DPP-4 [pH of WEAK ACID and WEAK BASE]

"Mehnat dikhayi nahi deti... lekin result mein chilla ke bolti hai."

GROUP–A: pH of Weak Acids / Weak Bases

Q1. **pH of 0.001 M acetic acid would be :-**

(1) 2
(2) > 3
(3) 7
(4) 14

Q2. **The pH of a 0.02 M ammonia solution which is 5% ionised will be :-**

(1) 2
(2) 11
(3) 5
(4) 7

Q3. **If K_a of HCN = 4×10^{-10}, then the pH of 2.5 $\times$ 10^{-1} molar HCN (aq) is :-**

(1) 4.2
(2) 4.7
(3) 0.47
(4) 5.0

Q4. **The dissociation constant of a weak monoacidic base is 10^{-5}. The pH of its 0.1 M solution will be approximately equal to :-**

(1) 11
(2) 8
(3) 7.5
(4) 10

Q5. **The degree of dissociation of acetic acid is given by the expression $\alpha = 0.1 \times C^{-1}$ (where C = concentration of the acid). What is the pH of the solution :-**

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

Q6. **The pH of a 0.1 M formic acid 0.1% dissociated is equal to 4. What will be the pH of another weak monobasic acid (same concentration) which is 1% dissociated :-**

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

Q7. **For 10^{-3} M H_2CO_3 if $\alpha = 10\%$ then find the value of pH ?**

Q8. If K_a of a weak acid is 4×10^{-6} and its concentration is 0.1 M. Find pH of solution.

Q9. Calculate the pH of a 500 mL solution of 1 M BOH. ($K_b = 2.5 \times 10^{-5}$)

Q10. The degree of dissociation of a weak acid, HOCl is 1.25×10^{-2}, calculate pH of 0.04 M HOCl solution.

GROUP–B: Degree of Dissociation ()

Q11. Calculate the degree of ionization of 0.04 M HOCl solution having ionization constant 1.25×10^{-4} :-

(1) 0.025
(2) 0.25
(3) 0.5
(4) 0.055

Q12. If Ka for CH_3COOH is 1.8×10^{-5}. Find out the percentage dissociation of 0.2 M CH_3COOH in 0.1 M HCl solution :-

(1) 0.018
(2) 0.36
(3) 18
(4) 36

Q13. Calculate the percentage ionization of 0.01 M acetic acid in 0.1 M HCl if K_a of acetic acid is 1.8×10^{-5} :-

(1) 0.18%
(2) 0.018%
(3) 1.8%
(4) 18%

Q14. Order of dissociation of 0.1 N CH_3COOH is (Dissociation constant $= 1 \times 10^{-5}$) :-

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

Q15. If the value of K_a of 1 M HCN is 10^{-5} then its degree of dissociation in 0.1 M HCl will be ($\alpha \ll 1$) :-

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

Q16. A weak acid HA has a K_a of 1.00×10^{-5}. If 0.100 moles of this acid is dissolved in one litre of water the percentage of acid dissociated at equilibrium is closest to :-

(1) 99.0%
(2) 1.00%
(3) 99.9%
(4) 0.100%

Q17. Find out the value of α of 10^{-2} M HCN solution if $[H^+] = 10^{-3}$.

GROUP–C: Ka Calculation / Ionization Constant of Weak Acids

Q18. **0.2 M solution of HCOOH is 3.2% ionised then find ionisation constant of acid :-**

(1) 4.2×10^{-4}

(2) 4.2×10^{-5}

(3) 2.1×10^{-4}

(4) 2.1×10^{-5}

Q19. **An acid HA ionises as $HA \rightleftharpoons H^+ + A^-$. The pH of 1.0 M solution is 5. Its dissociation constant would be :-**

(1) 1×10^{-10}

(2) 5

(3) 5×10^{-8}

(4) 1×10^{-5}

Q20. **The pH of a 0.1 molar solution of the acid HQ is 3. The value of the ionization constant, Ka of the acid is :- [AIEEE–2012]**

(1) 1×10^{-1}

(2) 1×10^{-3}

(3) 1×10^{-5}

(4) 1×10^{-7}

Q21. **If HCN has degree of ionisation equal to 4×10^{-3} in 0.2 M solution, find the value of ionization constant of HCN:-**

(a) 2×10^{-3}

(b) 3.2×10^{-5}

(c) 4×10^{-4}

(d) 5.4×10^{-5}

Q22. **Find out K_a for 10^{-2} M HCN acid, having pOH is 10 :-**

(1) $K_a = 10^{-4}$

(2) $K_a = 10^{-2}$

(3) $K_a = 10^{-5}$

(4) None of them

Q23. **Percentage ionisation of a 0.5 M solution of a weak base is 1.414%. What is the ionisation constant of the base?**

Q24. **Percentage ionisation of 1 M acetic acid solution is 1.2%. Find ionisation constant.**

Q25. **Find out the K_a of acetic acid which is 5% ionised in 2 M CH_3COOH solution.**

Q26. **0.1 M solution of BOH has pH 10 then find K_b.**

Q27. **For 10^{-3} M CH_3COOH if pH = 3.4. Find value of K_a.**

GROUP–D: Mix

Q28. **The molarity of nitrous acid at which its pH becomes 2. ($K_a = 4.5 \times 10^{-4}$) :-**

(1) 0.3333

(2) 0.4444

(3) 0.6666

(4) 0.2222

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Q29. **If α is the degree of dissociation of weak dibasic organic acid and y is the hydrogen ion concentration, what is the initial concentration of acid :-**

(1) $\frac{\alpha(y)^{-1}}{2}$ M

(2) $y(\alpha)^{-1}$ M

(3) $\frac{y(\alpha)^{-1}}{2}$ M

(4) None of them

Q30. **The concentration of $[H^+]$ and concentration of $[OH^-]$ of a 0.1 M aqueous solution of 2% ionised weak acid is [ionic product of water $= 1 \times 10^{-14}$] :-**

(1) 0.02×10^{-3} M and 5×10^{-11} M

(2) 1×10^{-3} M and 3×10^{-11} M

(3) 3×10^{-2} M and 5×10^{-12} M

(4) 3×10^{-2} M and 4×10^{-13} M

Q31. **At 25°C, the dissociation constant of a base, BOH, is 1.0×10^{-12}. The concentration of hydroxyl ions in 0.01 M aqueous solution of the base would be :-**

(1) 1.0×10^{-6} mol L^{-1}

(2) 1.0×10^{-7} mol L^{-1}

(3) 2.0×10^{-6} mol L^{-1}

(4) 1.0×10^{-5} mol L^{-1}

Q32. **Correct statement for HCN weak acid at 25°C :-**

(1) $\alpha = \frac{K_a}{[H^+]}$

(2) $\alpha = \frac{K_a \times [OH^-]}{K_w}$

(3) (1) & (2) both

(4) $K_b = C\alpha^2$

Q33. **For 10 M CH_3COOH solution if $K_a = 10^{-5}$ then find out : (i) α (ii) $[H^+]$ (iii) pH**