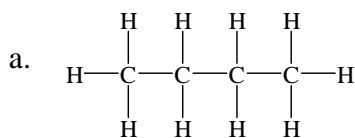


## CHE 120 Test 1 September 17, 2004

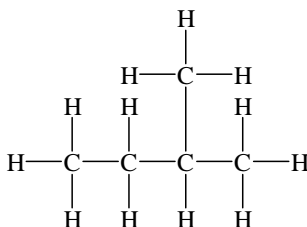
## I. Short Answer

- \_\_\_\_\_ 1. At room temperature and pressure, ionic compounds are  
 A. essentially all gases.      B. essentially all liquids.      C. essentially all solids.  
 D. found in substantial numbers as gases, as liquids, and as solids.
- \_\_\_\_\_ 2. Ionic compounds  
 A. generally dissociate into ions upon dissolving in water.  
 B. generally remain as neutral formula units or molecules upon dissolving in water.  
 C. do not dissolve in water at all.
- \_\_\_\_\_ 3. Which set of elements has the most similar chemical properties?  
 A. He, F, S, As      B. F, Cl, Br, I      C. Fr, Ba, Y, Ti      D. K, Cr, As, Kr
- \_\_\_\_\_ 4. One molecule of CH<sub>4</sub> contains \_\_\_\_\_ atom(s) of H.  
 A. 1      B. 4      C.  $6.022 \times 10^{23}$       D.  $2.409 \times 10^{24}$
- \_\_\_\_\_ 5. One mole of CH<sub>4</sub> contains \_\_\_\_\_ mole(s) of H.  
 A. 1      B. 4      C.  $6.022 \times 10^{23}$       D.  $2.409 \times 10^{24}$
- \_\_\_\_\_ 6. One mole of CH<sub>4</sub> contains \_\_\_\_\_ molecule(s) of CH<sub>4</sub> .  
 A. 1      B. 4      C.  $6.022 \times 10^{23}$       D.  $3.011 \times 10^{24}$
- \_\_\_\_\_ 7. The average mass of a molecule of CH<sub>4</sub> is  
 A. 16.0 amu    B. 16.0 g      C.  $6.022 \times 10^{23}$  amu      D.  $6.022 \times 10^{23}$  g
- \_\_\_\_\_ 8. The mass of a mole of CH<sub>4</sub> is  
 A. 16.0 amu    B. 16.0 g      C.  $6.022 \times 10^{23}$  amu      D.  $6.022 \times 10^{23}$  g
- \_\_\_\_\_ 9. 1 mL = 1 cm<sup>3</sup>    A. true      B. false
- \_\_\_\_\_ 10. Evaporation of a liquid is a \_\_\_\_\_ change.      A. chemical    B. physical
- \_\_\_\_\_ 11. The burning of the fuel for a space shuttle is a \_\_\_\_\_ change.    A. chemical      B. physical
- \_\_\_\_\_ 12. The density of solid Al at 20°C is 2.70 g/mL. This is a \_\_\_\_\_ property.    A. chemical    B. physical
- \_\_\_\_\_ 13. Distilled water is classified as a/an  
 A. element    B. compound      C. homogeneous mixture      D. heterogeneous mixture
- \_\_\_\_\_ 14. Coffee is classified as a/an  
 A. element    B. compound      C. homogeneous mixture      D. heterogeneous mixture
- \_\_\_\_\_ 15. Atoms of the same element all have the same  
 A. number of protons      B. number of neutrons      C. mass number      D. all three
- \_\_\_\_\_ 16. The mass number for all the atoms of bromine (Br) is 80.    A. true    B. False
- \_\_\_\_\_ 17. 1456.23 g + 0.5063 g =  
 A. 1457. g    B. 1456.7 g    C. 1456.74 g    D. 1457.736 g    E. 1456.7363 g
18. 0.0050 m has \_\_\_\_\_ (1, 2, 3, 4, 5) significant figures.
19. The neutral atom  ${}^{40}_{19}\text{K}$  has \_\_\_\_\_ protons, \_\_\_\_\_ neutrons, and \_\_\_\_\_ electrons.  
 The ion  ${}^{55}_{25}\text{Mn}^{2+}$  has \_\_\_\_\_ protons, \_\_\_\_\_ neutrons, and \_\_\_\_\_ electrons.  
 The bromide ion has \_\_\_\_\_ protons and \_\_\_\_\_ electrons. It is a/an \_\_\_\_\_ (anion, cation).
20. Consider the elements: H, Mg, K, Cr, Br      Which are nonmetals? \_\_\_\_\_  
 Which one is an alkali metal? \_\_\_\_\_      Which one is a transition metal? \_\_\_\_\_

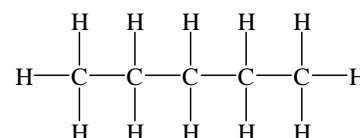
21. Of the following, which are isomers? \_\_\_\_\_ ( a & b, b & c, a & c, all three, none)



b.



c.



22. Name the following and classify each as ionic or molecular.  
 formula name ionic/molecular

- (a)  $S_2O_3$  \_\_\_\_\_
- (b)  $Fe_2O_3$  \_\_\_\_\_
- (c)  $LiNO_3 \cdot 3H_2O$  \_\_\_\_\_
- (d)  $HClO(aq)$  (name as an acid) \_\_\_\_\_
- (e)  $KHSO_4$  \_\_\_\_\_

23. Give formulas for the following and classify each as ionic or molecular.  
 name formula ionic/molecular

- (a) aluminum sulfide \_\_\_\_\_
- (b) hydrobromic acid \_\_\_\_\_
- (c) ammonium carbonate \_\_\_\_\_
- (d) chromium(II) hydroxide \_\_\_\_\_
- (e) phosphorus pentachloride \_\_\_\_\_

24. Give the structural formula and molecular formula for propane.

## II Numerical Problems. Show your work to receive full credit.

1. Convert  $7.20 \times 10^7 \text{ kg/min}^2$  to  $\text{g/s}^2$

2. Convert  $-25^\circ\text{C}$  to K

3. The density of aluminum at 20°C is 2.70 g/mL. Find the mass of 4.00 L of aluminum at 20°C.

4. A compound is 20.2% C and 79.8% F. The molecular weight of the compound is  $245 \pm 15$  amu.

(a) Find the empirical formula of the compound.

(b) Find the molecular formula. (Use  $\text{CF}_2$  for the empirical formula if you could not get (a).)

5. What is the %O by mass in  $\text{NO}_2$ ?

6. What is the mass in grams of  $4.50 \times 10^{19}$  molecules of  $\text{NO}_2$ ?

7. A particular element has two stable isotopes:

Calculate the atomic weight.

	natural abundance	mass
#1	20.0%	10.013 amu
#2	80.0%	11.009 amu

