

Assignment-1

(Solutions)

1. This concept has been discussed in lecture 30. Please refer

2. Mole balance eqⁿ:

$$F_{A0} - F_A + r_A V = 0 \quad \text{--- (1)}$$

$$\text{Now, } F_{A0} = C_{A0} \cdot v_0 = 5000$$

$$= 50$$

$$\text{Also, } F_A = 0.2 F_{A0}$$

$$\text{and, } r_A = -k C_A \quad \left[\begin{array}{l} \text{rate} \\ \text{of} \\ \text{reaction} \end{array} \right]$$

$$\Rightarrow r_A = -k \cdot (0.2) \cdot C_{A0} \quad \left[\begin{array}{l} \text{in} \\ \text{the} \end{array} \right]$$

\therefore (1) \Rightarrow

$$F_{A0} - 0.2 F_{A0} - k C_A V = 0$$

$$\Rightarrow 0.8 \cdot 5000 \left(\frac{\text{mol}}{\text{h}} \right) - \left[10 \cdot 69 \left(\frac{1}{\text{h}} \right) \cdot V \right]$$

$$\Rightarrow V = 0.67 \text{ m}^3$$

3. This concept has been explained in lecture 30.