

Q. How many grams of  $\text{NH}_4\text{NO}_3$  should be dissolved per litre of solution to have a pH of 5.13?  $K_b$  for  $\text{NH}_3$  is  $1.8 \times 10^{-5}$

- (a)  $2 \text{ g L}^{-1}$
- (b)  $4 \text{ g L}^{-1}$
- (c)  $8 \text{ g L}^{-1}$
- (d)  $1 \text{ g L}^{-1}$

-  $\text{NH}_4\text{NO}_3$  is a salt of strong acid and weak base for solutions of such salts

$$\text{pH} = \frac{1}{2} [\text{p}K_w - \log C - \text{p}K_b]$$

$$\therefore 10.26 = 14 - \log C - 4.74$$

$$\therefore \log C = 9.26 - 10.26 \Rightarrow -1.0$$

$$\therefore C = 10^{-1} \text{ M}$$

$$[\text{NH}_4\text{NO}_3] = 10^{-1} \text{ M}$$

$$W_{\text{NH}_4\text{NO}_3} = 10^{-1} \times 80 \text{ g L}^{-1} = 8 \text{ g L}^{-1}$$

Hence, option (c) is the correct answer.