Date Planned : __ / __ / __	Daily Tutorial Sheet-13	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level-3	Exact Duration :_____

147. At 800°C, the following equilibrium is established as $F_2(g) \rightleftharpoons 2F(g)$ The composition of equilibrium may be determined by measuring the rate of effusion of the mixture through a pin hole. It is found that at 800°C and 1 atm mixture effuses 1.6 times as fast as SO_2 effuses under the similar conditions. What is the value of K_p (in atm) ?

(A) 0.315 **(B)** 0.685 **(C)** 0.46 **(D)** 1.49

148. Calculate $\Delta_r G$ for the reaction at 27°C $H_2(g) + 2Ag^+(aq) \rightleftharpoons 2Ag(s) + 2H^+(aq)$

Given : $P_{H_2} = 0.5\,bar; [Ag^+] = 10^{-5}M; [H^+] = 10^{-3}M; \Delta_r G°[Ag^+(aq)] = 77.1\,kJ/mol$

(A) $-154.2\,kJ/mol$ **(B)** $-178.9\,kJ/mol$ **(C)** $-129.5\,kJ/mol$ **(D)** None of these

149. When N_2O_5 is heated at certain temperature, it gets dissociated as

$$N_2O_5(g) \rightleftharpoons N_2O_3(g) + O_2(g); K_c = 2.5.$$

At the same time N_2O_3 also decomposes as : $N_2O_3(g) \rightleftharpoons N_2O(g) + O_2(g)$

If initially 4.0 moles of N_2O_5 are taken in 1.0 litre flask and allowed to dissociate, concentration of O_2 at equilibrium is 2.5M. Equilibrium concentration of N_2O_5 is :

(A) 0.1 M **(B)** 1.5 M **(C)** 2.166 M **(D)** 1.846

150. Two solid compounds X and Y are dissociated at a certain temperature as follows

$X(s) \rightleftharpoons A(g) + 2B(g); K_{p_1} = 9\times10^{-3}\,atm^3$, $Y(s) \rightleftharpoons 2B(g) + C(g); K_{p_2} = 4.5\times10^{-3}\,atm^3$

The total pressure of gases over a mixture of X and Y is :

(A) 4.5 atm **(B)** 0.45 atm **(C)** 0.6 atm **(D)** None of these

Paragraph for Question No. 151 – 152

Variation of equilibrium constant K with temperature is given by van't Hoff equation $\ln K = \frac{\Delta S_r^\circ}{R} - \frac{\Delta H_r^\circ}{RT}$ from this equation, ΔH_r° can be evaluated if equilibrium constants K_1 and K_2 at two temperature T_1 and T_2 are known. $\log\left(\frac{K_2}{K_1}\right) = \frac{\Delta H_r^\circ}{2.303R}\left[\frac{1}{T_1} - \frac{1}{T_2}\right]$

151. For an Isomerisation reaction $X(g) \rightleftharpoons Y(g)$, the temperature dependency of equilibrium constant is given by : $\ln K = 2 - \frac{1000}{T}$. The value of $\Delta_r S°$ at 300 K is :

(A) 0.315 **(B)** 0.685 **(C)** 0.46 **(D)** 1.49

152. Select the correct statement :

(A) Value of K_{eq} always increases with increase in temperature

(B) For exothermic reaction value of K_{eq} increases with decrease in temperature

(C) For endothermic reaction value of K_{eq} increases with decrease in temperature

(D) For exothermic reaction slope of log K Vs. 1/T is negative