

NEET ANSWER KEY & SOLUTIONS

SUBJECT :- CHEMISTRY

CLASS :- 11th

PAPER CODE :- CWT-7

CHAPTER :- IONIC EQUILIBRIUM

ANSWER KEY

1. (C)	2. (A)	3. (C)	4. (C)	5. (C)	6. (B)	7. (A)
8. (C)	9. (A)	10. (A)	11. (A)	12. (D)	13. (B)	14. (B)
15. (B)	16. (C)	17. (B)	18. (C)	19. (D)	20. (B)	21. (C)
22. (A)	23. (C)	24. (A)	25. (A)	26. (D)	27. (B)	28. (B)
29. (B)	30. (A)	31. (D)	32. (A)	33. (A)	34. (B)	35. (D)
36. (D)	37. (C)	38. (A)	39. (B)	40. (A)	41. (C)	42. (C)
43. (A)	44. (A)	45. (B)	46. (C)	47. (A)	48. (C)	49. (B)
50. (A)						

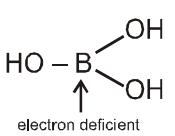
SOLUTIONS

SECTION-A

1. (C)
Sol. Because it gain and also lose the proton

$$\text{H}_2\text{O} + \text{H}_2\text{O} \rightleftharpoons \text{H}_3\text{O}^+ + \text{OH}^-$$
2. (A)
Sol. H_3PO_3 is dibasic so NaH_2PO_3 & Na_2HPO_3 both exist.
3. (C)
Sol. The molecule shows that three H atoms are replaceable, i.e., basicity of acid.
4. (C)
Sol. Conjugate acid base pair are differ by a proton (H^+).

$$\text{H}_2\text{F}^+ \xrightarrow{-\text{H}^+} \text{HF}$$

(acid)
(base)
5. (C)
Sol. $\text{H}_3\text{BO}_3 = \text{HO}-\text{B}(\text{OH})_2$

 So it will behave as Lewis acid.
6. (B)
Sol. Those substance which accept the proton are called Bronsted base and which donate the proton are called Bronsted acid.

$$\text{HCO}_3^- + \text{H}^+ \rightleftharpoons \text{H}_2\text{CO}_3 \text{ (as Bronsted base)}$$

$$\text{HCO}_3^- \rightleftharpoons \text{H}^+ + \text{CO}_3^{2-} \text{ (as Bronsted acid)}$$
7. (A)
Sol. In weak electrolyte, the degree of dissociation, $\alpha = \sqrt{\frac{K}{C}}$. So it increases with increasing dilution.

8. (C)
Sol. Ostwald's dilution law is valid for weak electrolytes.
9. (A)
Sol. $\text{pH} = -\log[\text{H}^+]$; $7.4 = -\log[\text{H}^+]$; $[\text{H}^+] = 4 \times 10^{-8} \text{ M}$
10. (A)
Sol. $T \uparrow, [\text{H}^+] \uparrow, \text{pH} \downarrow$
11. (A)
Sol. More is K_a , lesser is $\text{p}K_a$ ($\text{p}K_a = -\log K_a$), more is acidic strength.
12. (D)
Sol. (A) $[\text{H}^+] = y \times 10^{-x}$
 $\Rightarrow \text{pH} = -\log[\text{H}^+]$
 $\Rightarrow -\log [y \times 10^{-x}]$
 $\Rightarrow -\log y - \log 10^{-x}$
 $\Rightarrow x \log_{10} 10 - \log y$
 $\Rightarrow x - \log y.$
 (B) $[\text{H}^+] = \frac{1}{y} \times 10^{-x}$
 $\Rightarrow \text{pH} = -\log \left[\frac{1}{y} \times 10^{-x} \right] \Rightarrow x - \log \frac{1}{y}$
 $\Rightarrow x + \log y.$
 (C) $[\text{H}^+][\text{OH}^-] = 10^{-14}$
 $\Rightarrow -\log[\text{H}^+][\text{OH}^-] = -\log 10^{-14}$
 $\Rightarrow -\log \text{H}^+ - \log \text{OH}^- = 14$
 $\text{pH} = 14 + \log[\text{OH}^-].$
13. (B)
Sol. Millimole of $\text{H}^+ = 0.3 \times 500 = 150$
 Millimole of $\text{OH}^- = 0.1 \times 500 = 50$
 After neutralization Millimole of H^+ left = $150 - 50 = 100.$
 So, $[\text{H}^+] = \frac{100}{500 + 500} = \frac{1}{10}$
 $\text{pH} = -\log \left(\frac{1}{10} \right) = 1.$

