Name:

Chapter 5 Review Quiz

Multiple Choice

Identify the choice that best completes the statement or answers the question.

1. A metal reacts spontaneously with hydrochloric acid. What are the general products of the reaction?
   a. salt, carbon dioxide, water
   b. carbon dioxide, water
   c. salt, water
   d. salt, hydrogen gas

2. Which of the following is NOT an acid?
   a. HF
   b. NH_3
   c. CH_3COOH
   d. H_2SO_4

3. Which of the following is NOT a property of bases?
   a. soapy feel in aqueous solution
   b. conduct electricity in solution
   c. sour taste
   d. turn red litmus blue

4. Which of the following represents the correct ionic equation for zinc + sulfuric acid?
   a. $Zn(s) + H_2SO_4 \rightarrow ZnSO_4 + 2H^+$
   b. $Zn(s) + 2H^+ + SO_4^{2-} \rightarrow ZnSO_4 + H_2(g)$
   c. $Zn(s) + 2H^+ + SO_4^{2-} \rightarrow Zn^{2+} + SO_4^{2-} + H_2(g)$
   d. $Zn(s) \rightarrow Zn^{2+} + 2e^-$

5. A base can produce:
   a. hydrogen ions in solution.
   b. hydronium ions in solution.
   c. hydroxide ions in solution.
   d. oxide ions in solution.

6. A student has spilt some clear colourless acid on the floor. Which of the following would not neutralise the acid?
   a. adding water
   b. adding a base
   c. adding solid sodium carbonate
   d. adding an alkali

7. When hydrochloric acid is reacted with magnesium oxide it forms the same products as when HCl reacts with magnesium hydroxide. What can you conclude?
   a. HCl is so reactive that it produces the same products with a range of substances.
   b. Magnesium oxide is soluble.
   c. Magnesium oxide and magnesium hydroxide are the same substance.
   d. Magnesium oxide is a basic oxide.

8. A substance that can act as an acid or a base is known as:
   a. amphoteric.
   b. amphiprotic.
   c. an oxide.

d. none of the above.

▼ 9. Neutralisation is the name given to a reaction between:
a. an acid and metal.
b. an acid and base.
c. an acid and water.
d. a base and water.

▼ 10. Which of the following gives all the products of a reaction between an acid and a carbonate?
a. a salt and hydrogen
b. a salt and water and hydrogen.
c. a salt and carbon dioxide
d. a salt and water and carbon dioxide

▼ 11. For the reaction $HNO_3(aq) + KOH(aq) \rightarrow KNO_3(aq) + H_2O(l)$ $\Delta H = 56$ kJ mol^{-1}
If 20 mL of 0.15 mol L^{-1} HNO_3 solution reacts with 10 mL of 0.25 mol L^{-1} KOH solution in a thermally insulted container, how much heat energy is produced?
a. 0.028 kJ
b. 0.14 kJ
c. 0.224 kJ
d. 0.56 kJ

▼ 12. 200 mL of 2 mol L^{-1} HCl solution is mixed with 200 mL of 2 mol L^{-1} NaOH solution in a thermally insulated container. If the initial temperature of the solutions is 20°C and the amount of energy released in the reaction is 21 kJ, what is the final temperature of the solution?
a. 21°C
b. 33°C
c. 45°C
d. 66°C

▼ 13. Which of the following processes does NOT involve the application of a neutralisation reaction?
a. using an antacid to relieve indigestion
b. cleaning up an acid spill
c. using tea leaves to produce blue hydrangea flowers
d. adding quicklime to mine wastewater

▼ 14. The first scientist to propose that hydrogen was the key component that gave an acid its properties was:
a. Lavoisier.
b. Davy.
c. Arrhenius.
d. Lewis.

▼ 15. A Brønsted–Lowry base:
a. accepts a proton.
b. includes more bases than previous definitions.
c. accepts hydrogen ions.
d. all of the above.

▼ 16. What is a product of reacting hydrochloric acid and ammonia gas?
a. hydrogen gas
b. ammonia chloride
c. ammonium chloride
d. water

▼ 17. Which of the following reactions is not correct?
a. $NaOH(aq) + NH_4Cl(aq) \rightarrow NaCl(aq) + NH_4OH(aq)$
b. $HCl(aq) + MgO(s) \rightarrow MgCl_2(aq) + H_2O(l)$
c.

$NH_3(aq) + H_2O(l) \rightarrow NH_4^+(aq) + OH^-(aq)$

d. $H_2SO_4(aq) + 2NaHCO_3(aq) \rightarrow Na_2SO_4(aq) + 2CO_2(g) + 2H_2O(l)$

▼ 18. Which of the following statements regarding Brønsted–Lowry theory of acids and bases is incorrect?

a. An acid is a proton donor.
b. A base is a proton acceptor.
c. Substances cannot be defined as acid or base if no hydrogen is present.
d. The type of solvent is unimportant.

▼ 19. The Lewis definition of an acid and base is broader than the Brønsted–Lowry definition because:

a. it does not require a proton.
b. it does not require a solvent.
c. it considers electron pair acceptance and donation.
d. all of the above.

▼ 20. Water is amphiprotic because it can:

a. produce both H^+ and OH^- ions.
b. accept or donate a H^+.
c. dissolve both acids and bases.
d. it can form H_3O^+.

Check Your Work Start Over