

PYQSide

JEE MAIN EQUILIBRIUM — BUFFER SOLUTIONS — PYQS

Max. Marks: 24

Questions: 6

Section A (MCQ)

- Q.1** 20 mL of a solution of acetic acid required 28.4 mL of 0.1 M NaOH for its neutralization. A solution (X) was prepared by mixing 20 mL of the above acetic acid and 14.2 mL of 0.1 M NaOH solution. What is the pH of the solution (X)? (pK_a value of acetic acid is 4.75).

[JEE Main 2026 (Online) 4th April Evening Shift]

- (1) 7.0 (2) 4.75 (3) 3.5 (4) 4.82

Scan or tap for the full solution



- Q.2** At 25°C, 20.0 mL of 0.2 M weak monoprotic acid HX is titrated against 0.2 M NaOH. The pH of the solution (a) at the start of the titration (when NaOH has not been added) and (b) when 10 mL of NaOH is added respectively, are :

Given :

$$K_a = 5 \times 10^{-4}$$

$$pK_a = 3.3$$

 $\alpha \ll 1$ [JEE Main 2026 (Online) 2nd April Evening Shift]

(1)

(a)	(b)
0.7	2.0

(2)

(a)	(b)
2.0	3.3

(3)

(a)	(b)
1.1	2.2

(4)

(a)	(b)
3.0	2.2

Scan or tap for the full solution



- Q.3** Consider a weak base 'B' of $pK_b = 5.699$. 'x' mL of 0.02 M HCl and 'y' mL of 0.02 M weak base 'B' are mixed to make 100 mL of a buffer of pH 9 at 25°C. The values of 'x' and 'y' respectively are :
[Given : $\log 2 = 0.3010$, $\log 3 = 0.4771$, $\log 5 = 0.699$]

[JEE Main 2026 (Online) 28th January Morning Shift]

(1)

x	y
42.7	57.3

(2)

x	y
14.3	85.7

(3)

x	y
85.7	14.3

(4)

x	y
11.1	88.9

Scan or tap for the full solution



- Q.4** Which of the following mixture gives a buffer solution with pH = 9.25 ?
Given : $pK_b(\text{NH}_4\text{OH}) = 4.75$

[JEE Main 2026 (Online) 22nd January Evening Shift]

- (1) 0.5 M NH_4OH (0.2 L) + 0.2 M HCl (0.5 L)
(2) 0.2 M NH_4OH (0.5 L) + 0.1 M HCl (0.5 L)
(3) 0.2 M NH_4OH (0.4 L) + 0.1 M HCl (1 L)
(4) 0.4 M NH_4OH (1 L) + 0.1 M HCl (1 L)

Scan or tap for the full solution



Section B (Numerical)

- Q.5** The pH of a solution obtained by mixing 5 mL of 0.1 M NH_4OH solution with 250 mL of 0.1 M NH_4Cl solution is $______ \times 10^{-2}$. (Nearest integer)
Given: $pK_b(\text{NH}_4\text{OH}) = 4.74$
 $\log 2 = 0.30$
 $\log 3 = 0.48$
 $\log 5 = 0.70$

[JEE Main 2026 (Online) 4th April Morning Shift]

Scan or tap for the full solution



- Q.6** One litre buffer solution was prepared by adding 0.10 mol each of NH_3 and NH_4Cl in deionised water. The change in pH on addition of 0.05 mol of HCl to the above solution is $______ \times 10^{-2}$. (Nearest integer)
Given : pK_b of $\text{NH}_3 = 4.745$ and $\log_{10} 3 = 0.477$

[JEE Main 2025 (Online) 7th April Evening Shift]

Scan or tap for the full solution



ANSWER KEY

Section A (MCQ)

Ques.	1	2	3	4						
Ans.	2	2	2	2						

Section B (Numerical)

Ques.	5	6					
Ans.	756	48					