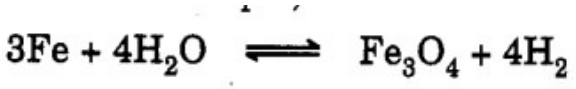
Viva Questions with Answers on Effect of Change of Concentration on Chemical Equilibrium.

1. What is law of mass action ?

Ans. The rate at which a chemical substance reacts is directly proportional to its molar concentra¬tion. The rate of reaction is directly proportional to the product of the molar concentrations of the reacting substances.

2. Define reversible reaction and give an example of a reversible reaction.

Ans. The reaction in which the products formed react back to give the reactant molecules are called reversible reactions. For example,



$$3Fe + 4H_2O \rightleftharpoons Fe_3O_4 + 4H_2$$

3. What is chemical equilibrium ?

Ans. In a chemical reaction when the rate of the forward reaction becomes equal to the rate of the backward reaction, that state is known as chemical equilibrium.

4. State the law of chemical equilibrium.

Ans. For a reversible reaction in equilibrium, the product of the molar concentration of products, divided by the product of the molar concentrations of the reactants, each concentration raised to the power equal to its coefficients is constant at a particular temperature. This constant is called
equilibrium constant.

5. How does concentration of reactants affect the equilibrium ?

Ans. If the concentration of any of the reactants is increased, the equilibrium shifts in the forward direction.

6. What is the meaning of the statement "the chemical equilibrium is dynamic" ?

Ans. Attainment of equilibrium in a chemical reaction does not mean that the reaction has stopped. The reaction is still in progress but the number of moles of the reactants combining in a given time is exactly the same as the number of moles of the reactants produced during the same time in the reverse reaction. Thus, the equilibrium is dynamic in nature and not static.

7. Does the constancy of colour intensity indicate the dynamic nature of equilibrium ? Explain your answer with appropriate reasons.

Ans. No, because the colour would become constant even if the reaction stops altogether at equilibrium.

8. Does temperature affect the equilibrium ?

Ans. Yes.

9. What will be effect of increasing the temperature of the reaction mixture at equilibrium ?

Ans. On increasing the temperature, the equilibrium shifts in favour of endothermic direction.

10. Name the complex which is formed on adding thiocyanate ion into the ferric salt solution.

Ans.

$$Fe^{3+}(aq) + SCN^{-}(aq) \longrightarrow [Fe(SCN)]^{2+}(aq)$$

(Blood red)

Thiocyanato iron (III) ion

11. Explain why representing the ionic reaction between ferric ions and thiocyanate ions as given below

$$Fe^{3+}(aq) + SCN^{-}(aq) \rightleftharpoons [Fe(SCN)]^{2+}(aq)$$

is more appropriate in the following form ?

$$[Fe(H_2O)_6]^{3+} + SCN^{-}(aq) \rightleftharpoons [Fe(H_2O)_5SCN]^{2+} + H_2O$$

Ans. Fe^{3+} ions in aqueous solution are present as hexacoordinate ions with water molecules. In the presence of SCN^- ions, one of the water molecules is replaced by SCN^- ion as the ligand.

12. What is the colour of $[Co(H_2O)_6]^{2+}$ ions ?

Ans. Pink.

13. What is the formula of the complex ion formed when a solution containing $[Co(H_2O)_6]^{2+}$ ions is treated with hydrochloric acid ?

Ans. $[CoCl_4]^{2-}$.

14. What is the colour of $[CoCl_4]^{2-}$ ions ?

Ans. Blue.