K_p & K_c Relationship and Characteristics of K

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

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

$\therefore K_p = K_c[RT]^1$ or $\frac{K_p}{K_c} = RT$ 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 ΔH 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 Δn 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) $N_2 + O_2 \rightleftharpoons 2NO$ .....(i)

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

For equation number (i)

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

For equation number (ii)

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

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

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

A	+	3B	$\rightleftharpoons$	4C
a		*b*		*0*
(a – x)		*(b – 3x)*		*4x*

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

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

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

69. (b) Equilibrium pressure = 3atm

$NH_4COONH_{2(s)} \rightleftharpoons 2NH_{3(g)} + CO_{2(g)}$

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