

Name: _____ Per _____

Empirical and Molecular Formulas

Practice Sheet #20

1. What is an empirical formula?
2. What is a molecular formula?
3. Do you think chemists use molecular formulas or empirical formulas more often? Why?
4. Methylamine has the following composition: 38.7% carbon, 16.2 % hydrogen, and the remainder nitrogen. Determine the empirical formula.
5. A compound containing nitrogen and oxygen is decomposed in the laboratory and produces 24.5 g of nitrogen and 70.0 g of oxygen. Calculate the empirical formula of the compound.
6. A laboratory analysis of vanillin, the flavoring agent in vanilla, determined the mass percent composition: C, 63.15 %, H, 5.30 % and O, 31.55 %. Determine the empirical formula of vanillin.

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7. The molecular formula for some substances are as follows. Determine the empirical formula for each.
- Acetylene: C_2H_2
 - Glucose: $C_6H_{12}O_6$
 - Octane: C_8H_{18}
8. Styrene is a chemical used in the manufacture of hard plastics. Styrene contains 92.3 % carbon and 7.7 % hydrogen. The molecular weight of styrene is 104.144 g/mol. Determine the empirical and molecular formula.
9. Potassium persulfate is used in the process of film developing. A 0.8162 g sample was found to contain 0.231 g of potassium, 0.1936 g of sulfur, and 0.3865 g of oxygen. The molecular weight of potassium persulfate is 675.8 g/mol. Determine the empirical and molecular formula.
10. Naphthalene is a compound containing carbon and hydrogen that is often used in mothballs. Its empirical formula is C_5H_4 and its molar mass is 128.16 g/mol. What is its molecular formula?