Date Planned : __ / __ / __	Daily Tutorial Sheet-4	Expected Duration : 90 Min
Actual Date of Attempt : __ / __ / __	Level-1	Exact Duration :_____

46. For the reaction $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ the relation connecting the degree of dissociation (α) of $N_2O_4(g)$ with the equilibrium constant K_p is :

(A) $\alpha = \dfrac{K_p / p}{4 + K_p / p}$ **(B)** $\alpha = \dfrac{K_p}{4 + K_p}$

(C) $\alpha = \left(\dfrac{K_p / p}{4 + K_p / p}\right)^{1/2}$ **(D)** $\alpha = \left(\dfrac{K_p}{4 + K_p}\right)^{1/2}$

47. Naphthalene, a white solid used to make mothballs, has a vapour pressure of 0.10 mmHg at 27°C. Hence, K_p and K_c for the equilibrium are

$C_{10}H_8(s) \rightleftharpoons C_{10}H_8(g)$

(A) 0.10, 0.10 **(B)** $0.10, 4.1\times10^{-3}$

(C) $1.32\times10^{-4}, 5.36\times10^{-6}$ **(D)** $5.36\times10^{-6}, 1.32\times10^{-4}$

48. For $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$, initial concentration of each reactant and product is 1 M. If K_{eq} = 0.41 then :

(A) More PCl_3 will form **(B)** More Cl_2 will form

(C) More PCl_5 will form **(D)** No change

49. In a 500 mL flask, the degree of dissociation of PCl_5 at equilibrium is 40 % and the initial amount is 5 moles. The value of equilibrium constant in mol L^{-1} for decomposition of PCl_5 is :

(A) 2.33 **(B)** 2.66 **(C)** 5.32 **(D)** 4.66

50. A liquid is in equilibrium with its vapour at its boiling point. On the average, the molecules in two phases have equal :

(A) Inter-molecular forces **(B)** Potential energy

(C) Kinetic energy **(D)** Total energy

51. Phosphorus pentachloride dissociates as follows, in a closed reaction vessel,

$$PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$$

If total pressure at equilibrium of the reaction mixture is p and degree of dissociation of PCl_5 is x, the partial pressure of PCl_3 will be :

(A) $\left(\dfrac{x}{x+1}\right)p$ **(B)** $\left(\dfrac{2x}{1+x}\right)p$ **(C)** $\left(\dfrac{x}{x-1}\right)p$ **(D)** $\left(\dfrac{x}{1-x}\right)p$

52. The chemical equilibrium of a reversible reaction is not influenced by :

(A) Pressure **(B)** Catalyst

(C) Concentration of the reactants **(D)** Temperature

53. Which of the following is not a characteristic property of chemical equilibrium?

(A) Rate of forward reaction is equal to rate of backward reaction at equilibrium

(B) After reaching the chemical equilibrium, the concentrations of reactants and products remain unchanged with time

(C) For $A(g) \rightleftharpoons B(g)$, K_c is 10^{-2}. If this reaction is carried out in the presence of catalyst, the value of K_c decreases

(D) After reaching the equilibrium, both forward and backward reactions continue to take place

54. The equilibrium reaction that is not influenced by volume change at constant temperature is :

(A) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ **(B)** $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

(C) $N_2O_4(g) \rightleftharpoons 2NO_2(g)$ **(D)** $2NO(g) + O_2(g) \rightleftharpoons 2NO_2(g)$

55. The change in pressure will not affect the equilibrium constant for :

(A) $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$ **(B)** $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

(C) $H_2(g) + I_2(g) \rightleftharpoons 2HI(g)$ **(D)** All of these

56. For a reaction if $K_p > K_c$, the forward reaction is favoured by :

(A) Low pressure **(B)** High pressure

(C) High temperature **(D)** Low temperature

57. $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

In the reaction given above, the addition of small amount of an inert gas at constant pressure will shift the equilibrium towards which side?

(A) LHS (Left hand side) **(B)** RHS (Right hand side)

(C) Neither side **(D)** Either side

58. When hydrogen molecules decomposed into its atoms, which conditions gives maximum yield of H atom ?

(A) High temperature and low pressure **(B)** Low temperature and high pressure

(C) High temperature and high pressure **(D)** Low temperature and low pressure

59. According to Le-Chatelier's principle, the increase of temperature in the following reaction

$$CO_2(g) + 2H_2O(g) \longrightarrow CH_4(g) + 2O_2(g)$$

will cause it shift to the right. This reaction is, therefore :

(A) Exothermic **(B)** Unimolecular **(C)** Endothermic **(D)** Spontaneous

60. For the chemical reaction $3X(g) + Y(g) \rightleftharpoons X_3Y(g)$, the amount of X_3Y at equilibrium is affected by:

(A) Temperature and pressure **(B)** Temperature only

(C) Pressure only **(D)** Temperature, pressure and catalyst