

Question 38**(16 marks)**

Skunks are animals that are perhaps best known for the pungent odour they produce. Several organic compounds are responsible for this odour. One of these compounds contains carbon, hydrogen, sulfur and oxygen.

Combustion of a 5.00 g sample of this compound produced 6.46 g of carbon dioxide and 2.68 g of water. There was also enough sulfur (as sulfur dioxide) to make 10 L of $0.00371 \text{ mol L}^{-1}$ sulfuric acid.

(a) Determine the empirical formula of the compound.

(12 marks)

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

When another 5.00 g sample was vaporised it was found to occupy a total volume of 637 mL at 150 kPa and 40 °C.

(b) Determine the molecular formula of the compound. (4 marks)
