

Name \_\_\_\_\_  
CHM 115 10:00 am Dr. Friedel

I. D. # \_\_\_\_\_  
September 22, 2004

### Test I-B

Place your name on this test booklet and ParSCORE Test Form. **Also you must fill in the box for form B.**

Place your I. D. number on this test booklet. Memorize the I. D. number. It will be your number on all future tests and quizzes.

This exam consists of 6 pages. Make sure you have the correct number of pages and that the pages are numbered correctly.

This exam consists of two parts. Part I consists of 20 multiple choice items which must be answered on the ParSCORE Test Form with a number 2 pencil. Make a heavy black mark filling the ellipse associated with your answer. Part I is worth 100 points. Part II consists of 5 questions which must be answered in detail in this test booklet. The points assigned for each question in Part II are indicated. Total points are 150.

### Useful Information

$$16 \text{ oz} = 1 \text{ lb} = 453.6 \text{ g} \quad 1 \text{ L} = 1.057 \text{ qts}$$

$$12 \text{ in} = 1 \text{ ft} \quad 1 \text{ m} = 1.094 \text{ yds}$$

2.

Part I

1. Which one of the following lists gives the correct symbols for the elements phosphorus, potassium, silver, chlorine and sulfur in that order?
  - A) K, Po, Ag, Cl, S
  - B) P, Po, Ag, Cl, S
  - C) Ph, K, Ag, S, Cl
  - D) P, K, Au, Cl, S
  - E) P, K, Ag, Cl, S
  
2. The nucleus of a radon atom,  ${}^{222}_{86}\text{Rn}$ , contains
  - A) 222 protons and 86 neutrons
  - B) 86 protons and 136 neutrons
  - C) 86 protons and 86 electrons
  - D) 86 protons, 136 neutrons, and 86 electrons
  - E) 86 neutrons and 86 electrons
  
3. Cathode rays
  - A) travel in straight lines.
  - B) are streams of electrons.
  - C) are composed of particles that have a very small mass.
  - D) All of the above are true about cathode rays.
  
4. The number of protons in the nucleus determines the
  - A) atomic mass
  - B) atomic number
  - C) mass number
  - D) number of neutrons
  - E) number of isotopes
  
5. Rutherford's gold foil experiment
  - A) demonstrated the existence of electrons.
  - B) showed that the "plum pudding" model of the atom is correct.
  - C) showed that the atom has a positive, massive nucleus.
  - D) proved the existence of neutrons.

3.

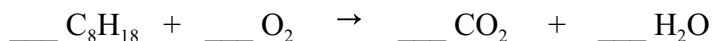
6. A proton has nearly the mass of a(n)

- A) electron                      B) neutron                      C) C-12 atom  
D) alpha particle

7. Which of the following corresponds to the largest mass?

- A) 10 dg      B) 10 pg      C) 10 mg      D) 10 cg      E) 10 ng

8. The complete combustion of octane,  $C_8H_{18}$ , yields carbon dioxide and water:



What is the coefficient of oxygen in the balanced equation?

- A) 17              B) 19              C) 23              D) 25              E) 34

9. Which element and group or classification are not matched correctly?

<u>Element</u>	<u>Group or Classification</u>
A) iron	Transition metal
B) sodium	Alkali metal
C) manganese	Alkaline earth metal
D) bromine	Halogen
E) Silicon	Metalloid

10. Which one of the following is true concerning the simplest unit of  $MgCl_2$ ?

- A) 1 Mg atom and 1  $Cl_2$  molecule  
B) 1  $MgCl_2$  molecule  
C) 1 Mg atom and 2 chlorine atoms  
D) 1 positive ion and 2 negative ions  
E) 1 positive ion and 1 negative ion

11. What is the correct answer to the following problem?

$$3.54 \times 10^{-10} + 2.68 \times 10^{-12}$$

- A)  $3.5668 \times 10^{-10}$       B)  $3.567 \times 10^{-10}$       C)  $3.57 \times 10^{-10}$       D)  $3.6 \times 10^{-10}$   
E) none of the above

4.

