

Chemistry 121  
Spring 2004  
Test 1  
FORM A

Name: \_\_\_\_\_

Instructions: You have 75 minutes to complete this 100-point exam. You may use a simple scientific calculator. No programmable calculators allowed.

$$^{\circ}F = \left( \frac{9^{\circ}F}{5^{\circ}C} \right) (^{\circ}C) + 32^{\circ}F$$

$$^{\circ}C = \left( \frac{5^{\circ}C}{9^{\circ}F} \right) (^{\circ}F - 32^{\circ}F)$$

$$1 \text{ in} = 2.54 \text{ cm}$$

$$1000\text{g} = 1\text{kg}$$

$$1000 \text{ mg} = 1 \text{ g}$$

**I. MULTIPLE CHOICE:** (30 pts, 3 points each) Carefully and clearly circle the best answer.

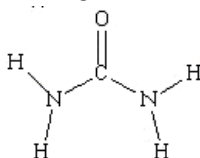
1. The correct elemental symbol for silicon is:
  - a. S
  - b. Se
  - c. Si
  - d. Sc
  
2. Which element has properties similar to arsenic, As?
  - a. Sb
  - b. Se
  - c. Ge
  - d. S
  
3. The melting point of sodium is  $98^{\circ}\text{C}$ , what is this in Kelvin?
  - a. 175 K
  - b. 371 K
  - c.  $-175 \text{ K}$
  - d.  $-371 \text{ K}$
  
4. Which of the following elements is an alkaline earth metal?
  - a. Na
  - b. F
  - c. Cr
  - d. Sr
  
5. A calcium atom has 20 neutrons. Its mass number is:
  - a. 40.08
  - b. 20
  - c. 40
  - d. 60

6. An atom of vanadium (V) loses 2 electrons. It is now called a(n)
- Anion
  - Element
  - Isotope
  - Cation

7. What ion is likely to form from selenium (Se)?
- $\text{Se}^+$
  - $\text{Se}^{2+}$
  - $\text{Se}^{-2}$
  - $\text{Se}^-$

8. What is the chemical formula of the following molecule?

- $\text{CN}_2\text{OH}_4$
- $\text{H}_2\text{NCONH}_2$
- $\text{ON}_2\text{CH}_4$
- $\text{CH}_4\text{N}_2\text{O}$



9. If sodium acetate,  $\text{NaCH}_3\text{CO}_2$ , breaks up, what ions will result?

- $\text{Na}^+$ ,  $\text{CH}_3$ ,  $\text{CO}_2$
- $\text{Na}$ ,  $\text{CH}_3\text{CO}_2$
- $\text{Na}^+$ ,  $\text{CH}_3\text{CO}_2^-$
- $\text{Na}^{2+}$ ,  $\text{CH}_3\text{CO}_2^{2-}$

10. The smallest particle of an element that retains the chemical properties of the element is a(n):
- atom
  - ion
  - solid
  - molecule

**II. Short Answer and Calculations** (80 pts): Clearly indicate your answer in the space provided. Partial credit will be given for correct work. If I cannot read the work, it will not be graded.

1. (10 pts) Name the following compounds:

- $\text{SCl}_2$  \_\_\_\_\_
- $\text{PF}_3$  \_\_\_\_\_
- $\text{CaSO}_4$  \_\_\_\_\_
- $\text{Fe}_2\text{O}_3$  \_\_\_\_\_
- $\text{NH}_4\text{NO}_3$  \_\_\_\_\_

2. (10 pts) Give the correct formula for the following compounds:

- Sulfur hexafluoride \_\_\_\_\_
- Sodium carbonate \_\_\_\_\_
- Magnesium hydroxide \_\_\_\_\_
- Chromium (II) chloride \_\_\_\_\_
- Copper (II) hydroxide hexahydrate \_\_\_\_\_

3. (10 pts) What is the volume of 3.00 g alcohol that has a density of 0.785 g/mL?
4. (10 pts) What is the molar mass of ammonium sulfide,  $(\text{NH}_4)_2\text{S}$ ?
5. (10 pts) How many molecules are there in 2.35 g of ammonium sulfide? (HINT: use molar mass from previous problem)

6. (15 pts) Element Q on Planet Qurtok has 2 stable isotopes,  $^{49}\text{Q}$  (49.06885 g/mol) and  $^{52}\text{Q}$  (51.96590 g/mol). What is the percent abundance of each isotope if the molar mass of Q is 49.9576 g/mol?

7. (15 pts) Vitamin C (also called Ascorbic Acid) can be found in citrus fruit, berries, broccoli, tomatoes, etc. It is composed of carbon (40.91%), hydrogen (4.55%) and oxygen (54.55%) and has a molar mass of 176 g/mol. What are Vitamin C's empirical and molecular formulas?