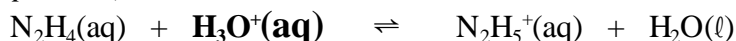


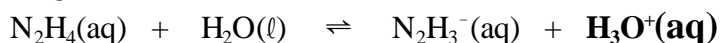
**PART A**  
**MC #6**

Brönsted <b>ACID</b>	proton ( $\text{H}^+$ ) <i>donor</i>	more <b>positive</b> ( $\because$ one $\text{H}^+$ <i>more</i> )
Brönsted <b>BASE</b>	proton ( $\text{H}^+$ ) <i>acceptor</i>	more <b>negative</b> ( $\because$ one $\text{H}^+$ <i>less</i> )

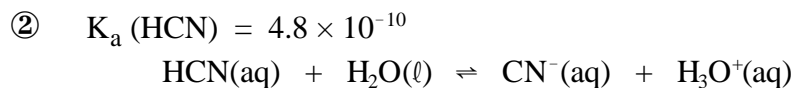
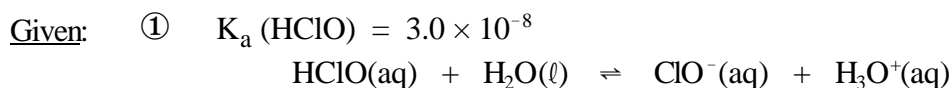
In this case, hydrazine ( $\text{N}_2\text{H}_4$ ) acts as a **conjugate base** which **accepts a proton  $\text{H}^+$**  (*or*  $\text{H}_3\text{O}^+$ ) to form the **conjugate acid** ( $\text{N}_2\text{H}_5^+$ , *more positive*).



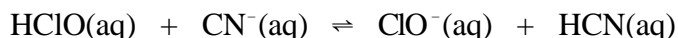
Note that hydrazine ( $\text{N}_2\text{H}_4$ ) can also serve as **conjugate acid** which donates a proton  $\text{H}^+$  (*or*  $\text{H}_3\text{O}^+$ ) to form the **conjugate base** ( $\text{N}_2\text{H}_3^-$ , *more negative*).



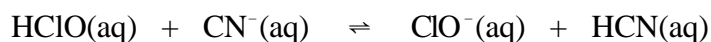
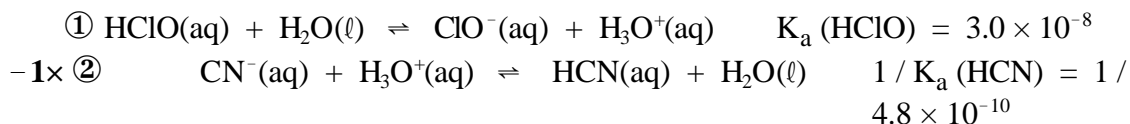
**PART A**  
**MC #7**



To find:  $K_c$  for the reaction:



Rearrange the above two equations as follows:



$$K_c = K_a(\text{HClO}) \times \frac{1}{K_a(\text{HCN})}$$

$$K_c = (3.0 \times 10^{-8}) \left( \frac{1}{4.8 \times 10^{-10}} \right) = 6.25 \times 10^1$$

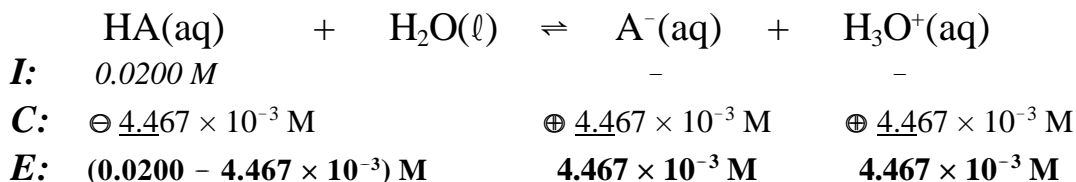
**PART A**  
**MC #8**

Given: ① 0.0200 M chloroacetic acid (a *weak acid*, HA)

② pH = 2.35

$$\therefore [\text{H}^+] = 10^{-\text{pH}} = 10^{-2.35} = 4.467 \times 10^{-3} \text{ M} \\ = [\text{A}^-]$$

To find:  $K_a$  of chloroacetic acid



$$K_c = \frac{[\text{A}^-][\text{H}_3\text{O}^+]}{[\text{HA}]} = K_a(\text{HA})$$

$$K_a(\text{HA}) = \frac{(4.467 \times 10^{-3} \text{ M})(4.467 \times 10^{-3} \text{ M})}{(0.0200 - 4.467 \times 10^{-3}) \text{ M}} = 1.287 \times 10^{-3} \text{ M} = 1.3 \times 10^{-3} \text{ M}$$

**PART A**  
**MC #9**

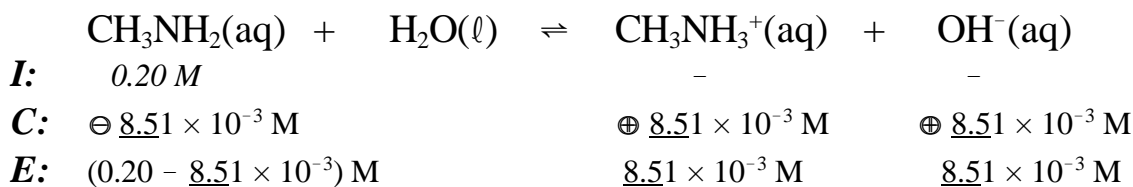
Given: ① [CH<sub>3</sub>NH<sub>2</sub>(aq)] = 0.20 M

② pH = 11.93

$$\text{pOH} = 14.00 - 11.93 = 2.07$$

$$\therefore [\text{OH}^-] = 10^{-\text{pOH}} = 10^{-2.07} = 8.51 \times 10^{-3} \text{ M}$$

To find:  $K_b$  (CH<sub>3</sub>NH<sub>2</sub>)



$$K_b(\text{CH}_3\text{NH}_2) = \frac{[\text{CH}_3\text{NH}_3^+][\text{OH}^-]}{[\text{CH}_3\text{NH}_2]}$$

$$= \frac{(8.51 \times 10^{-3})(8.51 \times 10^{-3})}{(0.20 - 8.51 \times 10^{-3})} = 3.8 \times 10^{-4}$$