46.(C) $N_2O_4(g) \rightleftharpoons 2NO_2(g)$

$$\begin{array}{cc} C & 0 \\ C - C\alpha & 2C\alpha \end{array}$$

$n_{total} = C + C\alpha$

$$K_p = \frac{\left(\left(\frac{2C\alpha}{C + C\alpha}\right)\times P\right)^2}{\frac{C - C\alpha}{C + C\alpha}\times P}$$

$$K_p = \frac{4\alpha^2 p}{(1-\alpha)(1+\alpha)} \quad \Rightarrow \quad \alpha = \sqrt{\frac{K_p / P}{4 + K_p / P}}$$

47.(C) $K_p = P_{C_{10}H_8(g)} = 0.10\,\text{mm} = \frac{0.10}{760}\text{atm} = 1.32\times10^{-4}$

$$K_c = \frac{K_P}{(RT)^{\Delta n}} = \frac{K_p}{RT} = \frac{1.32\times10^{-4}}{0.0821\times300} = 5.36\times10^{-6}$$

48.(C) Since value of K_c is less than 1 it means concentration of product at equilibrium is less than concentration of reactant. Hence more PCl_5 will form.

49.(B) $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$

$$\begin{array}{lccc} t = 0 & 5 & 0 & 0 \\ t = t_{eq} & 3 & 2 & 2 \end{array}$$

$$K_c = \frac{[PCl_3]\,[Cl_2]}{[PCl_5]} = \frac{\frac{2}{0.5}\times\frac{2}{0.5}}{3/0.5} = 2.66$$

50.(C) Molecules in two phases have same kinetic energy when liquid and vapour are in equilibrium.

51.(A) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$

$$\begin{array}{ccc} C & 0 & 0 \\ C - Cx & Cx & Cx \end{array}$$

$n_{total} = C + Cx$

Mole fraction of PCl_3

$$X_{PCl_3} = \frac{Cx}{C + Cx}$$

Partial pressure of $PCl_3 = X_{PCl_3} \cdot \text{Total Pressure}$

52.(B) K_c is not influenced by pressure, catalyst, concentration of reactant or concentration of product. It only changes with temp. However the chemical equilibrium will change with pressure temp and cone of reactants and products.

53.(C) Catalyst does not alter the value of equilibrium constant.

54.(A) When number of moles of reactant & product are equal in stoichiometric coefficient, rate of forward or backward reaction does not change with change in pressure or volume.

55.(D) Equilibrium constant only depends on temperature.

56.(A) If $K_P > K_C \Rightarrow \Delta n_g > 0$

Hence, forward reaction is favoured at low pressure.

57.(A) Addition of inert gas at constant pressure drives the reaction to the side with higher number of gaseous moles.

58.(A) At high temperature & low pressure yield of following reaction will be maximum.

$H_2(g) \rightleftharpoons 2H(g)$

59.(C) For endothermic reaction, with increase in temperature rate of forward reaction increases.

60.(A) By changing temperature or pressure for given reaction, amount of product affected.