CH 221 Fall 2025:
Problem Set #2
Instructions

Step One:

• **Learn the material** for Problem Set #1 by **reading Chapter 2** of the textbook and/or by watching the videos found on the website (https://mhchem.org/221video)

• **Try the problems** for Problem Set #2 found on the next pages on your own first. Write your answers in the space provided or write your answers on separate paper (your choice.) Include your name on your problem set!

Step Two:

Watch the recitation video for Problem Set #2:

http://mhchem.org/1/2

Self correct *all* of the problems while viewing the video. Mark correct problems with a star (or other similar mark), and correct all incorrect problems (show the correct answer and the steps required to achieve it.)

Step Three:

Turn the Problem Set in at the beginning of recitation to the instructor on **Monday, October 6 (section L1), Tuesday, October 7 (section L2) Wednesday, October 8 (section L3)** *or* **Friday, October 10 (section L4)** The graded problem set will be returned to you the following week during recitation.

Do *not* include this page to avoid a point penalty; your front page should be page II-2-3.

If you have any questions regarding this assignment, please email (mike.russell@mhcc.edu) the instructor! Good luck on this assignment!

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CH 221 Problem Set #2

Name:

Complete the problem set on your own first using these sheets for your work or separate paper (your choice.) **Self correct your work *(all problems!)*** using the recitation video for this problem set, found here: **http://mhchem.org/1/2**

* *Covering:* **Chapter Two** *and* **Chapter Guide Two**

* *Important Tables and/or Constants:* 1 mol = 6.022×10^{23}, periodic table (http://mhchem.org/pertab)

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1. Give the complete symbol (${}^{A}_{Z}X$) for each of the following atoms:
    a. fluorine with 10 neutrons
    b. chromium with 28 neutrons
    c. xenon with 78 neutrons

2. Copper exists as two isotopes: ^{63}Cu (62.9298u) and ^{65}Cu (64.9278u). What is the approximate percentage of ^{65}Cu in samples of the element?
    a. 10%
    b. 30%
    c. 50%
    d. 70%
    e. 90%

3. Antimony has two stable isotopes, ^{121}Sb and ^{123}Sb, with masses of 120.9038u and 122.9042u, respectively. Calculate the percent abundances of these isotopes of antimony.

4. Here are the symbols for five of the seven elements whose names begin with the letter B: **B, Ba, Bk, Bi** and **Br**. Match each symbol with one of the descriptions below:
    a. a radioactive element
    b. a liquid at room temperature
    c. a metalloid
    d. an alkaline earth element
    e. a Group 5A element

5. Complete the table:

molecular formula (MF)	empirical formula (EF)
C_6H_6	
$C_8H_4O_8$	
H_2O_2	
N_2O	

6. Complete the table:

Compound	molar mass to 0.01 (g/mol)
CH_4	
H_2O	
$C_2H_4O_2$	

7. Calculate the mass in grams of:
   a. 4.24 mol of gold
   b. 15.6 mol of He
   c. 0.063 mol of platinum
   d. 3.63×10^{-4} mol of Pu

8. Calculate the amount (moles) represented by each of the following:
   a. 16.0 g of Na
   b. 0.876 g of tin
   c. 0.0034 g of platinum
   d. 0.983 g of Xe

9. The recommended daily allowance (RDA) of iron in your diet is 15 mg. How many moles is this? How many atoms?

10. In an experiment, you need 0.125 mol of sodium metal. Sodium can be cut easily with a knife, so if you cut out a block of sodium, what should the volume of the block be in cubic centimeters? If you cut a perfect cube, what is the length of the edge of a cube? (The density of sodium metal is 0.971 g/cm^3.)

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