

### K<sub>p</sub> & K<sub>c</sub> Relationship and Characteristics of K

61. (b)  $2A(g) \rightleftharpoons 3C(g) + D(s)$

For this reaction,  $\Delta n_g = 3 - 2 = 1$

$$\therefore K_p = K_c [RT]^1 \text{ or } \frac{K_p}{K_c} = RT \text{ or } K_c = \frac{K_p}{RT}$$

62. (a) According to Le-Chatelier principle exothermic reaction is forwarded by low temperature, in forward direction number of moles is less, hence pressure is high.

63. (d) In this reaction  $\Delta H$  is negative so reaction move forward by decrease in temperature while value of  $\Delta n = 2 - 3 = -1$  i.e., negative so the reaction move forward by increase in pressure.

64. (a)  $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

For this reaction  $\Delta n = 2 - 1 = 1$

Value of  $\Delta n$  is positive so the dissociation of  $PCl_5$  take forward by decrease in pressure & by increase in pressure the dissociation of  $PCl_5$  decrease.

65. (b)  $N_2 + O_2 \rightleftharpoons 2NO \quad \dots(i)$

$$\frac{1}{2}N_2 + \frac{1}{2}O_2 \rightleftharpoons NO \quad \dots(ii)$$

For equation number (i)

$$K_1 = \frac{[NO]^2}{[N_2][O_2]} \quad \dots(iii)$$

For equation number (ii)

$$K_2 = \frac{[NO]}{[N_2]^{1/2}[O_2]^{1/2}} \quad \dots(iv)$$

From equation (iii) & (iv) it is clear that

$$K_2 = (K_1)^{1/2} = \sqrt{K_1}; \text{ Hence, } K_2 = \sqrt{K_1}$$

66. (b)  $K_p = K_c [RT]^{\Delta n_g}$

$$\Delta n_g = 1 - 1.5 = -0.5$$

$$K_p = K_c [RT]^{-1/2} \therefore \frac{K_p}{K_c} = [RT]^{-1/2}$$

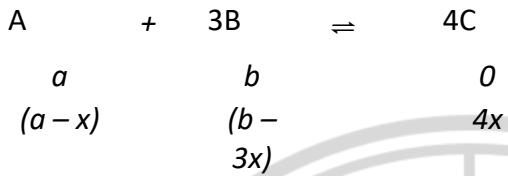


67. (b)  $N_{2(g)} + O_{2(g)} \rightleftharpoons 2NO_{(g)}$

$$K_c = 0.1, K_p = K_c(RT)^{\Delta n}$$

$$\Delta n = 0, K_p = K_c = 0.1$$

68. (c)

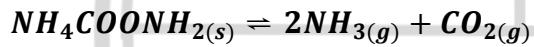


$$K_c = \frac{[C]^4}{[A][B]^3} = \frac{4x \cdot 4x \cdot 4x \cdot 4x}{(a-x)(b-3x)}$$

$$\text{Given } a = b, a - x = 4x \Rightarrow a = 5x = b$$

$$K_c = \frac{4x \cdot 4x \cdot 4x \cdot 4x}{(5x-x)(5x-3x)} = \frac{4x \cdot 4x \cdot 4x \cdot 4x}{4x \cdot 2x \cdot 2x \cdot 2x} = 8.$$

69. (b) Equilibrium pressure = 3atm



$$K_p = p_{NH_3}^2 \cdot p_{CO_2} = 3^2 \cdot 3 = 27$$

