DPP-2 [pH Concept]

Chapter: Ionic Equilibrium

"This isn't just an assignment. It's a step toward your dream."

GROUP–1 : pH & pOH BASICS

Q1. **Which of the following solutions is most acidic?**

(1) pH = 5
(2) pH = 3
(3) pH = 9
(4) pH = 13

Q2. **An aqueous solution whose pH = 0 is–**

(1) Basic
(2) Acidic
(3) Neutral
(4) Amphoteric

Q3. **The pH of solutions A, B, C and D are 9.5, 2.5, 3.5 and 5.5 respectively. The most acidic solution is–**

(1) D
(2) C
(3) A
(4) B

Q4. **A solution has pOH equal to 13 at 298 K. The solution will be–**

(1) highly acidic
(2) highly basic
(3) moderately basic
(4) unpredictable

Q5. **The pH of 0.001 M HCl solution is–**

(1) 1
(2) 2
(3) 3
(4) 4

Q6. **If $[OH^-] = 5.0 \times 10^{-5}$ M then pH will be–**

(1) 5 – log 5
(2) 9 + log 5
(3) log 5 – 5
(4) log 5 – 9

Q7. **The hydrogen ion concentration in a given solution is 6×10^{-4} M. Its pH will be–**

(1) 6
(2) 3.22
(3) 4
(4) 2

Q8. **The pH of a 10^{-3} M KOH solution is–**

(1) 3
(2) 10
(3) 11
(4) 12

Q9. **If pH = 3.31, then find out $[H^+]$ (Approx)**

(1) 3.39×10^{-4}
(2) 5×10^{-4}
(3) 3.0×10^{-3}
(4) None

Q10. **pH of tomato juice is 4.4. Then concentration of H_3O^+ will be–**

(1) 3.9×10^{-4}
(2) 3.9×10^{-5}
(3) 3.9×10^{-4}
(4) 3.9×10^{5}

Q11. **If pH of a solution is 3, what is $[OH^-]$?**

(1) 10^{-3}
(2) 10^{-11}
(3) 10^{-7}
(4) 10^{-10}

Q12. **A sample of rain water has pH = 6.2. The OH^- ion concentration is–**

(1) 6.2×10^{-8}
(2) $10^{-6.2}$
(3) $10^{-7.8}$
(4) $6.2 \times 10^{-7.8}$

Q13. **How many H^+ ions are present in 1 ml of a solution whose pH is 13?**

(1) 10^{-16}
(2) 6.022×10^{13}
(3) 6.022×10^{7}
(4) 6.022×10^{23}

Q14. **Find out pH of solution having 2×10^{-3} moles of OH^- in 2 litre solution–**

(1) pH = 3
(2) pH = 3 + log2
(3) pH = 3 – log2
(4) pH = 11

GROUP–2 : Ionic Product of Water (K_w)

Q15. **If ionic product of water is $K_w = 10^{-16}$ at 4°C, then pH of neutral water at 4°C is–**

(1) 8
(2) 6
(3) 4
(4) 7

Q16. **If pure water has $pK_w = 13.36$ at 50°C, the pH of pure water will be–**

(1) 6.68
(2) 7.0
(3) 7.13
(4) 6.0

Q17. **At 100°C, $K_w = 10^{-12}$. pH of pure water at 100°C will be–**

(1) 7.0
(2) 6.0
(3) 8.0
(4) 12.0

Q18. **At 60°C, pure water has $[H_3O^+] = 10^{-6.7}$ mol/L. What is the value of K_w at 60°C :-**

(A) 10^{-6}
(B) 10^{-12}
(C) 10^{-67}
(D) $10^{-13.4}$

Q19. **If ionic product of water is $K_w = 10^{-16}$ at 4°C, then a solution with pH = 7.5 at 4°C will–**

(1) Turn blue litmus red
(2) Turn red litmus blue
(3) Be neutral to litmus
(4) Be alkaline

Q20. **Ionic product of water will increase, if–**

(1) Dissociation of pressure
(2) Add H^+
(3) Add OH^-
(4) Increase the temperature

Q21. **With increase in temperature, pH of pure water–**

(1) Increases
(2) Decreases
(3) Remains constant
(4) May increase or decrease

Q22. **K_w of H_2O at 373 K is 1×10^{-12}. Identify, which of the following is incorrect :**

(A) pH + pOH = 12, for every aqueous solutions.
(B) pH of H_2O is 6.
$H^+ = [OH^-]$.
(C) H_2O is acidic.

