10^{-5} \text{ m}} = 2 \times 10^2 \text{ N/m}^2 \text{ at rupture.}$$

The osmotic pressure is

$\Delta c k_B T$

0 mm

50 mm


$$\Delta c k_B T \left( 50 \times 10^{-3} \frac{\text{mol}}{\text{L}} \right) \times \left( \frac{6.02 \times 10^{23}}{\text{mole}} \right) \times \left( \frac{1 \text{ L}}{(1 \text{ m})^3} \right) \times \left( 1.38 \times 10^{-23} \frac{\text{J}}{\text{K}} \right) \times (300 \text{ K})$$

$$\Delta c k_B T = 1.2 \times 10^5 \frac{\text{N}}{\text{m}^2}$$

The cell will rupture.

(2.) see HW3 - 2.m

(3.) see HW3 - 3.m