## Conjugate Pairs Worksheet

1 Complete the equation for each of the following reactions with water. Indicate the acid (A), base (B), conjugate acid (CA), and conjugate base (CB).

a. HI (aq.) + 
$$H_2O$$
 (l)  $\Longrightarrow$ 

b. HF (aq.) + 
$$H_2O$$
 (l)  $\Longrightarrow$ 

c. 
$$C_2H_3O_2^-$$
 (aq.) +  $H_2O$  (l)  $\Longrightarrow$ 

d. 
$$CO_3^{2-}$$
 (aq.) +  $H_2O$  (l)  $\rightleftharpoons$ 

- 2 Write an equation that shows the reaction of ammonia, NH<sub>3</sub>, with hydrobromic acid, HBr. Label the acid, the base, the conjugate acid, and the conjugate base.
- 3 Write an equation that shows the reaction of the phosphate ion,  $PO_4^{3-}$ , with the hydronium ion,  $H_3O^+$ . Label the acid, the base, the conjugate acid, and the conjugate base.
- Write an equation that shows the reaction of the hydrogen sulfide ion, HS<sup>-</sup>, with the hydroxide ion, OH<sup>-</sup>. Label the acid, the base, the conjugate acid, and the conjugate base.
- [5] Write the formulas for the conjugate bases formed by the following acids.

## Conjugate Pairs Worksheet

## **Answers**

1 Complete the equation for each of the following reactions with water. Indicate the acid (A), base (B), conjugate acid (CA), and conjugate base (CB).

a. HI (aq.) + 
$$H_2O$$
 (I)  $\rightleftharpoons$   $H_3O^+$  (aq.) +  $I^-$  (aq.)

B CA

b. HF (aq.) +  $H_2O(l) \rightleftharpoons H_3O^+$  (aq.) +  $F^-$  (aq.)

В CA CB

c.  $C_2H_3O_2^{-1}$  (aq.) +  $H_2O$  (l)  $\rightleftharpoons$   $HC_2H_3O_2$ (aq.) +  $OH^{-1}$  (aq.)

CA В CB

d.  $CO_3^{2-}$  (aq.) +  $H_2O$  (l)  $\rightleftharpoons$   $HCO_3^{-}$  (aq.) +  $OH^{-}$  (aq.)

A CA

Write an equation that shows the reaction of ammonia, NH<sub>3</sub>, with hydrobromic acid, HBr. Label the acid, the base, the conjugate acid, and the conjugate base.

 $NH_3 + HBr \longrightarrow NH_2^+ + Br^-$ 

Acid Conjugate Conjugate Base Acid Base

Write an equation that shows the reaction of the phosphate ion, PO<sub>4</sub>3-, with the hydronium ion, H<sub>3</sub>O<sup>+</sup>. Label the acid, the base, the conjugate acid, and the conjugate base.

 $PO_{\Delta}^{3-} + H_{3}O^{+} \longrightarrow HPO_{\Delta}^{2-} + H_{2}O$ 

Conjugate Conjugate Base Acid Acid Base

4 Write an equation that shows the reaction of the hydrogen sulfide ion, HS-, with the hydroxide ion, OH<sup>-</sup>. Label the acid, the base, the conjugate acid, and the conjugate base.

HS⁻ + OH⁻ <u></u>  $H_{2}O$ S-

Acid Base Conjugate Conjugate Acid Base

Write the formulas for the conjugate bases formed by the following acids. 5

**a.**  $H_2PO_4^ HPO_4$ b. HCN CN-

OHc. H<sub>2</sub>0 d. HOOCCOOH HOOCCOO