

Molecular (True) Formula

Practice Problems (Level 3)

- 52.0354 g/mol
1. A sample of gas is analyzed and found to consist of 46.0% carbon and 53.9% nitrogen. The density of the gas at 708 torr and 20.0°C is 2.02 g/L. What molecular formula do you predict for this gas?

- 135.229 g/mol
2. A sample of an unknown compound weighing 3.58 g is analyzed and found to consist of 3.18 g of carbon and 0.40 g of hydrogen. When 4.50 g of this compound is dissolved in 100.0 g of water, the freezing point of the resulting solution is -0.620°C. What molecular formula do these data suggest for this compound?

- 180.157 g/mol
3. A monosaccharide of unknown composition is analyzed and found to consist of 40.2% carbon, 53.3% oxygen, and 6.6% hydrogen. A solution formed by dissolving 6.67 g of this compound in 150. g of water has a freezing point of -0.45°C. What formula do you predict for this compound?

- 132.289 g/mol
4. Analysis of a gaseous organic compound shows it to consist of 81.9% carbon and 18.2% hydrogen. A sample of 65.0 mL of the gas is found to weigh 0.296 g at STP. What is the correct molecular formula for this compound?

- 180.157 g/mol
5. An unidentified organic compound has a composition of 40.0% carbon, 6.7% hydrogen, and 53.2% oxygen. When 28.6 g of this compound is dissolved in 245 g of water, the solution has a boiling point of 100.33°C. What molecular formula corresponds to these data?

- 114.230 g/mol
6. A sample of an unidentified compound weighing 2.9147 g is analyzed and found to consist of 2.458 g of carbon and 0.459 g of hydrogen. At 745 torr and 35.0°C, 287.7 mL of this gas weighs 1.272 g. What is the correct molecular formula for this gas?