

## 2006 AP<sup>®</sup> CHEMISTRY FREE-RESPONSE QUESTIONS

3. Answer the following questions that relate to the analysis of chemical compounds.
- (a) A compound containing the elements C, H, N, and O is analyzed. When a 1.2359 g sample is burned in excess oxygen, 2.241 g of  $\text{CO}_2(g)$  is formed. The combustion analysis also showed that the sample contained 0.0648 g of H.
- (i) Determine the mass, in grams, of C in the 1.2359 g sample of the compound.
  - (ii) When the compound is analyzed for N content only, the mass percent of N is found to be 28.84 percent. Determine the mass, in grams, of N in the original 1.2359 g sample of the compound.
  - (iii) Determine the mass, in grams, of O in the original 1.2359 g sample of the compound.
  - (iv) Determine the empirical formula of the compound.