

REVIEW QUESTIONS

Chapter 2

1. Complete the missing information in the table below:

Symbol				$^{31}\text{P}^{3-}$	$^{40}\text{Ca}^{2+}$
Protons	23		28		
Neutrons		45	31		
Electrons		36			
Net Charge	0	2-	2+		
Atomic No.					
Mass No.	51				

2. The following are the results of analysis of two samples containing phosphorous and oxygen. From these results determine if the two samples are the same compound. If the compounds are different, show that the data follows the law of multiple proportions.

	<u>Mass of P</u>	<u>Mass of O</u>
Sample A	2.581 g	3.322 g
Sample B	3.718 g	2.881 g

3. Gallium has two naturally occurring isotopes with the following masses and natural abundances:

<u>Isotope</u>	<u>Mass (amu)</u>	<u>Abundance (%)</u>
Ga-69	68.9258	60.108
Ga-71	70.92470	39.892

Using the information above, sketch the mass spectrum of Gallium.

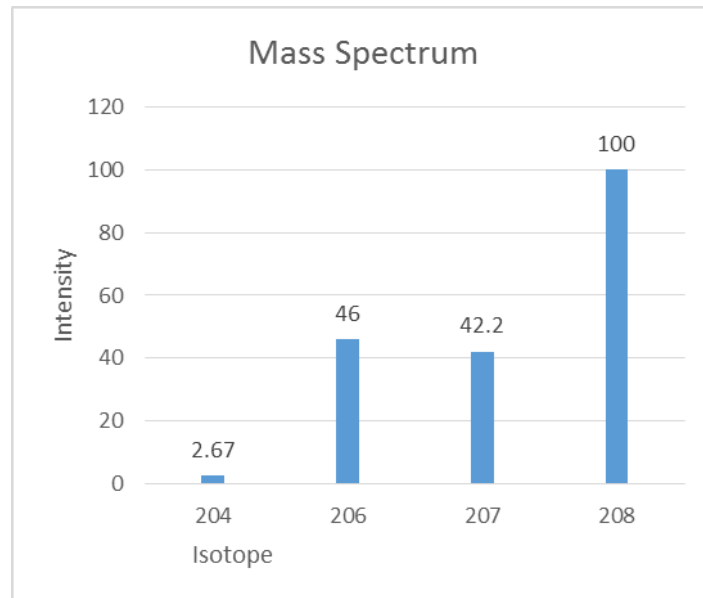
4. The isotope of an unknown element, X, has a mass number of 79. The most stable ion of the isotope has 36 electrons and forms a binary compound with sodium, having a formula of Na_2X . Which of the following statements is (are) *true*? For the false statements, correct them.
- The binary compound formed between X and fluorine will be a covalent compound.
 - The isotope of X has 38 protons.
 - The isotope of X contains 41 neutrons.
 - The identify of X is strontium, Sr.
5. Three different samples of a solid containing mercury and oxygen were analyzed and the following data was obtained:

	Mass of Sample	Mass of Mercury	Mass of Oxygen
Sample A	1.0410 g	0.9641 g	0.0769 g
Sample B	1.5434 g	1.4293 g	0.1141 g
Sample C	1.2183 g	1.1283 g	0.0900 g

Are these data consistent with the hypothesis that the material is a compound?

6. Elements in the same family often form oxyanions of the same general formula. The anions are named in a similar fashion. What are the names of the oxyanions of selenium and tellurium shown below:
- SeO_4^{2-}
 - SeO_3^{2-}
 - TeO_4^{2-}
 - TeO_3^{2-}

7. Write isotopic symbols in the form of X-A (e.g. C-13) for each isotope listed below:
- The copper isotope with 34 neutrons
 - The uranium isotope with 146 neutrons
8. Use the mass spectrum of lead, shown below, to determine the atomic mass of lead. (Estimate the values from the graph to 3 significant figures)



9. The atomic mass of fluorine is 18.998 amu and its mass spectrum shows a large peak at this mass. The atomic mass of chlorine is 35.45 amu, but the mass spectrum of chlorine does not have a peak at this mass. Explain the difference.
10. Calculate the molar mass of each substance shown below:
- $(\text{NH}_4)_3\text{PO}_4$
 - $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$
11. Calculate the mass (in grams) of each of the following:
- $2.3 \times 10^{-3} \text{ mol Sb}$
 - 1.8×10^{22} lead atoms
12. Brass is a copper and zinc alloy containing 37.0% zinc by mass and has a density of 8.48 g/cm^3 . A brass fitting has a total volume of 112.5 cm^3 . How many copper atoms does this fitting contain?