Mole and Empirical Formula Problems

Name:

1. What is the mass of 7.50 moles of sulfur dioxide (SO_2)?

2. What is the mass of 0.438 moles of ammonium chloride ($(NH_4)Cl$?

3. How many moles are there in a 250.0 g sample of sodium phosphate (Na_3PO_4)?

4. How many moles are there in a 993.6 g sample of potassium sulfate (K_2SO_4)?

5. How many atoms are there in 3.00 moles of sodium (Na)?

6. How many atoms are there in 1.638×10^{-9} moles of lithium (Li)?

7. How many molecules are there in 4.55 moles of nitrogen (N_2)?

8. How many atoms are there in 2.18 moles of nitrogen (N)?

9. How many molecules are there in 0.633 moles of water (H_2O)?

10. How many moles are there in 15.5×10^{23} molecules of carbon dioxide (CO_2)?

11. How many moles are there in 1.326×10^{12} molecules of carbon tetrachloride (CCl_4)?

12. What is the volume occupied by 4.20 moles of oxygen (O_2) gas at STP?

13. What is the volume occupied by 0.0147 moles of nitrogen dioxide (NO_2) gas at STP?

14. How many moles are there in 45.0 L of methane (CH_4) gas at STP?

15. How many moles are there in 0.335 L of Argon (Ar) gas at STP?

16. Calculate the % composition of lithium oxide (Li_2O)?

17. Calculate the % composition of dinitrogen tetroxide (N_2O_4)?

18. What is the % composition of a carbon – oxygen compound if there are 40.8 g of carbon and 54.4 g of oxygen?

19. What is the % composition of a sulfur – chlorine compound if there are 9.63 g of sulfur and 21.3 g of chlorine?

20. A sample has a total mass of 0.432 g. It contains 0.128 g of oxygen and the rest is fluorine. What is the % composition?

21. What is the empirical formula for a compound that is composed of 47.9% zinc and 52.1% chlorine?

22. What is the empirical formula for a compound that contains 1.75 g of carbon and 46.75 g of bromine?

23. What is the empirical formula for a compound that contains 42.4 g of hydrogen and 169.7 g of carbon?

    a. If the gram molecular mass of this compound is 30.0 g, what is the molecular formula?

24. What is the empirical formula for a compound that contains 8.60 g of boron and 302.2 g of iodine?

    a. If the gram molecular mass of this compound is 391.5 g, what is the molecular formula?