14. (B)
Sol. pH of the solution A = 3
 $[H^+]_A = 10^{-3}$ M.
 pH of the solution B = 2
 $[H^+]_B = 10^{-2}$ M
 $[H^+] = 10^{-3} + 10^{-2} = 10^{-3} + 10 \times 10^{-3} = \frac{11 \times 10^{-3}}{2}$
 pH = 2.26
15. (B)
Sol. Initial $\Rightarrow [OH^-] = \frac{2}{200} = 10^{-2}$ M \therefore pH = 12
 Final $\Rightarrow [OH^-] = 10^{-2} + \frac{0.04}{40 \times 0.1} = 2 \times 10^{-2}$
 \therefore pH = 12.3
 So, change = 12.3 - 12 = +0.3
16. (C)
Sol. As the solution is acidic, pH < 7. This is because $[H^+]$ from H_2O cannot be neglected in comparison to 10^{-8} M.
17. (B)
Sol. CO_2 is acidic oxide, which on dissolution in water develops acidic nature.
18. (C)
Sol. $\alpha \% = \sqrt{\frac{K_a}{C}} \times 100$
 $\Rightarrow \sqrt{\frac{1.8 \times 10^{-5}}{0.2}} \times 100 = 0.950$.
19. (D)
Sol. $[H^+] = \alpha \cdot C = \frac{2}{100} \times .02$; $[H^+] = 4 \times 10^{-4}$ M
 pH = $-\log [H^+] = 4 - \log 4$; pH = 3.3979
20. (B)
Sol. $CH_3COOH \rightleftharpoons CH_3COO^- + H^+$

t=0	0.1	0	0
t=t _{eq}	0.1-0.001	0.001	0.001

$$K_a = \frac{[CH_3COO^-][H^+]}{[CH_3COOH]} = \frac{(0.001)(0.001)}{(0.1)}$$

$$\Rightarrow K_a = 10^{-5}$$
21. (C)
Sol. $K_a \propto \alpha^2$
 $\frac{K_{a_1}}{K_{a_2}} = \left(\frac{4}{9}\right)^2 = \frac{16}{81}$
22. (A)
Sol. On adding the 3 ionisation reactions, ionisation constants will get multiplied.

23. (C)
Sol. $K_a = 10^{-4} \times 10^{-6} \times 10^{-8} = 10^{-18}$
 or, $10^{-18} = \frac{[H^+]^3 [PO_4^{3-}]}{[H_3PO_4]} \Rightarrow [H^+] = 10^{-5}$
 \Rightarrow pH = 5
24. (A)
Sol. $H^+ + OH^- \rightarrow H_2O$.
25. (A)
Sol. Anion of weak acid will undergo hydrolysis. So, PO_4^{3-} .
26. (D)
Sol. $NaClO_4$ is a salt of strong acid $HClO_4$.
27. (B)
Sol. Anionic hydrolysis results in basic solution.
28. (B)
Sol. $pH = 7 + \frac{1}{2} (pK_a - pK_b) = 7 + \frac{1}{2} [0]$
 pH = 7.
29. (B)
Sol. $pK_b > pK_a$
 i.e. $K_a > K_b$
 i.e. acidic.
30. (A)
Sol. Salt is of WAWB
 $\sqrt{K_h} = \frac{h}{1-h}$
 $\sqrt{6.25 \times 10^{-6}} = \frac{h}{1-h}$
 $25 \times 10^{-4} = \frac{h}{1-h}$
 $\%h = 25 \times 10^{-2} = 0.25$
31. (D)
Sol. $pH = \frac{1}{2} [pK_w + pK_a + \log_{10} C] = \frac{1}{2} [14 + 5 - \log_2 + \log_{10} 10^{-2}] = 8.35$.
32. (A)
Sol. Acetic acid will dissociate less due to common ion effect of CH_3COO^-
 So, H^+ concentration will decrease hence pH will increase.
33. (A)
Sol. On adding small amount of acid (H^+) and base (OH^-), weak acid or weak base will form respectively.
34. (B)
Sol. Weak base should be in excess.

