

This exam consists of 4 pages. Make sure you have one of each. Print your name at the top of each page now. A fifth page contains a periodic chart. You may tear it off and use it as a scratch sheet. Show your work on calculations, including unit conversions, and give answers in the correct units and appropriate number of significant figures.

In problems involving molecular and formula weights, you may use values rounded to the nearest 0.1 amu.

If anything confuses you or is not clear, raise your hand and ask!

Page	Points
1	_____
2	_____
3	_____
4	_____
Total	_____

(4) 1. Gold has a density of 19.3 g/cm^3 . What would be the mass of a gold bar measuring $5.0 \text{ cm} \times 2.0 \text{ cm} \times 15 \text{ cm}$?

(4) 2. You bought a new automobile which gets a gas mileage of 28 miles/gallon. Your European friend wants to know what this is in kilometers per liter. What do you tell him? (1 mile = 1.609 kilometers; 1 gallon = 3.785 liters)

(8) 3. Name the following compounds:

$\text{Fe}(\text{OH})_3$ _____ K_2S _____

BaCO_3 _____ $(\text{NH}_4)_2\text{SO}_3$ _____

(8) 4. Write the formulas for the following:

rubidium sulfide _____ dinitrogen pentoxide _____

iron (II) bromite _____ magnesium iodate _____

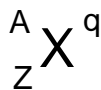
(9) 5. Give the number of protons, neutrons, and electrons in the following:

Nuclide	Protons	Neutrons	Electrons
^{119}Sn	_____	_____	_____
$^{80}\text{Se}^{-2}$	_____	_____	_____
$^{40}\text{Ca}^{+2}$	_____	_____	_____

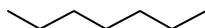
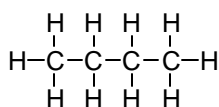
- (8) 6. Give the atomic symbol, as in the illustration, including **Z**, **A**, and **q** for atoms or ions containing the following numbers of particle:

(a) 12 p, 12 n, 10 e

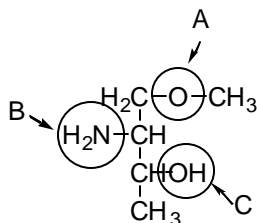
(b) 17 p, 18 n, 18 e



- (8) 7. Give the molecular formula and name for the following hydrocarbons.

Structural Formula**Molecular Formula****Name**

- (6) 8. For the following organic compound, give the **name** of the circled organic functional groups.

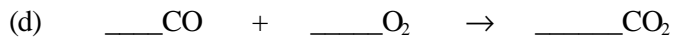
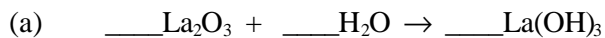


A. _____

B. _____

C. _____

- (14) 9. Balance the following chemical equations (reduce to the smallest whole number coefficients):

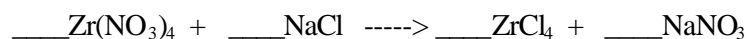


(4) 10. Calculate the number of grams in 93.8 moles of SO_3 .

(4) 11. Calculate the number of molecules in 33.1 g of NH_3 .

(8) 12. A compound containing only carbon, hydrogen and oxygen was shown by combustion analysis to consist of 40.0% C and 6.7% H. What is its empirical formula?

(15) 12. Balance the following chemical equation:



78.5 g of $\text{Zr}(\text{NO}_3)_4$ are mixed with 85.5 g of NaCl, and the above reaction proceeds. Answer each of the following questions in the blank provided, **showing your work in the space under the question**

(a) How many moles of $\text{Zr}(\text{NO}_3)_4$ is this? _____

(b) How many moles of NaCl is this? _____

(c) Which is the limiting reagent? _____

(d) How many g of ZrCl_4 will be produced? _____

(e) How many g of the excess reagent will be left? _____