

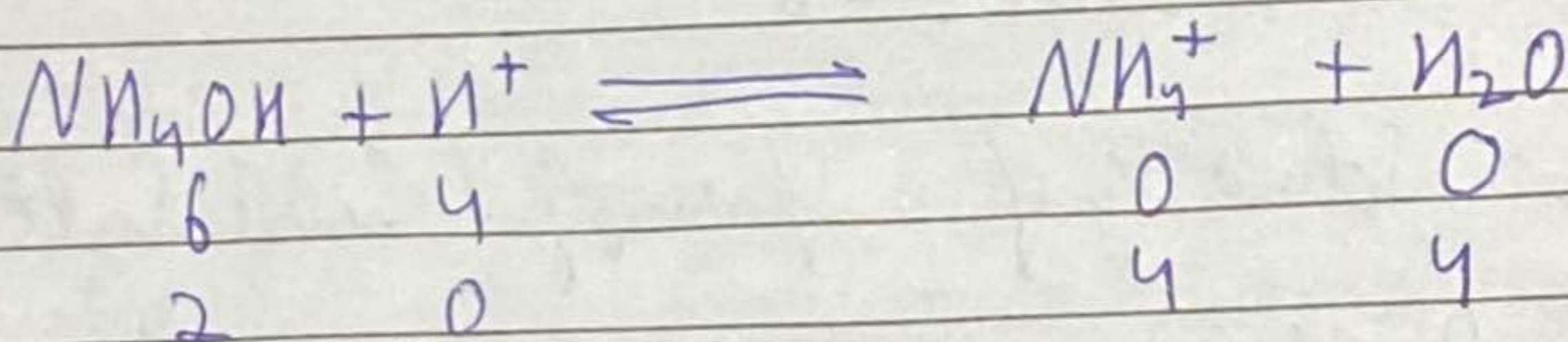
## Previous Year JEE Problems

Q. 20 mL of 0.1 M  $H_2SO_4$  solution is added to 30 mL of 0.2 M  $NH_4OH$  solution. The pH of resultant mixture is [  $pK_b$  of  $NH_4OH = 4.7$  ].

- (a) 9.4  
 (b) 9.0  
 (c) 5.0  
 (d) 5.2

Ans-  $pK_b$  of  $NH_4OH = 4.7$  (Given)

20 mL of 0.1 M  $H_2SO_4 = n_{H^+} \Rightarrow 4 \text{ mmol}$   
 30 mL of 0.2 M  $NH_4OH = n_{NH_4OH} = 6 \text{ mmol}$



Given Solution is a Basic Buffer.

$$\therefore pOH = pK_b + \log \frac{[NH_4^+]}{[NH_4OH]}$$

$$= 4.7 + \log 2 \Rightarrow 4.7 + 0.3 \Rightarrow 5$$

$$\therefore pOH \Rightarrow 5.0$$

$$pH \Rightarrow 14 - 5 \Rightarrow 9$$

Hence option (b) is correct option.