# QB365 Question Bank Software Study Materials

## Ionic Equilibrium 50 Important 1 Marks Questions With Answers (Book Back and Creative)

12th Standard

**Chemistry**

Total Marks : 50

**Multiple Choice Question**

50 x 1 = 50

1) Concentration of the $Ag^+$ ions in a saturated solution of $Ag_2C_2O_4$ is $2.24 \times 10^{-4}$mol $L^{-1}$ solubility product of $Ag_2C_2O_4$ is_____.

(a) $2.42 \times 10^{-8}mol^3L^{-3}$ (b) $2.66 \times 10^{-12}mol^3L^{-3}$ (c) $4.5 \times 10^{-11}mol^3L^{-3}$ **(d) $5.619 \times 10^{-12}mol^3L^{-3}$**

2) Following solutions were prepared by mixing different volumes of NAOH of HCL different concentrations

1) 60 mL$\frac{M}{10}$HCl + 40mL$\frac{M}{10}$NaOH
2) 55 mL$\frac{M}{10}$HCl + 45mL$\frac{M}{10}$NaOH
3) 75 mL$\frac{M}{5}$HCl + 25mL$\frac{M}{5}$NaOH
4) 100 mL$\frac{M}{10}$HCl + 100mL$\frac{M}{10}$NaOH

pH of which one of them will be equal to 1?

(a) (iv) (b) (i) (c) (ii) **(d) (iii)**

3) The solubility of $BaSO_4$ in water is $2.42 \times 10^{-3}gL^{-1}$ at 298K. The value of its solubility product($K_{sp}$) will be (Given molar mass of $BaSO_4$ =233g $mol^{-1}$)

(a) $1.08 \times 10^{-14}mol^2L^{-2}$ (b) $1.08 \times 10^{-12}mol^2L^{-2}$ **(c) $1.08 \times 10^{-10}mol^2L^{-2}$** (d) $1.08 \times 10^{-8}mol^2L^{-2}$

4) pH of a saturated solution of $Ca(OH)_2$ is 9. The Solubility product ($K_{sp}$) of $Ca(OH)_2$ _____.

**(a) $0.5 \times 10^{-15}$** (b) $0.25 \times 10^{-10}$ (c) $0.125 \times 10^{-15}$ (d) $0.5 \times 10^{-10}$

5) Conjugate base for Bronsted acids $H_2O$ and HF are _____.

(a) $OH^-$ and $H_2FH^+$, respectively (b) $H_3O^+$ and $F^-$, respectively **(c) $OH^-$ and $F^-$, respectively**

(d) $H_3O^+$ and $H_2F^+$, respectively

6) Which will make basic buffer?

(a) 50 mL of 0.1M NaOH+25mL of 0.1M $CH_3COOH$ (b) 100 mL of 0.1M $CH_3COOH$+100 mL of 0.1M $NH_4OH$

**(c) 100 mL of 0.1M HCl+200 mL of 0.1M $NH_4OH$** (d) 100 mL of 0.1M HCl+100 mL of 0.1M NaOH

7) Which of the following fluro compounds is most likely to behave as a Lewis base?

(a) $BF_3$ **(b) $PF_3$** (c) $CF_4$ (d) $SiF_4$

8) Which of these is not likely to act as Lewis base?

**(a) $BF_3$** (b) $PF_3$ (c) CO (d) $F^-$

9) The aqueous solutions of sodium formate, anilinium chloride and potassium cyanide are respectively _____.

(a) acidic, acidic, basic **(b) basic, acidic, basic** (c) basic, neutral, basic (d) none of these

10) The percentage of pyridine ($C_5H_5N$) that forms pyridinium ion ($C_5H_5NH$) in a 0.10M aqueous pyridine solution _____.($K_b$ for $C_5H_5N$ = $1.7 \times 10^{-9}$) is

(a) 0.006% **(b) 0.013%** (c) 0.77% (d) 1.6%

11) Equal volumes of three acid solutions of pH 1,2 and 3 are mixed in a vessel. What will be the $H^+$ ion concentration in the mixture?

**(a) $3.7 \times 10^{-2}$** (b) $10^{-6}$ (c) 0.111 (d) none of these

12) The solubility of AgCl (s) with solubility product $1.6 \times 10^{-10}$ in 0.1M NaCl solution would be _____.

(a) $1.26 \times 10^{-5}$M **(b) $1.6 \times 10^{-9}$M** (c) $1.6 \times 10^{-11}$M (d) Zero

13) If the solubility product of lead iodide is $3.2 \times 10^{-8}$, its solubility will be _____.

