

Name _____

CHEM 115 EXAM #1
Practice Fall 2007

Circle the correct answer or fill in the blanks. (numbers 1 - 2, 2.5 points each)

- The term used to describe a substance composed of two or more elements *combined in a fixed ratio* is:
 - solution
 - homogeneous mixture
 - heterogeneous mixture
 - compound
 - aggregate
- What do all isotopes of an element have in common?
 - atomic number
 - atomic mass
 - number of nucleons
 - number of neutrons
 - mass number

Fill in the blank with the appropriate word, phrase, or numerical answer.
(numbers 3 - 7, 2 points for each blank)

- Matter commonly is found in three physical states. List the two that would be expected to have similar densities? _____ and _____.
- A mixture that has different regions of composition and properties is known as a _____ mixture.
- A scientist obtains the number 16.7249862 on a calculator. If this number actually has four (4) significant figures, how should it be written? _____
- Round 0.0034169 to four significant figures and express in scientific notation. _____
- What is the empirical formula of C_6H_6 ? _____

(5 points, 1 point per blank)

- Use your periodic table to answer the following (use chemical symbols not names)
 - the element expected to be chemically most similar to oxygen _____
 - an element that exhibits properties between metals and nonmetals _____
 - an element that is a transition metal _____
 - a halogen _____
 - an alkaline earth metal _____

(8 points)

9. Write the formula for water and calculate the percent by mass of the elements found in water. FORMULA _____

PERCENT by MASS work shown here:

(6 points)

10. Specify the numbers of protons, neutrons, and electrons found in ^{56}Fe and $^{56}\text{Fe}^{3+}$.

	#n	#p	#e
^{56}Fe	_____	_____	_____
$^{56}\text{Fe}^{3+}$	_____	_____	_____

(8 points)

11. Calculate the number of moles of 3.01×10^{25} atoms of aluminum (Al)

AND the total mass of those atoms in kilograms.

(8 points)

12. What is the molecular formula for a compound with an empirical formula of CH_2O and a molar mass of 150.14 g/mole ?

What if the molar mass was 180.16 g/mole ?

(18 points)

13. Cadaverine is a foul smelling compound with an unknown formula $C_xH_yN_z$ and a molecular mass of 102.2 u (or amu). When a 0.03560 g sample of cadaverine burns in excess O_2 , 0.07665 g CO_2 and 0.04392 g H_2O are produced. The nitrogen oxides produced are not collected.

(a) What is the empirical formula of this compound?

(b) What is the molecular formula of cadaverine?

(12 points, 3 points each)

14. Balance the following reactions:

