# DPP
## DAILY PRACTICE PROBLEMS

**Class : XIth**            **Subject : CHEMISTRY**

**Date :**            **DPP No. : 2**

## Topic :- Equilibrium

1. A solution of $FeCl_3$ in water acts as acidic due to:
   a) Acidic impurities    b) Ionisation    c) Hydrolysis of $Fe^{3+}$    d) Dissociation

2. The concept that an acid is a proton donor and a base is a proton acceptor was introduced by:
   a) Arrhenius    b) Bronsted-Lowry    c) Lewis    d) Faraday

3. Which is decreasing order of strength of bases?
   $$\overline{O}H, \overline{N}H_2, HC \equiv C^- \text{ and } CH_3CH_2^-$$
   a) $H_3CCH_2^- > NH_2^- > HC \equiv C^- > OH^-$      b) $HC \equiv C^- > CH_3CH_2^- > NH_2^- > OH^-$
   c) $OH^- > NH_2^- > CH \equiv C^- > H_3CCH_2^-$      d) $NH_2^- > HC \equiv C^- > OH^- > H_3CCH_2^-$

4. The strength of an acid depends on its tendency to
   a) Accept protons    b) Donate protons    c) Accept electrons    d) Donate electrons

5. The following reactions are known to occur in the body,
   $$CO_2 + H_2O \rightleftharpoons H_2CO_3 \rightleftharpoons H^+ + HCO_3^-$$
   If $CO_2$ escapes from the system, then:
   a) pH will decrease
   b) Hydrogen ion concentration will diminish
   c) $H_2CO_3$ concentration will be unaltered
   d) The forward reaction will be promoted

6. The common ion effect is shown by which of the following sets of solutions?
   a) $BaCl_2 + BaNO_3$    b) $NaCl + HCl$    c) $NH_4OH + NH_4Cl$    d) None of these

7. In the reaction, $C(s) + CO_2(g) \rightleftharpoons 2CO(g)$, the equilibrium pressure is 12 atm. If 50% of $CO_2$ reacts, $K_p$ for the change is :
   a) 12 atm    b) 16 atm    c) 20 atm    d) 6 atm

8. For a given solution pH $= 6.9$ at $60°C$, where $K_w = 10^{-12}$. The solution is:
   a) Acidic    b) Basic    c) Neutral    d) Unpredictable

9. A quantity of $PCl_5$ was heated in a 10 litre vessel at $250°C$ to show $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$. At equilibrium the vessel contains 0.1 mole of $PCl_5$, 0.20 mole of $PCl_3$ and 0.20 mole of $Cl_2$. The equilibrium constant of the reaction is :
   a) 0.02    b) 0.05    c) 0.04    d) 0.025

10. One mole of ethyl alcohol was treated with one mole of acetic acid at $25°C$. 2/3 of the acid changes into ester at equilibrium. The equilibrium constant for the reaction will be:
    a) 1    b) 2    c) 3    d) 4

11. 9.2 g of $N_2O_4(g)$ is taken in a closed 1 L vessel and heated till the following equilibrium is reached
    $$N_2O_4(g) \rightleftharpoons 2NO_2(g)$$
    At equilibrium, 50% $N_2O_4(g)$ is dissociated. What is the equilibrium constant (in $molL^{-1}$)? (Molecular weight of $N_2O_4 = 92$)
    a) 0.1    b) 0.2    c) 0.3    d) 0.4

12. Assuming complete dissociation which of the following aqueous solutions will have the same pH value?
    (i) 100 mL of 0.01 M HCl

(ii) 100 mL of 0.01 M $H_2SO_4$
(iii) 50 mL of 0.01 M HCl
(iv) Mixture of 50 mL of 0.02 M $H_2SO_4$ and 50 mL of 0.02 M NaOH
a) (i), (ii)  b) (i), (iii)  c) (ii), (iv)  d) (i), (iv)

13. At 3000 K, the equilibrium pressure of $CO_2$, CO and $O_2$ are 0.6, 0.4 and 0.2 atm respectively. $K_p$ for the reaction $2CO_2 \rightleftharpoons 2CO + O_2$, is
a) 0.089  b) 0.098  c) 0.189  d) 0.198

14. The $pK_a$ of weak acid $H_A$ is 4.5. The pOH of an aqueous buffer solution of H$A$ in which 50% of the acid is ionised:
a) 7.0  b) 4.5  c) 2.5  d) 9.5

15. An amphoteric buffer solution in which conc. of $H^+$ and H$X$ is same. The value of $K_a$ of H$X$ is $10^{-8}$, then pH of buffer solution is
a) 3  b) 8  c) 10  d) 14

16. In the reaction, $3A + 2B \rightarrow 2C$, the equilibrium constant $K_c$ is given by
a) $\dfrac{[3A] \times [2B]}{[C]}$  b) $\dfrac{[A]^3 \times [B]}{[C]}$  c) $\dfrac{[C]^2}{[A]^3 \times [B]^2}$  d) $\dfrac{[C]}{[3A][2B]}$

17. Which reaction is not affected by change in pressure?
a) $H_2 + I_2 \rightleftharpoons 2HI$  b) $N_2 + 3H_2 \rightleftharpoons 2NH_3$
c) $PCl_5 \rightleftharpoons PCl_3 + Cl_2$  d) $2C + O_2 \rightleftharpoons 2CO$

18. Three reactions involving $H_2PO_4^-$ are given below
$$\text{(i)} H_3PO_4 + H_2O \rightarrow H_3O^+ + H_2PO_4^-$$
$$\text{(ii)} H_2PO_4^- + H_2O \rightarrow HPO_4^{2-} + H_3O^+$$
$$\text{(iii)} H_2PO_4^- + OH^- \rightarrow H_3PO_4 + O^{2-}$$
In which of the above does $H_2PO_4^-$ act as an acid?
a) (ii) only  b) (i) and (ii)  c) (iii) only  d) (i) only

19. pH for the solution of salt undergoing anionic hydrolysis (say $CH_3COONa$) is given by:
a) $pH = \dfrac{1}{2}[pK_w + pK_a + \log c]$

b) $pH = \dfrac{1}{2}[pK_w + pK_a - \log c]$

c) $pH = \dfrac{1}{2}[pK_w + pK_b - \log c]$

d) None of the above

20. For the reactions, $A + B + Q \rightleftharpoons C + D$, if the temperature is increased then concentration of the products will
a) Increase  b) Decrease  c) Remains the same  d) Become zero