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| https://upload.wikimedia.org/wikipedia/en/3/33/BSHS_Logo.jpg | Bunbury Senior High School | | | | | |
| **CHEMISTRY UNIT 3 & 4** | | | | | | |
| **Practical Test:** | | | | | | |
| **Identifying Unknown Organic Compounds** | | | | | | |
|  | | | | | | |
| **NAME:** | | |  | | | |
|  | | |  | | | |
| **Time allowed for this paper** | | | | | | |
| Reading time: | | 5 minutes | | | | |
| Working time: | | 50 minutes | | | | |
|  | | | | | | |
| **Marks for investigation:** | | | | | | |
| Section | | | Marks available | Marks obtained | | Weighted mark |
| Empirical formula calculations | | | 37 | \_\_\_\_\_ / 37 | | \_\_\_\_\_ / 25 |
| Chemical tests and identification | | | 18 | \_\_\_\_\_ / 18 | | \_\_\_\_\_ / 75 |
|  | | |  | | **Total** | \_\_\_\_\_\_ / 100 |

**PART A: EMPIRICAL FORMULA CALCULATIONS**

Substance A

Substance A was analysed for carbon, hydrogen and oxygen. The sample was found to contain 62% carbon, 10% hydrogen and 28% oxygen by mass. The molecular weight of the compound was found to be approximately 58 g mol-1. Find the empirical formula and molecular formula. **(6 marks)**

Substance B

Substance B has an empirical formula of C3H8O. A 1.027 g sample of the colourless liquid was vapourised and found to occupy 0.594 L at 150 °C and 101.3 kPa. Calculate the molecular weight of the compound, and hence find the molecular formula of the compound. **(6 marks)**

Substance C

Substance C was known to contain carbon, hydrogen and oxygen. A 0.775 g sample of the colourless liquid underwent combustion in an excess of oxygen, producing 1.83 g of carbon dioxide and 0.751 g of water.

A separate of 0.620 g sample was vapourised under standard temperature and pressure conditions. The resulting gas occupied 129 mL volume at 220 °C and 1.50 atm pressure.

Find the molecular and empirical formula of the compound. **(14 marks)**

Substance D

Substance D is a pale-yellow coloured viscous liquid. The substance known to contain carbon, hydrogen and oxygen.

* A 1.25 g sample of the colourless liquid underwent combustion in an excess of oxygen, producing 3.51 g of carbon dioxide.
* A separate 0.885 g sample underwent combustion in an excess of oxygen, producing 0.960 g of water.
* A separate analysis revealed a molecular weight of approximately 280-285 g mol-1.

Calculate the empirical formula and molecular formula of the compound. **(11 marks)**