

## EXERCISES

Write the molecular, total ionic and net ionic equations for the following word equations, where possible:

1. acetic acid + calcium hydroxide  $\rightarrow$  calcium acetate + water

a) molecular eq'n

b) total ionic eq'n

c) net ionic eq'n

2. sulphuric acid + barium nitrate  $\rightarrow$  barium sulphate + nitric acid

a) molecular eq'n

b) total ionic eq'n

c) net ionic eq'n

3. zinc + copper (II) chloride  $\rightarrow$  copper + zinc chloride

a) molecular eq'n

b) total ionic eq'n

c) net ionic eq'n

**4.** sulfuric acid + barium hydroxide  $\rightarrow$  barium sulfate + water

a) molecular eq'n

b) total ionic eq'n

c) net ionic eq'n

**5.** sodium carbonate + potassium nitrate  $\rightarrow$  potassium carbonate + sodium nitrate

a) molecular eq'n

b) total ionic eq'n

c) net ionic eq'n

**6.** sodium carbonate + hydrochloric acid  $\rightarrow$  sodium chloride + water + carbon dioxide

a) molecular eq'n

b) total ionic eq'n

c) net ionic eq'n

## SOLUTIONS

- (a)  $2 \text{HC}_2\text{H}_3\text{O}_2 (\text{l}) + \text{Ca}(\text{OH})_2 (\text{aq}) \rightarrow \text{Ca}(\text{C}_2\text{H}_3\text{O}_2)_2 (\text{aq}) + 2 \text{H}_2\text{O} (\text{l})$   
(b)  $2 \text{HC}_2\text{H}_3\text{O}_2 (\text{l}) + \text{Ca}^{2+}(\text{aq}) + 2 \text{OH}^{-}(\text{aq}) \rightarrow \text{Ca}^{2+}(\text{aq}) + 2 \text{C}_2\text{H}_3\text{O}_2^{-}(\text{aq}) + 2 \text{H}_2\text{O} (\text{l})$   
(c)  $\text{HC}_2\text{H}_3\text{O}_2 (\text{l}) + \text{OH}^{-}(\text{aq}) \rightarrow \text{C}_2\text{H}_3\text{O}_2^{-}(\text{aq}) + \text{H}_2\text{O} (\text{l})$
- (a)  $\text{H}_2\text{SO}_4 (\text{aq}) + \text{Ba}(\text{NO}_3)_2 (\text{aq}) \rightarrow \text{BaSO}_4 (\text{s}) + 2 \text{HNO}_3 (\text{aq})$   
(b)  $2 \text{H}^{+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) + \text{Ba}^{2+}(\text{aq}) + 2 \text{NO}_3^{-}(\text{aq}) \rightarrow \text{BaSO}_4 (\text{s}) + 2 \text{H}^{+}(\text{aq}) + 2 \text{NO}_3^{-}(\text{aq})$   
(c)  $\text{SO}_4^{2-}(\text{aq}) + \text{Ba}^{2+}(\text{aq}) \rightarrow \text{BaSO}_4 (\text{s})$
- (a)  $\text{Zn} (\text{s}) + \text{CuCl}_2 (\text{aq}) \rightarrow \text{Cu} (\text{s}) + \text{ZnCl}_2 (\text{aq})$   
(b)  $\text{Zn} (\text{s}) + \text{Cu}^{2+}(\text{aq}) + 2 \text{Cl}^{-} (\text{aq}) \rightarrow \text{Cu} (\text{s}) + \text{Zn}^{2+}(\text{aq}) + 2 \text{Cl}^{-}(\text{aq})$   
(c)  $\text{Zn} (\text{s}) + \text{Cu}^{2+}(\text{aq}) \rightarrow \text{Cu} (\text{s}) + \text{Zn}^{2+}(\text{aq})$
- (a)  $\text{H}_2\text{SO}_4 (\text{aq}) + \text{Ba}(\text{OH})_2 (\text{aq}) \rightarrow \text{BaSO}_4 (\text{s}) + 2 \text{H}_2\text{O} (\text{l})$   
(b)  $2 \text{H}^{+}(\text{aq}) + \text{SO}_4^{2-}(\text{aq}) + \text{Ba}^{2+}(\text{aq}) + 2 \text{OH}^{-}(\text{aq}) \rightarrow \text{BaSO}_4 (\text{s}) + 2 \text{H}_2\text{O} (\text{l})$   
(c) *same as (b), since there are no spectator ions*
- No reaction since all products remain aqueous
- (a)  $\text{Na}_2\text{CO}_3 (\text{aq}) + 2 \text{HCl}(\text{aq}) \rightarrow 2 \text{NaCl}(\text{aq}) + \text{H}_2\text{O}(\text{l}) + \text{CO}_2 (\text{g})$   
(b)  $2\text{Na}^{+}(\text{aq}) + \text{CO}_3^{2-}(\text{aq}) + 2\text{H}^{+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq}) \rightarrow 2\text{Na}^{+}(\text{aq}) + 2\text{Cl}^{-}(\text{aq}) + \text{H}_2\text{O} (\text{l}) + \text{CO}_2 (\text{g})$   
(c)  $\text{CO}_3^{2-}(\text{aq}) + 2 \text{H}^{+}(\text{aq}) \rightarrow \text{H}_2\text{O} (\text{l}) + \text{CO}_2 (\text{g})$