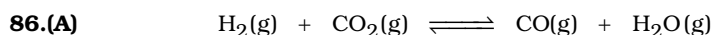


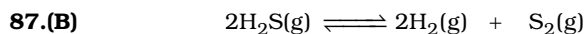
Daily Tutorial Sheet-7

Level-2



Initial	1	1	0	0
	$1-x$	$1-x$	x	x

$$K_p = \frac{x^2}{(1-x)^2}$$



At eq $\quad 0.1-x \quad \quad x \quad \quad x/2$
 $V = 0.4 \text{ L}$

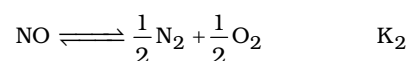
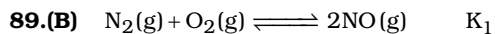
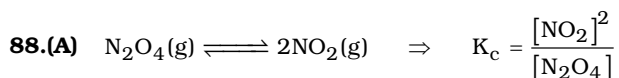
$$K_c = \frac{[\text{H}_2]^2[\text{S}_2]}{[\text{H}_2\text{S}]^2} = \frac{[x/V]^2[x/2V]}{[0.1-x/V]^2}$$

$$K_c = \frac{x^3}{2V(0.1)^2} = 1.0 \times 10^{-6}$$

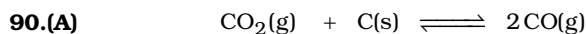
$$x^3 = 1.0 \times 10^{-6} \times 2 \times 0.4 \times 0.1 \times 0.1 = 8 \times 10^{-9}$$

$$x = 2 \times 10^{-3}$$

$$\% \text{ dissociation} = \frac{2 \times 10^{-3} \times 100}{0.1} = 2\%$$



$$K_1 = \frac{1}{K_2^{1/2}}$$



Initial 0.5 atm

At Eqm. $(0.5-p) \quad \quad 2p \text{ atm}$

This is case of heterogeneous equilibrium.

C(s) being solid is not considered

Total pressure of CO_2 and CO gases.

$$P_{\text{CO}_2} + P_{\text{CO}} = P_{\text{total}}$$

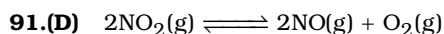
$$0.5 - p + 2p = 0.8$$

$$P = 0.3 \text{ atm}$$

$$\therefore P_{\text{CO}_2} = 0.5 - 0.3 = 0.2 \text{ atm}$$

$$P_{\text{CO}} = 2p = 0.6 \text{ atm}$$

$$K_p = \frac{P_{\text{CO}}^2}{P_{\text{CO}_2}} = \frac{0.6 \times 0.6}{0.2} = 1.8 \text{ atm}$$

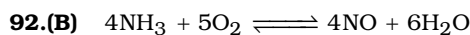


$$K_c = 1.8 \times 10^{-6} \text{ at } 184^\circ\text{C} (= 457 \text{ K})$$

$$R = 0.00831 \text{ kJ mol}^{-1} \text{ K}^{-1}$$

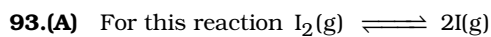
$$K_p = K_c (RT)^{\Delta n_g} \text{ where, } \Delta n_g = (\text{gaseous product} - \text{gaseous reactants}) = 3 - 2 = 1$$

$$\therefore K_p = 1.8 \times 10^{-6} \times 0.00831 \times 457 = 6.836 \times 10^{-6} > 1.8 \times 10^{-6}. \text{ Thus, } K_p > K_c$$



$$K_c = \frac{[\text{NO}]^4 [\text{H}_2\text{O}]^6}{[\text{NH}_3]^4 [\text{O}_2]^5}$$

Hence, units of $K_c = \text{conc.}^{+1}$



$$\begin{array}{ccc} 1 & & 0 \\ 1-x & & 2x \end{array}$$

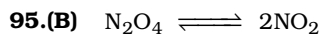
$$K_c = \frac{[\text{I}]^2}{[\text{I}_2]} = \frac{(2x)^2}{1-x}$$

As degree of dissociation is 5%

$$x = 0.05$$

$$K_c = \frac{(2 \times 0.05)^2}{1-0.05} = \frac{0.01}{0.95} = 0.0105$$

94.(C) As equation IV can be obtained by adding equation I and equation II and subtracting from equation III.



$$\begin{array}{ccc} 0.1 & & \\ 0.1-x & & 2x \end{array}$$

$$K_p = \frac{(2x)^2}{(0.1-x)} \times [p/(0.1+x)]$$

$$K_p = \frac{40 \times x^2}{(0.1-x)}$$

$$x = 0.017$$

$$\text{NO}_2 = 0.017 \times 2 = 0.034 \text{ mole}$$