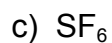
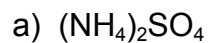


AP Chemistry Summer Work (2023-2024)

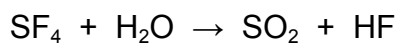
Answer the following questions. Please show your work, be sure to include the proper units, and **box** your answers.

1. The Women's 100m dash record is 10.49s. What is this speed in km/hr?
2. How many protons, electrons, and neutrons are in the following isotopes?
 - a) Ca- 40,
 - b) U-238,
3. What is the atomic weight of antimony if it has two naturally occurring isotopes, Sb-121 with an isotopic mass of 120.904 amu and an abundance of 57.21% and Sb-123 with an isotopic mass of 122.904 amu and an abundance of 42.79%?
4. What is the structural formula for dinitrogen monoxide?
5. Write the expected formula when the following elements combine to form compounds:
 - a) B and Cl
 - b) Al and O

6. Name the following molecular and ionic compounds and identify which are ionic and which are molecular:



7. Balance the following reaction:



8. Given the formula for ethanol as $\text{C}_2\text{H}_6\text{O}$, calculate it's

a) molecular weight

b) the number of moles of ethanol in 1.00 g of ethanol

c) the number of molecules of ethanol in 1.00 g of ethanol

d) the percentage of carbon in ethanol

9. A sample of $\text{Na}_2\text{B}_4\text{O}_7$ contains 0.3478 g of sodium. What is the mass of the sample?

10. A compound contains only the elements Al and O. Its elemental composition is determined to be 53.0% aluminum and 47.0% oxygen. The mass of one mole of the compound is 102 g.

a) What is the empirical formula of the compound?

b) What is its molecular formula?

11. Write a net ionic equation for the reaction of Lead(II) Nitrate with Potassium Bromide.

12. Write the shorthand notation (e.g. 2s) for the subshells described by the following quantum numbers:

a) $n=2, l=1, m_l = 0$

b) $n=3, l=2, m_l = 1$

13. Create an orbital diagram for the ground state electrons of calcium.
14. Arrange the following atoms in order of increasing atomic size:
Mg, Ca, Sr
15. Predict which member of the pair has the greater first ionization energy:
Na or Rb?
16. Calculate the percent yield when 205 g of aluminum hydroxide reacts with 751 g of sulfuric acid to yield 252 g of aluminum sulfate.