Week 2 Worksheet

Chem 11100-2: Section 33

Oct. 5, 2021

Remarks: The following information might be useful

1. $AlBr_3$ is aluminum bromide

2. HBr is hydrogen bromide

3. PbI_2 is lead (II) iodide

4. $Pb(NO_3)_2$ is lead (II) nitrate

5. KI is potassium iodide

6. KNO_3 is potassium nitrate

***Problem* 1:** How many protons, electrons, and neutrons are possessed by each of the following nuclides?

(i) $^{222}_{86}Rn$

(ii) $^{70}_{38}Sr^{2+}$

(iii) $^{15}N^{3-}$

(iv) 3+ ion of Al-27

***Problem* 2:** Copper has an average atomic mass of 63.55 amu and is made of only 2 naturally occuring isotopes, Cu-63 and Cu-65. 69.1% of all Cu is Cu-63 with an exact mass of 62.93 amu.

a) Calculate the exact mass of Cu-65 atom.

b) Can we know which of the 2 isotopes is heavier? If so how?

***Problem* 3:** What is the mass (in grams) of 1 billion (1.00×10^9) atoms of silver?

	Mass of Cu atoms	Mass of O atoms
Sample A	120.0 g	95.00 g
Sample B	30.24 g	11.97 g

Problem 4: There are many different compounds made of only copper and oxygen. Determine whether samples A and B are the same compounds or different.

Problem 5: Bromine reacts with 2.10 grams iron to form a final compound with a mass of 11.10 grams.

  a) What is the empirical formula of the final compound formed in the reaction?

  b) (*Bonus*) Is the compound formed a molecular or ionic compound? How do you know?

Problem 6: During physical activity, lactic acid (molar mass 90.1 g/mol) forms in muscle tissue and is responsible for muscle soreness. The compound contains 40.0% C, 6.71% H, and 53.1% O. What is the empirical and molecular formula for lactic acid?

Problem 7: Aluminum metal and hydrogen bromide gas react to form hydrogen gas and solid aluminum bromide.

  a) Write a balanced chemical equation for this reaction.

  b) How many grams of aluminum metal would you need to fully react with 125g HBr?

  c) How many grams of hydrogen gas would be formed as a result of this reaction?

  d) A student ran the reaction but only got a 60.0% yield of H_2 gas. How many grams of H_2 gas did the student collect?

Problem 8: Lead (II) iodide can be formed via the reaction of aqueous lead (II) nitrate and aqueous potassium iodide. Potassium nitrate is a byproduct of this reaction.

  a) Write a balanced chemical equation for this reaction.

  b) How many grams of lead (II) iodide will form in a solution containing 5.00 grams of lead (II) nitrate and 6.00 grams potassium iodide?