

CH 121

General Chemistry

Exam 1

June 3, 2003

KEY

Name: _____
(please print)

SSN: * * * - * * - _____
(last 4 digits)

Each question is worth 1 point.

Circle your answer clearly, otherwise no credit will be given.

Circle only one answer. If you circle two or more, you will receive no credit.

1. In the gaseous state, particles
 - a. move independently and randomly.
2. The number, three hundred and fifty thousand, written in scientific notation is best written as
 - c. 3.5×10^5
3. Evaluate the expression $(8.346 + 2.854)(1.2750) =$
 - e. 1.4280×10^1
4. An iron "shotput" which is used in track meets has a mass of 16.00 lbs. (7260 g). If the density of iron is 7.87 g/cm^3 , what is the radius of the iron ball? (The volume of a sphere is $\frac{4}{3} \pi r^3$)
 - b. 6.04 cm
5. A transition metal, a halogen, and a metalloid in that order are
 - c. Cr, Cl, As
6. About 1910 Rutherford and colleagues performed experiments by targeting a stream of alpha particles at a piece of gold foil and recording the deflection of the particles on a sensitive screen. Which of the following statement(s) were conclusion(s) that were drawn from those experiments?
 1. Most of the volume of the atom is empty space.
 2. The nucleus of an atom is extremely dense.
 3. Electrons are negatively charged.
 - c. 1 and 2 only
7. Which of the following elements is a non-metal?
 - e. Cl
8. The chemical properties of germanium would be most similar to
 - c. Si.
9. In 0.250 moles of ethylene glycol (antifreeze), $\text{HOCH}_2\text{CH}_2\text{OH}$, there are
 - c. 1.51×10^{24} atoms.

10. How many moles are in 8.50 mL of liquid bromine if the density of bromine is 3.12 g/mL?

b. 0.166 mol

11. Which of the following compounds will form a solution with water that is a good conductor of electricity?

c. NaCl

12. Which of the following series represents only known stable nonmetal ions?

e. S^{2-} , P^{3-} , F^{-}

13. Boron forms an extensive series of hydrides. If a hydride is isolated that is 81.1% B, a possible molecular formula of the compound is

c. B_4H_{10}

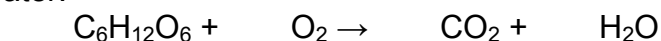
14. A 3.26 g sample of an organic compound was found to contain 2.42 g carbon, 0.282 g hydrogen, and 0.563 g nitrogen. Calculate the empirical formula of the compound.

e. C_5H_7N

15. The balanced equation for the complete combustion of cyclohexane, C_6H_{12} , is

b. $C_6H_{12} + 9O_2 \rightarrow 6CO_2 + 6H_2O$

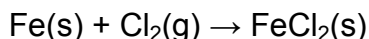
16. When glucose undergoes complete combustion, the products are carbon dioxide and water.



When the equation above is properly balanced with the smallest whole numbers, the respective coefficients are:

b. 1, 6, 6, 6

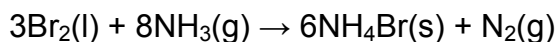
17. Many metals react with halogens to give metal halides. For example,



If you begin with 10.0 g of iron,

c. you will need 12.7 g of Cl_2 for complete reaction and will produce 22.7 g of $FeCl_2$.

18. How many grams of bromine are needed to react completely with 85.0 grams of NH_3 to produce ammonium bromide and nitrogen according to the equation below?



None of the answers is correct, every student receives credit.

19. Styrene, the building block of polystyrene, is a hydrocarbon, a compound consisting only of C and H. A given sample is burned completely and it produces 1.481 g of CO_2 and 0.303 g of H_2O . Determine the empirical formula of the compound.

a. CH

20. A compound contains by weight 41.4% carbon, 3.47% H, and 55.1% oxygen. A 0.050-mole sample of this compound weighs 8.71 g. The molecular formula of the compound is:

e. $\text{C}_6\text{H}_6\text{O}_6$

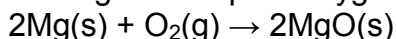
21. Which of the following is an example of a chemical change?

c. natural gas burning

22. Which of the following is **NOT** an element of the fourth period in the periodic table?

c. Mg

23. How many moles of magnesium (if any) remain when 5.00 grams of magnesium is burned in 2.50 grams of pure oxygen?



d. 0.0498 mol

24. Zinc has a density of 7.14 g/cm^3 . If you have a piece of zinc that is 0.20 cm thick, 1.5 cm wide, and 3.0 cm long, how many moles of zinc are present?

b. 0.098 mol

25. The number of neutrons in 30 molecules of As_4 where As has the mass number of 75 is

c. 5040.