Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Chem R Pd. \_\_\_\_ Types of Formulas

Directions: Below are 3 types of chemical formulas that represent the **same** molecule. Analyze each example and come up with a **detailed definition** for each formula.

|  |  |  |
| --- | --- | --- |
| **Type of Formula** | **Example** | **Definition** |
| Molecular Formula | C6H12O6 |  |
| Empirical Formula | CH2O |  |
| Structural Formula | http://hyperphysics.phy-astr.gsu.edu/hbase/organic/imgorg/gluclin.gif |  |

**STOP HERE**

Use your definitions from above to answer the following Regents questions.

1) What is the empirical formula of P4H10?

a) P4H5 b) PH2 c) P2H5 d) P4H10

2) Which of the following molecules is paired with the correct empirical formula?

a) C5H10 and CH2 c) N2O4 and NO

b) C6H12O6 and CH6O d) C8H16 and C2H4

3) Which of the following compounds has the same molecular and empirical formula?

a) C3H6 b) H2O c) H2O2 d) N2O4

4) Which of the following could be a molecular formula that matches the empirical formula CH2?

a) C2H4 b) C3H6 c) C4H8 d) C5H10

**STOP HERE**

**Practice Problems**:

1) If a molecule has an empirical formula of C2OH4 and a molar mass of 88 g/mol. What is its molecular formula?

2) Benzene, a chemical produced naturally by volcanoes and forest fires, has an empirical formula of CH and a molar mass of 78 g/mol. What is its molecular formula?

3) Tryptophan (the stuff in turkey that makes you sleepy) has an empirical formula of C11H12N2O2 and a molar mass of 204 g/mol. What is its molecular formula?

4) Some molecules have the same empirical formulas. This can serve as a problem with chemical identification. A student in a laboratory must determine if the chemical he is working with is one that is essential for human health (glucose) or is a cancer-causing chemical (formaldehyde). Both have an empirical formula of CH2O. The student measures 1 mole of this substance to weigh 180 grams. Identify this substance.