Calculate the amt. of Amm. Chloride required to dissolve 500ml of water to have pH 4.5 [K_b for $NH_4OH = 1.8 \times 10^{-5}$]

Soln $[H^+] = 10^{-pH} \Rightarrow 10^{-4.5} = 10^{-5}$ antilog 0.5

$= 3.162 \times 10^{-5} M$.

Let C be Conc. of NH_4Cl

$$NH_4^+ + H_2O \rightleftharpoons NH_4OH + H^+$$
$$C(1-h) \qquad Ch \quad Ch$$

if h is small $K_h = Ch^2$ $\left[K_h = \frac{K_w}{K_b} = \frac{10^{-14}}{1.8\times10^{-5}} = 5.5 \times 10^{-10}\right]$

$$h = \frac{K_h}{Ch} = \frac{K_h}{[H^+]} = 1.739 \times 10^{-5}$$

$Ch = [H^+] \Rightarrow h = \frac{[H^+]}{C}$

$\Rightarrow h = \frac{3.162 \times 10^{-5}}{1.739 \times 10^{-5}} = 1.8$ mol L^{-1}

500ml contain $= \frac{1.8}{L} = 0.9$ mole

mass $= 0.9 \times 53.5 = \boxed{48.159}$