12. How many cubic decimeters are in one cubic meter?
- A)  $10^9$  B)  $10^6$  C)  $10^3$  D)  $10^{-6}$  E)  $10^{-9}$
13. How many quarts are in 800.0 mL?
- A) 0.7569 qts. D) 756.9 qts.  
B) 0.8000 qts. E) 0.8456 qts.  
C) 845.6 qts.
14. Liquid hydrogen boils at  $-423^\circ\text{F}$ . What is the boiling point on the Kelvin scale?
- A) 20. K B) 30. K C) 126 K D) 426 K E) 526 K
15. The recommended dose of Elixophyllin, a drug used to treat asthma, is 6.0 mg/kg of body mass. What is the dose in mg for a 170 lb person?
- A)  $2.2 \times 10^3$  mg B)  $4.6 \times 10^2$  mg C)  $1.0 \times 10^3$  mg D) 6.0 mg
16. An experiment calls for 54.3 mL of ethanol. What is this volume in cubic meters ( $\text{m}^3$ )?
- A)  $5.43 \times 10^{-6}\text{m}^3$  B)  $5.43 \times 10^5\text{m}^3$  C)  $5.43 \times 10^6\text{m}^3$   
D)  $5.43 \times 10^{-5}\text{m}^3$  E)  $5.43 \times 10^7\text{m}^3$
17. Which of the following statements is incorrect?
- A) The conversion of compounds into its elements is a chemical change.  
B) The conversion of sugar to carbon and water is a chemical change.  
C) The conversion of elements into compounds is a chemical change.  
D) The conversion of liquid water to a gas is a chemical change.  
E) The conversion of ice directly to a gas is a physical change.
18. Which of the following is the best way to show that gasoline is a mixture of substances?
- A) Measure its density  
B) Burn it  
C) Filter it  
D) Measure its temperature during boiling

5.

19. What is the best term which describes the direct change of moth crystals from a white solid to a colorless gas in a closet?
- A) melting   B) boiling   C) condensing   D) evaporating   E) subliming
20. Which of the following mixtures is most likely to be homogeneous?
- A) concrete                  B) ketchup    C) mud                  D) milk                  E) sea water

Part II

1. (8 pts) Write formulas for the following compounds
- a) sodium oxide                  \_\_\_\_\_
- b) sulfur trioxide                \_\_\_\_\_
- c) aluminum sulfate            \_\_\_\_\_
- d) copper(II) phosphate        \_\_\_\_\_
2. (8 pts) Name the following compounds
- a)  $\text{Fe}_2\text{S}_3$                           \_\_\_\_\_
- b)  $\text{N}_2\text{O}_4$                           \_\_\_\_\_
- c)  $\text{K}_2\text{CO}_3$                         \_\_\_\_\_
- d)  $(\text{NH}_4)_2\text{HPO}_4$                 \_\_\_\_\_
3. (12 pts) A copper wire (density =  $8.96 \text{ g/cm}^3$ ) has a diameter of 0.25 mm. If the sample of copper wire has a mass of 22 g, how long is the wire? (Assume the wire has the shape of a cylinder.)

6.

4. (12pts) The atomic mass of Ga is 69.723. There are only two naturally occurring isotopes of gallium, Ga-69 which has a mass of 68.9257 and Ga-71 which has a mass of 70.9249. Calculate the percent abundance of each isotope.

5. (10)Sulfur forms two chlorides. A 45.00 gram sample of one chloride decomposes to give 8.30 g of S and 36.71 g of Cl. A 45.00 gram sample of the other chloride decomposes to 5.90 g of S and 39.11 g of Cl.

A) State the Law of Multiple Proportions.

B) Show that the two sulfur compounds obey the Law of Multiple Proportions.