

Name \_\_\_\_\_

Part 1. Multiple Choice (26).

Record your answers on the Scantron™ answer sheet. ONLY the Scantron™ answer sheet will be graded.

- Which one of the following is a chemical change?
  - Water melts at 0°C
  - Sodium is cut with a knife
  - Hydrogen burns with oxygen to produce water
  - Table salt dissolves in water
- The separation of compounds by thin layer chromatography is based on differences in the compounds' :
  - boiling point
  - water solubility
  - color
  - polarity
- Nitrogen and oxygen combine to form NO and NO<sub>2</sub>. This is an example of the
  - Law of Constant Composition
  - Law of Multiple Proportions
  - Law of Conservation of Mass
  - law of Conservation of Energy
- Which one of the following is heterogeneous?
  - a tossed salad
  - copper wire
  - grape juice
  - a sugar solution
- According to the Kinetic Molecular Theory, as the temperature of a compound increases:
  - it's melting point increases
  - it's molecular motion increases
  - it freezes
  - it's boiling point increases
- Which one of the following elements exists as a diatomic molecule?
  - argon
  - sulfur
  - potassium
  - chlorine
- Convert 45 °C to °F.
  - 45 °F
  - 57 °F
  - 113 °F
  - 139 °F
- Convert 3.5 in<sup>3</sup> to cm<sup>3</sup>.
  - 107 cm<sup>3</sup>
  - 57 cm<sup>3</sup>
  - 35 cm<sup>3</sup>
  - 8.9 cm<sup>3</sup>

9. The number of significant figures in the answer to the calculation  $(8.16 - 7.8) \div 1.256 \times 10^{-3}$  is  
 a) 1                      b) 2                      c) 3                      d) 4
10. Which one of the following is an isotope of  $^{40}\text{Ar}$   
 a)  $^{40}\text{K}$                       b)  $^{40}_{22}\text{Ti}$                       c)  $^{41}_{19}\text{X}$                       d)  $^{39}_{18}\text{X}$
11. Which set of elements are most likely to have similar chemical and physical properties?  
 a) Na, K, Rb                      b) C, Co, Cu                      c) Li, Be, B                      d) B, Si, C
12. Which pair are constitutional isomers?  
 a)  $\text{C}_3\text{H}_7\text{OH}$  and  $\text{CH}_3\text{OCH}_2\text{CH}_3$                       b)  $\text{C}_3\text{H}_8$  and  $\text{CH}_3\text{CH}_2\text{CH}_3$   
 c)  $\text{CH}_2\text{O}$  and  $\text{C}_6\text{H}_{12}\text{O}_6$                       d)  $\text{C}_6\text{H}_5\text{OH}$  and  $\text{C}_6\text{H}_4(\text{OH})_2$
13. Which one of the following is not a typical property of an ionic compound?  
 a) has a high melting point  
 b) consists of anions and cations in a crystal lattice  
 c) conducts electricity as a solid  
 d) is a solid at room temperature

Part 2. Fill in the blank lines.

- 14(3) Carry out the following conversions:  
 a)  $2.75 \text{ g} = \underline{\hspace{2cm}} \text{ mg}$                       b)  $338 \text{ mL} = \underline{\hspace{2cm}} \text{ L}$   
 c)  $85 \text{ mm} = \underline{\hspace{2cm}} \text{ cm}$
- 15(3) How many significant figures do each of the following measured values have?  
 a)  $13.70 \text{ cm}$                        
 b)  $0.068 \text{ g}$                        
 c)  $9.050 \text{ mL}$
- 16(6) The atom  $^{35}_{17}\text{X}$  has        protons,        neutrons, and        electrons. It's mass number is        and it's atomic number is       . The name of the element is                                     . (Do NOT give the symbol).
- 17(2) How many moles are present in  $25.0 \text{ g Cl}_2$ ?
- 18(2) How many grams are in  $1.8 \times 10^{-3}$  moles of nickel?
- 19(2) Of the elements Ag, Ar, K,  $\text{N}_2$ , and Pb, which is most reactive?        Which is least reactive?
- 20(2) Of the elements Al, F, O, Rb, and S, the most metallic is                     , the least metallic is                     .

21(3) Classify each of the following as either metal, metalloid, or nonmetal.

- a) Ca \_\_\_\_\_                      b) F \_\_\_\_\_  
c) Si \_\_\_\_\_

22(7) Give the symbol for an element of each of the following types.

- a) alkali metal \_\_\_\_\_                      b) alkaline earth metal \_\_\_\_\_  
c) halogen \_\_\_\_\_                      d) inert gas \_\_\_\_\_  
e) transition metal \_\_\_\_\_                      f) third period nonmetal \_\_\_\_\_  
g) main group metal \_\_\_\_\_

23(4) Write the condensed formulas and the structural formulas for the isomers of butane.

24(4) Name the following:

- a)  $\text{CaCl}_2 \cdot 2\text{H}_2\text{O}$  \_\_\_\_\_  
b)  $\text{Co}(\text{NO}_3)_2$  \_\_\_\_\_  
c)  $\text{P}_2\text{S}_3$  \_\_\_\_\_  
d)  $\text{HClO}_4(\text{aq})$  \_\_\_\_\_

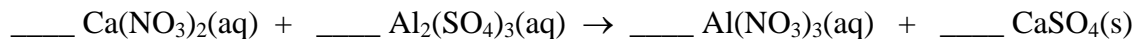
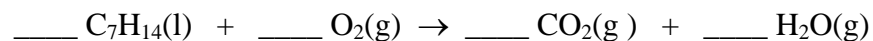
25(4) Write the formulas for the following:

- a) hexane \_\_\_\_\_  
b) hydrosulfuric acid \_\_\_\_\_  
c) sodium cyanide \_\_\_\_\_  
d) nitric acid \_\_\_\_\_

26(4) Classify each of the following as ionic or molecular.

- a)  $\text{CaCl}_2$  \_\_\_\_\_                      b)  $(\text{NH}_4)_3\text{PO}_4$  \_\_\_\_\_  
c)  $\text{P}_2\text{S}_3$  \_\_\_\_\_                      d)  $\text{C}_5\text{H}_{12}$  \_\_\_\_\_

27(4) Balance the following equation.



Part 3. Calculations. . Round atomic weights to the second decimal place. Show all your work for all problems.

28(6) a) Calculate the molar mass of  $\text{C}_4\text{H}_8\text{Cl}_2\text{O}$

b) Calculate the number of moles in 5.0 g  $\text{C}_4\text{H}_8\text{Cl}_2\text{O}$ .

c) Calculate the number of grams in 0.4355 moles of  $\text{C}_4\text{H}_8\text{Cl}_2\text{O}$ .

29(6) A compound is found to be composed of 40.0% carbon, 6.66% hydrogen, and the remainder oxygen. It has a molar mass of about 180.g. Determine its empirical formula and its molecular formula.

Empirical Formula = \_\_\_\_\_

Molecular Formula = \_\_\_\_\_

