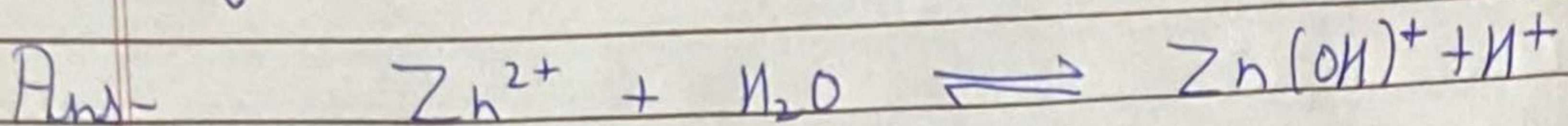


Q. The acid ionization constant for :-

$Zn^{2+} + H_2O \rightleftharpoons Zn(OH)^+ + H^+$   
is  $1.0 \times 10^{-9}$ . Calculate the pH of 0.0010 M solution of  $ZnCl_2$ .



$$[H^+] = \sqrt{\frac{K_a}{C}}$$

$$= \sqrt{\frac{K_w}{K_b C}}$$

Now, we know that  $Zn^{2+}$  and  $Zn(OH)^+$  are conjugate acid and base.

$$\therefore K_a \times K_b = 10^{-14}$$

$$\therefore K_b = \frac{10^{-14}}{10^{-9}} = 10^{-5}$$

$$\therefore [H^+] = \sqrt{\frac{10^{-14}}{10^{-5} \times 0.001}} = \sqrt{10^{-12}} = 10^{-6}$$

$$\therefore pH = 6$$