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NEET EQUILIBRIUM — BUFFER SOLUTIONS — PYQS

Max. Marks: 48 **Questions:** 12

Section A (MCQ) — 12 questions

Q.1 At 298 K, a certain buffer solution contains equal concentrations of X^- and HX. K_b for X^- is 10^{-10}. What is the pH of this buffer solution? [NEET (UG) 2026]

(1) 10 (2) 4 (3) 2 (4) 6

Scan or tap for the full solution

Q.2 The pH of the solution containing 50 mL each of 0.10 M sodium acetate and 0.01 M acetic acid is [Given pK_a of CH_3COOH = 4.57] [NEET (UG) 2022]

(1) 5.57 (2) 3.57 (3) 4.57 (4) 2.57

Scan or tap for the full solution

Q.3 Which will make basic buffer? [NEET (UG) 2019]

(1) 100 mL of 0.1 M HCl + 200 mL of 0.1 M NH_4OH

(2) 100 mL of 0.1 M HCl + 100 mL of 0.1 M NH_4OH

(3) 50 mL of 0.1 M NaOH + 25 mL of 0.1 M CH_3COOH

(4) 100 mL of 0.1 M CH_3COOH + 100 mL of 0.1 M NaOH

Scan or tap for the full solution

Q.4 Which one of the following pairs of solution is not an acidic buffer ? [AIPMT 2015]

(1) CH_3COOH and CH_3COONa

(2) H_2CO_3 and Na_2CO_3

(3) H_3PO_4 and Na_3PO_4

(4) $HClO_4$ and $NaClO_4$

Scan or tap for the full solution

Q.5 The dissociation constant of weak acid is 1×10^{-4}. In order to prepare a buffer solution with a pH = 5, the [Salt]/[Acid] ratio should be [NEET 2013 (Karnataka)]

(1) 4 : 5 (2) 10 : 1 (3) 5 : 4 (4) 1 : 10

Scan or tap for the full solution

Q.6 Buffer solutions have constant acidity and alkalinity because [AIPMT 2012 (Prelims)]

(1) these give unionised acid or base on reaction with added acid or alkali

(2) acids and alkalies in these solutions are shielded from attack by other ions

(3) they have large excess of H^+ or OH^- ions

(4) they have fixed value of pH

Scan or tap for the full solution

Q.7 A buffer solution is prepared in which the concentration of NH_3 is 0.30 M and the concentration of NH_4^+ is 0.20 M. If the equilibrium constant, K_b for NH_3 equals 1.8×10^{-5}, what is the pH of this solution? ($\log 2.7 = 0.43$) [AIPMT 2011 (Prelims)]

(1) 9.08 (2) 9.43 (3) 11.72 (4) 8.73

Scan or tap for the full solution

Q.8 What is $[H^+]$ in mol/L of a solution that is 0.20 M in CH_3COONa and 0.10 M in CH_3COOH? K_a for $CH_3COOH = 1.8 \times 10^{-5}$ [AIPMT 2010 (Prelims)]

(1) 3.5×10^{-4} (2) 1.1×10^{-5}

(3) 1.8×10^{-5} (4) 9.0×10^{-6}

Scan or tap for the full solution

Q.9 In a buffer solution containing equal concentration of B^- and HB, the K_b for B^- is 10^{-10}. The pH of buffer solution is [AIPMT 2010 (Prelims)]

(1) 10 (2) 7 (3) 6 (4) 4

Scan or tap for the full solution

Q.10 Which of the following pairs constitutes a buffer? [AIPMT 2006]

(1) HCl and KCl (2) HNO_2 and $NaNO_2$

(3) NaOH and NaCl (4) HNO_3 and NH_4NO_3

Scan or tap for the full solution

Q.11 Solution of 0.1 N NH_4OH and 0.1 N NH_4Cl has pH 9.25. Then find out pK_b of NH_4OH [AIPMT 2002]

(1) 9.25 (2) 4.75 (3) 3.75 (4) 8.25

Scan or tap for the full solution

Q.12 The rapid change of pH near the stoichiometric point of an acid-base titration is the basis of indicator detection. pH of the solution is related to ratio of the concentrations of the conjugate acid (HIn) and base (In^-) forms of the indicator by the expression [AIPMT 2004]

(1) $\log \frac{[In^-]}{[HIn]} = pK_{In} - pH$

(2) $\log \frac{[HIn]}{[In^-]} = pK_{In} - pH$

(3) $\log \frac{[HIn]}{[In^-]} = pH - pK_{In}$

(4) $\log \frac{[In^-]}{[HIn]} = pH - pK_{In}$

Scan or tap for the full solution

ANSWER KEY

Ques.	1	2	3	4	5	6	7	8	9	10	11
Ans.	**2**	**1**	**1**	**4**	**2**	**1**	**2**	**4**	**4**	**2**	**2**
Ques.	12										
Ans.	**4**										