**(a) $2 \times 10^{-3}$M** (b) $4 \times 10^{-4}$M (c) $1.6 \times 10^{-5}$M (d) $1.8 \times 10^{-5}$M

14) MY and $NY_3$, are insoluble salts and have the same $K_{sp}$ values of $6.2 \times 10^{-13}$ at room temperature. Which statement would be true with regard to MY and $NY_3$?

(a) The salts MY and $NY_3$ are more soluble in 0.5M KY than in pure water

(b) The addition of the salt of KY to the suspension of MY and $NY_3$ will have no effect on their solubility's

(c) The molar solubilities of MY and $NY_3$ in water are identical

**(d) The molar solubility of MY in water is less than that of $NY_3$**

15) What is the pH of the resulting solution when equal volumes of 0.1M NaOH and 0.01M HCl are mixed?

(a) 2.0 (b) 3 (c) 7.0 **(d) 12.65**

16) The dissociation constant of a weak acid is $1 \times 10^{-3}$. In order to prepare a buffer solution with a pH = 4, the [Acid]/[Salt] ratio should be _____.

(a) 4:3 (b) 3:4 (c) 10:1 **(d) 1:10**

17) The pH of $10^{-5}$M KOH solution will be _____.

**(a) 9** (b) 5 (c) 19 (d) none of these

18) $H_2PO_4^-$ the conjugate base of _____.

(a) $PO_4^{3-}$ (b) $P_2O_5$ **(c) $H_3PO_4$** (d) $HPO_4^{2-}$

19) Which of the following can act as Lowery – Bronsted acid well as base?

(a) HCl (b) $SO_4^{2-}$ **(c) $HPO_4^{2-}$** (d) $Br^-$

20) The pH of an aqueous solution is Zero. The solution is _____.

(a) slightly acidic **(b) strongly acidic** (c) neutral (d) basic

21) The hydrogen ion concentration of a buffer solution consisting of a weak acid and its salts is given by _____.

**(a)** $[H^+] = \frac{K_a[acid]}{[salt]}$ (b) $[H^+] = K_a[salt]$ (c) $[H^+] = K_a[acid]$ (d) $[H^+] = \frac{K_a[salt]}{[acid]}$

22) Which of the following relation is correct for degree of hydrolysis of ammonium acetate?

(a) $h = \sqrt{\frac{K_h}{C}}$ (b) $h = \sqrt{\frac{K_a}{K_b}}$ **(c)** $h = \sqrt{\frac{K_w}{K_a \cdot K_b}}$ (d) $h = \sqrt{\frac{K_a \cdot K_b}{K_w}}$

23) Dissociation constant of $NH_4OH$ is $1.8 \times 10^{-5}$ the hydrolysis constant of $NH_4Cl$ would be _____.

(a) $1.8 \times 10^{-19}$ **(b) $5.55 \times 10^{-10}$** (c) $5.55 \times 10^{-5}$ (d) $1.80 \times 10^{-5}$

24) What is the decreasing order of strength of bases
OH, $NH_2^-$ H - C ≡ C and $CH_3 - CH_2^-$

(a) $OH^- > NH_2^- >$ H-C≡C $> CH_3^-CH_2^-$ (b) $NH_2^- > OH^- > CH_3^-CH_2^- >$ H-C≡C **(c) $CH_3^-CH_2^- > NH_2^-$ > H-C≡C$^-$ > $OH^-$**

(d) $OH^-$ > H-C ≡ $C^-$ > $CH_3^-CH_2^-$ > $NH_2^-$

25) Which one among the following in the strongest Bronsted base.

(a) $ClO_4^-$ (b) $ClO_3^-$ (c) $ClO_2^-$ **(d)** $ClO^-$

26) Pick out the incorrect statement regarding Lewis acids and bases

(a) A Lewis acid is a electron deficient molecule (b) Lewis bases is one which donates an electron pair

**(c) Lewis base is a cation** (d) Lewis acid is a electron deficient molecule and Lewis base is a cation

27) Pick the odd one out

(a) $Cl^-$ (b) CaO **(c) $SO_2$** (d) $CH^-_3$

28) Ionic product of water increases when _____.

(a) Pressure decreases (b) $H^+$ ions are added (c) $OH^-$ ions are added **(d) temperature increases**

29) Addition of sodium chloride to a saturated solution of silver chloride _____.

(a) dissociation of AgCI increases (b) concentration of $CI^-$ decreases **(c) dissociation of $AgCl^-$ decreases**

(d) concentration of $Ag^+$ increases

30) The buffer present in human blood is _____.

