

Daily Tutorial Sheet - 13

Level-3

147.(D) $\frac{r_{\text{mix}}}{r_{\text{SO}_2}} = \sqrt{\frac{M_{\text{SO}_2}}{M_{\text{mix}}}} \Rightarrow 2.56 = \frac{64}{M_{\text{mix}}} \Rightarrow M_{\text{mixture}} = 25$

Let mole fraction of F_2 is x

$$25 = \frac{38 \times x + (1-x) \times 19}{1}$$

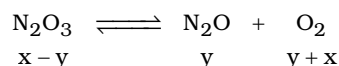
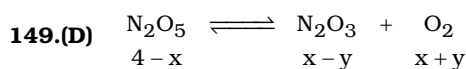
$$x = 0.315; \Rightarrow K_p = \frac{P_{\text{F}}^2}{P_{\text{F}_2}} = \frac{(0.685P)^2}{(0.315P)} = 1.49 \text{ atm}$$

148.(C) $\Delta_r G^\circ = 0 - 77.1 \times 2 = -154.2 \text{ kJ/mol}$

$$Q = \frac{[\text{H}^+]^2}{P_{\text{H}_2} \cdot [\text{Ag}^+]^2} = \frac{10^{-6}}{0.5 \times (10^{-10})} = 2 \times 10^4$$

$$\Delta G = \Delta_r G^\circ + RT \ln Q$$

$$\Delta_r G = -154.2 + \frac{8.314 \times 300 \ln(2 \times 10^4)}{1000} = -129.5 \text{ kJ/mol}$$

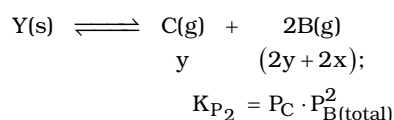
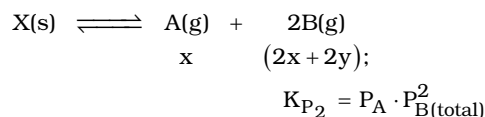


$$\therefore [\text{O}_2] = x+y = 2.5 \text{ and } 2.5 = \frac{(x+y)(x-y)}{4-x}$$

$$\therefore x = 2.166$$

$$[\text{N}_2\text{O}_5] = 4-x = 1.846$$

150.(B) Let x is partial pressure of A and y is partial pressure of C when both equilibrium simultaneously established in a vessel



$$\frac{K_{P_1}}{K_{P_2}} = \frac{x}{y} \Rightarrow x = 2y$$

$$K_{P_1} = x(2x+2y)^2 \Rightarrow x = 0.1 \text{ atm}; \therefore y = 0.05 \text{ atm}$$

$$\text{Total pressure of gasses} = P_A + P_B + P_C = 3(x+y) = 0.45 \text{ atm}$$

151.(A) Comparing $\ln k = \frac{\Delta S_r^\circ}{R} - \frac{\Delta H_r^\circ}{RT}$ with $\ln k = 2 - \frac{1000}{T}$

$$\frac{\Delta S_r^\circ}{R} = 2 \Rightarrow \Delta S_r^\circ = 2R \Rightarrow \Delta S_r^\circ = 2 \times \text{value of } R$$

152.(B) For exothermic reaction low temperature is favourable.