Q23. **For water at 25°C, 2×10^{-7} moles per litre corresponds to which of the following?**

(1) $[H^+] + [OH^-]$
(2) $[H^+]^2$
(3) $[OH^-]^2$
(4) $[H^+] - [OH^-]$

Q24. At 25°C, the dissociation constant for pure water is given by–

(1) $(55.4 \times 10^{14})^{-1}$
(2) 1×10^{-14}
(3) $\frac{1 \times 10^{-14}}{18}$
(4) None of these

Q25. Ionic product of water is equal to–

(1) Dissociation constant of water $\times$ $[H_2O]$
(2) Dissociation constant of water $\times$ $[H^+]$
(3) Product of $[H_2O]$ and $[H^+]$
(4) Product of $[OH^-]^2$ and $[H^+]$

Q26. Which of the following expression is not true ?

$H^+ = [OH^-] = \sqrt{K_w}$ for a neutral solution at all temperatures.
$H^+ > \sqrt{K_w}$ & $[OH^-] < \sqrt{K_w}$ for an acidic solution.
$H^+ < \sqrt{K_w}$ & $[OH^-] > \sqrt{K_w}$ for an alkaline solution.
$H^+ = [OH^-] = 10^{-7}$ M for a neutral solution at all temperatures.

GROUP–3 : Acid–Base Strength & Dilution

Q27. pH of solution is increased from 3 to 6. Its H^+ concentration will be–

(1) Reduced to half
(2) Doubled
(3) Reduced by 1000 times
(4) Increased by 1000 times

Q28. In a solution of pH = 5, more acid is added in order to reduce the pH = 2. The increase in hydrogen ion concentration is–

(1) 100 times
(2) 1000 times
(3) 3 times
(4) 5 times

Q29. If pH of a solution decreases from 9 to 6, then the hydrogen ion concentration will–

(1) Become 3 times
(2) Decrease 1000 times
(3) Increase 1000 times
(4) Remain same

Q30. A solution with pH 2.0 is more acidic than the one with pH 6.0 by a factor of:

(A) 3
(B) 4
(C) 3000
(D) 10000

Q31. How many litres of water must be added to 1 litre aqueous solution of HCl with a

pH of 1 to create an aqueous solution with pH of 2 ?

(1) 0.1 L
(2) 0.9 L
(3) 2.0 L
(4) 9.0 L

Q32. How many moles of HCl must be removed from 1 litre of aqueous HCl solution to change its pH from 2 to 3 :-

(A) 1
(B) 0.02
(C) 0.009
(D) 0.01

GROUP–4 : Titration / Molarity / Normality / Concentration

Q33. 8 g NaOH is dissolved in one litre of solution, the molarity of solution is–

(1) 0.2 M
(2) 0.4 M
(3) 0.02 M
(4) 0.8 M

Q34. If 5 g of $Ca(OH)_2$ is dissolved in 2 L solution, the molarity is–

(1) 0.067 M
(2) 0.034 M
(3) 0.25 M
(4) 0.125 M

Q35. The formula weight of H_2SO_4 is 98. The weight of acid in 400 mL of 0.1 M solution is–

(1) 2.45 g
(2) 3.92 g
(3) 4.90 g
(4) 9.8 g

Q36. The amount of acetic acid present in 100 mL of 0.1M solution is–

(1) 0.30 g
(2) 3.0 g
(3) 0.60 g
(4) None

Q37. If the molar concentration of PbI_2 is 1.5×10^{-3} mol L^{-1}, the concentration of iodide ions in g–ion L^{-1} is–

(1) 3.0×10^{-3}
(2) 6.0×10^{-3}
(3) 0.3×10^{-3}
(4) 0.6×10^{-6}

Q38. What is the molar concentration of chloride ion in the solution obtained by mixing 300 mL of 3.0 M NaCl and 200 mL of 4.0 M $BaCl_2$?

(1) 5.0 M
(2) 1.8 M
(3) 1.6 M
(4) None of these

Q39. Normality of 2M sulphuric acid is–

(1) 2 N
(2) 4 N
(3) N/2
(4) N/4

Q40. 0.5 g of NaOH is dissolved in 1 L of solution. The normality of the solution is–

(1) 0.0125 N
(2) 0.025 N
(3) 0.05 N
(4) 0.5 N