35. (D)
Sol. $\text{pH} = \text{pK}_a + \log \frac{[\text{HA}]}{[\text{NaA}]} = 3.346 + \log \frac{[0.20]}{500} \times \frac{[500]}{[0.05]} = 3.95$

SECTION-B

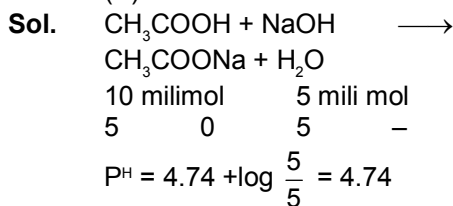
36. (D)

37. (C)

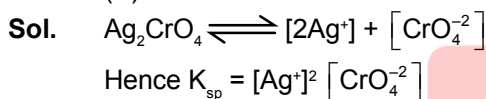
Sol. Fact.

38. (A)

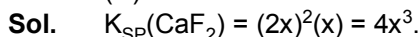
39. (B)



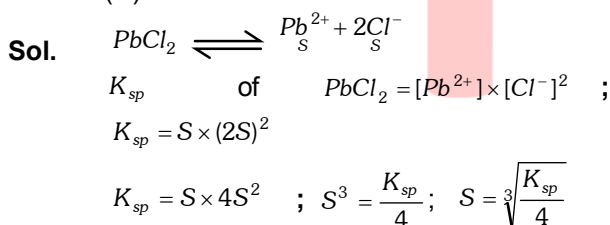
40. (A)



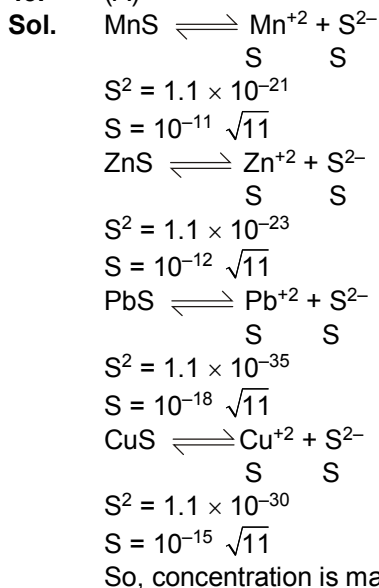
41. (C)



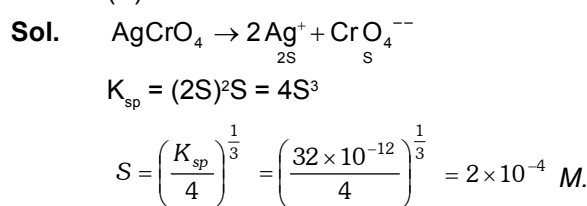
42. (C)



43. (A)



44. (A)



45. (B)

Sol. The solubility of BaSO_4 in g/litre is given 2.33×10^{-3}

\therefore in mole/litre. = $n = \frac{W}{\text{m. wt}} \times 10^{-5} = \frac{2.33 \times 10^{-3}}{233}$

Because BaSO_4 is a compound
 $K_{\text{sp}} = S^2 = [1 \times 10^{-5}]^2 = 1 \times 10^{-10}$

46. (C)

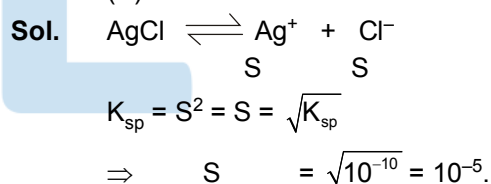
Sol. Let S is the solubility of BaF_2 in a solution of $\text{Ba}(\text{NO}_3)_2$.

Then $K_{\text{SP}} = [\text{Ba}^{2+}] [\text{F}^-]^2$.

Then $[\text{F}^-] = 2S$;

Then $\frac{1}{2} [\text{F}^-] = S$

47. (A)



48. (C)

Sol. 0.01 M CaCl_2 gives maximum Cl^- ions to keep K_{sp} of AgCl constant, decrease in $[\text{Ag}^+]$ will be maximum.

49. (B)

Sol. For sparingly soluble salts, reason is not a correct explanation. Hence both assertion and reason are true but reason is not a correct explanation of assertion.

50. (A)

Sol. Barium carbonate is more soluble in HNO_3 than in water because carbonate is a weak base and reacts with the H^+ ion of HNO_3 causing the barium salt to dissociate.
 $\text{BaCO}_3 + \text{HNO}_3 \rightarrow \text{Ba}(\text{NO}_3)_2 + \text{CO}_2 + \text{H}_2\text{O}$