(a) $CH_3COOH + CH_3COONa$ (b) $NH_4OH + NH_4CI$ **(c) $H_2CO_3 + HCO_3^-$**

(d) $CH_3COOH + CH_3COONa$ and $NH_4OH + NH_4CI$

31) Buffer index is _____.

(a) $\beta = \frac{dB}{pK_a}$ **(b)** $\beta = \frac{dB}{d(pH)}$ (c) $\beta = \frac{dB}{pH}$ (d) $\beta = \frac{dB}{pOH}$

32) $NH_4OH$ is a weak base because _____.

(a) it has low vapour pressure **(b) it is only partially ionised** (c) it is completely ionised (d) it has low densit

33) Which one of the following relationship is correct?

(a) $pH = \frac{1}{[H^+]}$ (b) $pH = \log_{10}[H^+]$ (c) $\log_{10} pH = [H^+]$ **(d)** $pH = \log_{10}\frac{1}{[H^+]}$

34) Henderson equation for a weak acid and its salt is _____.

(a) $pH = pK_b + \log (Salt) / (Acid)$ **(b) $pH = pK_a + \log (Salt) / (Acid)$** (c) $pH = pK_a + \log (Salt) / (Base)$

(d) $pH = pK_a + \log (Acid) / (Salt)$

35) The degree of hydrolysis of 0.1 M solution of ammonium acetate is $8.48 \times 10^{-5}$. The dissociation constant of the weak base is _____.

(a) $1.39 \times 10^{-4}$ **(b) $1.39 \times 10^{-5}$** (c) $1.45 \times 10^{-10}$ (d) $1.45 \times 10^{-9}$

36) A drop of hydrochloric acid is added to pure water, its pH _____.

(a) increases **(b) decreases** (c) increases and then decreases (d) resist the change in pH and so remains unaltered

37) The conjugate base of HCIO is _____.

**(a) $ClO^-$** (b) $Cl^-$ (c) $H_2ClO^+$ (d) CIO

38) The acid having O - O bond in its structure _____.

(a) $H_2SO_3$ (b) $H_2S_2O_6$ **(c) $H_2S_2O_8$** (d) $H_2S_4O_6$

39) According to Arrhenius theory an acid is a substance that dissociates to give this in water _____.

(a) Hydroxyl ion **(b) Hydrogen ion** (c) Proton (d) Both b & c

40) A proton acceptor is called _____.

(a) Lewis acid (b) Lewis base **(c) Lowry Bronsted base** (d) Lowry Bronsted acid

41) $BF_3$ is an acid according to _____.

(a) Arrhenius **(b) Lewis** (c) Robert Boyle (d) Lowry Bronsted

42) In $HCl + H_2O \rightleftharpoons H_3O^+ + Cl^-$ the conjugate acid - base pair is _____.

**(a) HCI & $CI^-$** (b) HCI & $H_3O^+$ (c) $H_2O$ & $Cl^-$ (d) None

43) All metal oxides are _____.

(a) Lewis acids **(b) Lewis bases** (c) Lewis oxides (d) Bronsted acids

44) In $Cr^{3+} + 6H_2O \rightarrow [Cr(H_2O)_6]^{3+}$ the Lewis base is _____.

(a) $Cr^{3+}$ **(b) $H_2O$** (c) $[Cr(H_2O)_6]^{3+}$ (d) None

45)

| Acid | $K_a$ (25°C) |
|---|---|
| 1) HCI | $2 \times 10^{6}$ |
| 2) HCOOH | $1.8 \times 10^{-4}$ |
| 3) $CH_3COOH$ | $1.8 \times 10^{-5}$ |

The weaker acid is _____.

(a) HCl (b) HCOOH **(c) $CH_3COOH$** (d) All

46) When the temperature is raised the ionic product of water _____.

(a) decreases **(b) increases** (c) is not affected (d) cannot be Predicted

47) An acid which is completely ionized in water is called a _____.

**(a) Strong acid** (b) Weak acid (c) Very weak acid (d) None

48) b = ?

**(a)** $\frac{dB}{d(pH)}$ (b) $\frac{d(pH)}{dB}$ (c) $\frac{dB}{d(pOH)}$ (d) $\frac{dB}{d(pK_a)}$

49) Which salt is not hydrolysed?

(a) NaCl (b) $KNO_3$ (c) $Na_2SO_4$ **(d) All the above**

50) In a buffer solution containing equal concentration of $B^-$ and HB, the $K_b$ for $B^-$ is $10^{-10}$. The pH if the buffer solution is _____.

(a) 10 (b) 7 (c) 6 **(d) 4**