

WATER = 'A'

INSIDE

$$P_{A0} = 10 \text{ mmHg}$$

CELLOPHANE

↑
THICKNESS
 $L = 0.10 \text{ mm}$

OUTSIDE

$$P_{AL} = 5 \text{ mmHg}$$

← SURFACE AREA = 0.20 m^2

FROM LECTURE:

$$\bar{J}_A = \frac{P_{AB}(P_{A0} - P_{AL})}{LRT} =$$

FOR CELLOPHANE $P_{AB} = 1.0 \times 10^{-10} \text{ m}^3 / \text{s m}^2 \text{ atm/m}$
@ STP

(AT STP $RT = 22.4 \text{ l/mol}$)

$$\bar{J}_A = \frac{(1.0 \times 10^{-10} \text{ m}^3 \text{ water} / (5 \text{ mmHg}))}{(5 \text{ m}^2 \text{ atm/m})(22.4 \text{ l/mol})(0.10 \text{ mm})} \times \frac{1000 \text{ l}}{\text{m}^3} \times \frac{\text{atm}}{760 \text{ mmHg}} \times \frac{1000 \text{ mm}}{\text{m}}$$

$$\bar{J}_A = \underline{2.94 \times 10^{-7} \text{ mol/m}^2 \text{ s}}$$

$$\dot{m}_A = \bar{J}_A \cdot A = \left(2.94 \times 10^{-7} \frac{\text{mol}}{\text{m}^2 \text{ s}}\right) \left(\frac{18.0 \text{ g}}{\text{mol}}\right) (0.20 \text{ m}^2) \left(\frac{86400 \text{ s}}{\text{day}}\right) \left(\frac{1000 \text{ mg}}{\text{g}}\right)$$

$$\underline{\dot{m}_A = 91 \text{ mg/day}}$$