Percent Composition and Molecular Formula Worksheet

1. What’s the empirical formula of a molecule containing 65.5% carbon, 5.5% hydrogen, and 29.0% oxygen?
2. If the molar mass of the compound in problem 1 is 110 grams/mole, what’s the molecular formula?
3. What’s the empirical formula of a molecule containing 18.7% lithium, 16.3% carbon, and 65.0% oxygen?
4. If the molar mass of the compound in problem 3 is 73.8 grams/mole, what’s the molecular formula?

***Write the molecular formulas of the following compounds:***

1. A compound with an empirical formula of C2OH4 and a molar mass of 88 grams per mole.
2. A compound with an empirical formula of C4H4O and a molar mass of 136 grams per mole.
3. A compound with an empirical formula of CFBrO and a molar mass of 254.7 grams per mole.
4. A compound with an empirical formula of C2H8N and a molar mass of 46 grams per mole.

***Answer the following questions:***

1. The percentage composition of acetic acid is found to be 39.9% C, 6.7% H, and 53.4% O. Determine the empirical formula of acetic acid.
2. The molar mass for question #9 was determined by experiment to be 60.0 g/mol. What is the molecular formula?
3. Aniline, a starting material for urethane plastic foams, consists of C, H, and N. Combustion of such compounds yields CO2, H2O, and N2 as products. If the combustion of 9.71 g of aniline yields 6.63 g H2O and 1.46 g N2, what is its empirical formula?
4. The molar mass of aniline is 93 g/mol. What is its molecular formula?
5. Calculate the mass percent of carbon, nitrogen and oxygen in acetamide, C2H5NO.
6. A 50.51 g sample of a compound made from phosphorus and chlorine is decomposed. Analysis of the products showed that 11.39 g of phosphorus atoms were produced. What is the empirical formula of the compound?
7. When 2.5000 g of an oxide of mercury, (HgxOy) is decomposed into the elements by heating, 2.405 g of mercury are produced. Calculate the empirical formula.
8. The compound benzamide has the following percent composition. What is the empirical formula?

C = 69.40 % H= 5.825 % O = 13.21 % N= 11.57 %

1. A component of protein called serine has an approximate molar mass of 100 g/mole. If the percent composition is as follows, what is the empirical and molecular formula of serine?

C = 34.95 % H= 6.844 % O = 46.56 % N= 13.59 %

Percent Composition and Molecular Formula Worksheet Key

1. What’s the empirical formula of a molecule containing 65.5% carbon, 5.5% hydrogen, and 29.0% oxygen? C3H3O mass = 55 g/mole
2. If the molar mass of the compound in problem 1 is 110 grams/mole, what’s the molecular formula? C6H6O2
3. What’s the empirical formula of a molecule containing 18.7% lithium, 16.3% carbon, and 65.0% oxygen? Li2CO3
4. If the molar mass of the compound in problem 3 is 73.8 grams/mole, what’s the molecular formula? Li2CO3

*Write the molecular formulas of the following compounds:*

1. A compound with an empirical formula of C2OH4 and a molar mass of 88 grams per mole. C4O2H8
2. A compound with an empirical formula of C4H4O and a molar mass of 136 grams per mole. C8H8O2
3. A compound with an empirical formula of CFBrO and a molar mass of 254.7 grams per mole. C2F2Br2O2
4. A compound with an empirical formula of C2H8N and a molar mass of 46 grams per mole. C2H8N

*Answer the following questions:*

1. The percentage composition of acetic acid is found to be 39.9% C, 6.7% H, and 53.4% O. Determine the empirical formula of acetic acid. CH2O
2. The molar mass for question #9 was determined by experiment to be 60.0 g/mol. What is the molecular formula? C2H4O2
3. Aniline, a starting material for urethane plastic foams, consists of C, H, and N. Combustion of such compounds yields CO2, H2O, and N2 as products. If the combustion of 9.71 g of aniline yields 6.63 g H2O and 1.46 g N2, what is its empirical formula? C6H7N
4. The molar mass of aniline is 93 g/mol. What is its molecular formula? C6H7N
5. Calculate the mass percent of carbon, nitrogen and oxygen in acetamide, C2H5NO. **%C 40.668 %H 8.533 %N 23.713 %O 27.086**
6. A 50.51 g sample of a compound made from phosphorus and chlorine is decomposed. Analysis of the products showed that 11.39 g of phosphorus atoms were produced. What is the empirical formula of the compound? PCl3
7. When 2.5000 g of an oxide of mercury, (HgxOy) is decomposed into the elements by heating, 2.405 g of mercury are produced. Calculate the empirical formula. Hg2O
8. The compound benzamide has the following percent composition. What is the empirical formula?

C = 69.40 % H= 5.825 % O = 13.21 % N= 11.57 % C7H7NO

1. A component of protein called serine has an approximate molar mass of 100 g/mole. If the percent composition is as follows, what is the empirical and molecular formula of serine?

C = 34.95 % H= 6.844 % O = 46.56 % N= 13.59 %

**C3H7NO3 empirical formula**

**C3H7NO3 molecular formula**