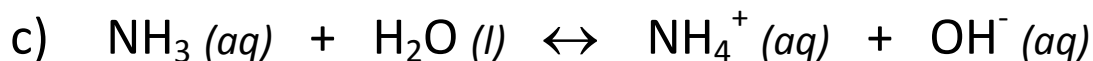
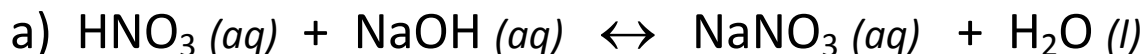


Name: _____

1. Show an equilibrium expression for hydrochloric acid (HCl) and hydronium ion in aqueous solution.

2. Label the acid/base and conjugate acid/base below.



3. Use $K_w = 1.0 \times 10^{-14}$ to determine $[\text{H}^+]$ in water for:

a) $[\text{OH}^-] = 1 \times 10^{-14} \text{ M}$

b) $[\text{OH}^-] = 1 \times 10^{-2} \text{ M}$

c) $[\text{OH}^-] = 5 \times 10^{-6} \text{ M}$

d) $[\text{OH}^-] = 8 \times 10^{-6} \text{ M}$

e) $[\text{OH}^-] = 1 \times 10^{-7} \text{ M}$

Name: _____

4. Find the pH for:

a) $[H^+] = 1 \times 10^{-1} \text{ M}$

b) $[H^+] = 1 \times 10^{-6} \text{ M}$

c) $[H^+] = 1 \times 10^{-7} \text{ M}$

d) $[H^+] = 1 \times 10^{-8} \text{ M}$

e) $[H^+] = 1 \times 10^{-14} \text{ M}$

f) $[H^+] = 4.5 \times 10^{-9} \text{ M}$

g) $[H^+] = 4.0 \times 10^{-9} \text{ M}$

h) $[H^+] = 3.5 \times 10^{-9} \text{ M}$

5. Find the acid concentration $[H^+]$ for:

a) $\text{pH} = 1$

b) $\text{pH} = 6$

c) $\text{pH} = 8.0$

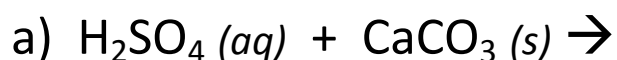
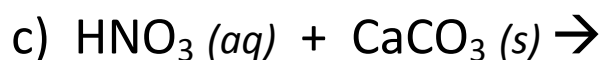
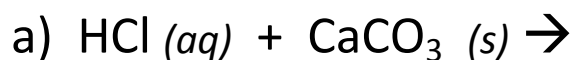
b) $\text{pH} = 6.63$

Name: _____

6. Use the Henderson-Hasselbalch equation to predict the pH of a buffer solution with 0.200 M HF and 0.240 M NaF. The pK_a for HF is 3.46.

pH = 3.54

7. Complete and balance the following gas evolution reactions



Name: _____

8. A 25.00 mL sample of HNO_3 of unknown concentration is titrated to an endpoint using 18.3 mL of 0.115 M NaOH. Find the acid molarity.

9. A 25.00 mL sample of HCl of unknown concentration is titrated to an endpoint using 11.7 mL of 0.088 M KOH. Find the acid molarity.

10. A 5.00 mL sample of NaOH of unknown concentration is titrated to an endpoint using 24.1 mL of 0.155 M HCl. Find the base molarity.

Name: _____

11. A 25.00 mL sample of H_2SO_4 of unknown concentration is titrated to an endpoint using 11.7 mL of 0.088 M NaOH. Find the acid molarity.

12. A 5.00 mL sample of $\text{Mg}(\text{OH})_2$ of unknown concentration is titrated to an endpoint using 28.8 mL of 0.0055 M HNO_3 . Find the acid molarity.