Chapter 5 Practice Test **Name:** **Date:**

True/False

____ 1. The addition of HCl to a sample of pure water will cause the H^+ concentration to increase and the pH to increase.

____ 2. A solution of sodium hydroxide will cause methyl orange to turn yellow, methyl red to turn yellow, and litmus to turn blue, and it will have a pH above that of pure water.

____ 3. When the pH of a solution changes from 8 to 11, the hydroxide ion concentration has increased by one hundred times.

____ 4. Aqueous solutions containing HCl, H_2SO_4, and CH_3COOH will each have a pH value higher than that of pure water.

____ 5. A pH meter is placed in each of three separate samples of pure water. NO_2 gas is then added to the first test tube, CO_2 gas is added to the second, and SO_2 gas is added to the third. The reading on each of the meters will increase.

____ 6. Aqueous solutions of MgO and CaO will have pH values higher than that of pure water, and aqueous solutions of NO_2 and SO_2 will have pH values lower than that of pure water.

Multiple Choice - *Identify the choice that best completes the statement or answers the question.*

7. A student tests some household vinegar (a solution of acetic acid) using several different indicators. Which of the following represents the results expected for the indicators listed?

	Phenolphthalein	Bromothymol Blue	Litmus	Methyl Red	Indigo Carmine
a.	pink	blue	red	yellow	blue
b.	colourless	blue	blue	red	yellow
c.	colourless	yellow	red	red	blue
d.	pink	yellow	blue	yellow	yellow

8. Which of the following data would correctly apply to a concentrated solution of hydrochloric acid?

	pH Value	H^+ Concentration	OH^- Concentration	Methyl Orange Colour
a.	low	high	low	red
b.	low	low	high	red
c.	high	low	high	yellow
d.	high	high	low	yellow

9. A student records the pH values of two different solutions and finds them to be three pH units apart. Which of the following sets of data is reasonable?

	pH Value of Solution A	pH Value of Solution B	H^+ ion Concentration in Solution A
a.	2	5	three times higher than solution B
b.	5	2	1000 times higher than solution B
c.	5	2	three times higher than solution B
d.	2	5	1000 times higher than solution B

10. Which of the following properties would not apply to a solution of sulfuric acid?
    a. conducts electricity
    b. has a low pH
    c. reacts with metals
    d. has a high OH^- concentration

11. Which of the following sets of indicator and pH data matches the aqueous solution listed?

	Aqueous Solution pH Value	Litmus Colour	Methyl Orange Colour	Approximate pH Value
a.	H_2SO_4	blue	yellow	12
b.	NaOH	red	yellow	2
c.	H_2SO_4	red	red	2
d.	NaOH	blue	red	12

12. Which of the following is the correct formula for chloric acid?
    a. $HClO_4$
    b. $HClO_3$
    c. $HClO_2$
    d. HClO

13. Which of the following acids has the chemical formula containing the most number of atoms?
    a. acetic acid
    b. hydrochloric acid
    c. nitrous acid
    d. chloric acid

14. Which of the following acids does not contain oxygen?
    a. sulfurous acid
    b. acetic acid
    c. hydrobromic acid
    d. perchloric acid

15. Which of the following correctly classifies each formula as an acid, a base, or a salt?

	Acid	Base	Salt
a.	$Sr(OH)_2$	$(NH_4)_3PO_4$	H_2CrO_4
b.	$(NH_4)_3PO_4$	$Sr(OH)_2$	H_2CrO_4
c.	$Sr(OH)_2$	$Sr(OH)_2$	$(NH_4)_3PO_4$
d.	H_2CrO_4	$Sr(OH)_2$	$(NH_4)_3PO_4$

16. Which compounds below could represent the reactants in a neutralization reaction?

I.	NaOH
II.	H_3PO_4
III.	$NaNO_3$
IV.	H_2O

    a. I. and II.
    b. I. and III.
    c. II. and III.
    d. III. and IV.

17. Which of the following represents the ionic compound formed during a neutralization reaction?
    a. acid
    b. base
    c. salt
    d. water

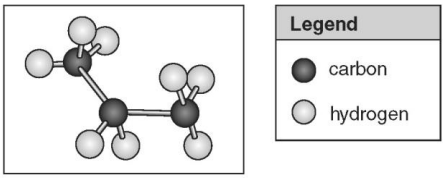
18. When sulfuric acid and strontium hydroxide react, the ionic compound produced is:
    a. Sr_3N_2
    b. H_2O
    c. H_2S
    d. $SrSO_4$

19. The reactants in the formation of acid precipitation will not include which of the following?

I.	H_2O
II.	CaO
III.	NO_2
IV.	SO_2

    a. I. and II. only
    b. II. only
    c. III. and IV. only
    d. I., II., III., and IV.

20. Which formula is represented by the following illustration?



a. C_4H_8
b. CH_3CH_3
c. C_3H_8
d. $CH_3CH_2CH_2CH_3$

21. Consider the balanced equation below representing the combustion of methane, the main component of natural gas.

$CH_4 + 2\ O_2 \rightarrow CO_2 + H_2O$

Of the four different species present in the equation, how many are organic and how many are inorganic?

a. one organic, three inorganic
b. two organic, two inorganic
c. three organic, one inorganic
d. four inorganic, zero organic

22. The two most common elements contained in organic compounds are:

I.	nitrogen
II.	hydrogen
III.	oxygen
IV.	carbon

a. I. and II.
b. I. and III.
c. II. and III.
d. II. and IV.

23. Which of the following are organic compounds?

I.	acetic acid
II.	sodium carbonate
III.	methyl alcohol
IV.	hydrochloric acid

a. I. and II. only
b. II., III., and IV. only
c. I. and III. only
d. I., II., and III. only

24. Which of the following are bonding properties of the element carbon?

I.	the ability to form chains
II.	the ability to form rings
III.	the ability to form multiple bonds
IV.	the ability to use all valence electrons for bonding

a. I. and II. only
b. II. and III. only
c. I., II., and III. only
d. I., II., III., and IV.

25. Which of the following is an organic compound?

a. sulfuric acid
b. methane
c. calcium carbonate
d. sodium oxalate

26. Which of the following is an inorganic compound?

a. CH_3COOH
b. CH_3OH
c. CH_4
d. $CaCO_3$

Matching

Match the formulas of the products with the appropriate pairs of reactants that would react to produce the products. Each set of formulas may be used only once.

a. $MgCl_2(aq) + H_2O(l)$
b. $MgCl_2(aq) + H_2(g)$
c. $MgCl_2(aq) + CO_2(g) + H_2O(l)$

____ 27. hydrochloric acid + magnesium metal → ?

____ 28. hydrochloric acid + magnesium carbonate → ?

____ 29. hydrochloric acid + magnesium hydroxide → ?

Short Answer

Complete the following reactions. 1 mark for writing the skeleton equation, 1 mark for balancing.

30. $HBr + NaOH \rightarrow$

31. $HCl + KOH \rightarrow$

32. $HCl + Mg(OH)_2 \rightarrow$

33. $H_2SO_4 + Al(OH)_3 \rightarrow$

34. $CH_3COOH + Ca(OH)_2 \rightarrow$

35. $HCl + Na \rightarrow$

36. $HCl + Mg \rightarrow$

37. $HBr + Al \rightarrow$

38. $H_2SO_4 + Al \rightarrow$