Name : _____ Date : _____

Solutions of Acids and Bases

1. Write the chemical equation showing how each of the following dissolves in water.

   $HNO_3 \longrightarrow$

   $Mg(OH)_2 \longrightarrow$

   $H_3PO_4 \longrightarrow$

   $H_2S \longrightarrow$

2. For each reaction type, complete the equations and balance them.

   a. Making acids from nonmetal oxide

   General form: nonmetal oxide + water $\longrightarrow$ acid

   $SO_3 + H_2O \longrightarrow$

   $CO_3 + H_2O \longrightarrow$

   b. Making bases from metal oxide

   General form: Metal oxide + water $\longrightarrow$ base

   $Li_2O + H_2O \longrightarrow$

   $MgO + H_2O \longrightarrow$

3. Write the balanced equation for the titration between sulfurous acid and potassium hydroxide.

4. Write the balanced net ionic equation for the titration between sulfurous acid and potassium hydroxide.

5. Write an equation for the reaction of potassium metal with hydrochloric acid.

6. Acids can be labelled as monoprotic, diprotic, or triprotic. Labeled the following as monoprotic, diprotic, or triprotic

   H_2SO_4 _____ H_3PO_4 _____

   HNO_3 _____ HBr _____

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Solutions of Acids and Bases

Answers

① Write the chemical equation showing how each of the following dissolves in water.

$HNO_3 \longrightarrow H^+ + NO_3^-$

$Mg(OH)_2 \longrightarrow Mg^{2+} + 2\ OH^-$

$H_3PO_4 \longrightarrow 3\ H^+ + PO_4^{3-}$

$H_2S \longrightarrow 2\ H^+ + S^{2-}$

② For each reaction type, complete the equations and balance them.

a. Making acids from nonmetal oxide

General form: nonmetal oxide + water ⟶ acid

$SO_3 + H_2O \longrightarrow H_2SO_4$

$CO_3 + 2\,H_2O \longrightarrow H_2CO_3 + 2\ OH^-$

b. Making bases from metal oxide

General form: Metal oxide + water ⟶ base

$Li_2O + H_2O \longrightarrow 2\ LiOH$

$MgO + H_2O \longrightarrow Mg(OH)_2$

③ Write the balanced equation for the titration between sulfurous acid and potassium hydroxide.

$H_2SO_3 + 2\ KOH \longrightarrow 2\ H_2O + K_2SO_3$

④ Write the balanced net ionic equation for the titration between sulfurous acid and potassium hydroxide.

$H_2SO_3 + 2\ OH^- \longrightarrow 2\ H_2O + SO_3^{2-}$

⑤ Write an equation for the reaction of potassium metal with hydrochloric acid.

$2\ K + 2\ HCl \longrightarrow 2\ KCl + H_2$

⑥ Acids can be labelled as monoprotic, diprotic, or triprotic. Labeled the following as monoprotic, diprotic, or triprotic

H_2SO_4 Diprotic H_3PO_4 Triprotic

HNO_3 Monoprotic HBr Monoprotic