

4 • Chemical Equations & Stoichiometry

AP QUESTIONS

1991 B

The molecular formula of a hydrocarbon is to be determined by analyzing its combustion products and investigating its colligative properties.

- (a) The hydrocarbon burns completely, producing 7.2 grams of water and 7.2 liters of CO_2 at standard conditions. What is the empirical formula of the hydrocarbon?

2000 B

Answer the following questions about $\text{BeC}_2\text{O}_4(s)$ and its hydrate.

- (a) Calculate the mass percent of carbon in the hydrated form of the solid that has the formula $\text{BeC}_2\text{O}_4 \cdot 3\text{H}_2\text{O}$.
- (b) When heated to $220.^\circ\text{C}$, $\text{BeC}_2\text{O}_4 \cdot 3\text{H}_2\text{O}(s)$ dehydrates completely as represented below.



If 3.21 g of $\text{BeC}_2\text{O}_4 \cdot 3\text{H}_2\text{O}(s)$ is heated to $220.^\circ\text{C}$ calculate

- (i) the mass of $\text{BeC}_2\text{O}_4(s)$ formed, and,
- (ii) the volume of the $\text{H}_2\text{O}(g)$ released, measured at STP.

2001 B

Answer the following questions about acetylsalicylic acid, the active ingredient in aspirin.

- (a) The amount of acetylsalicylic acid in a single aspirin tablet is 325 mg, yet the tablet has a mass of 2.00 g. Calculate the mass percent of acetylsalicylic acid in the tablet.
- (b) The elements contained in acetylsalicylic acid are hydrogen, carbon, and oxygen. The combustion of 3.000 g of the pure compound yields 1.200 g of water and 3.72 L of dry carbon dioxide, measured at STP. Determine the mass, in g, of each element in the 3.000 g sample of the compound.