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| **Substance: A** | | **Molecular formula**: C3H6O (TASK SOLUTIONS) | | |
| **INFORMATION GAINED FROM CHEMICAL TESTS AND OTHER OBSERVATIONS** | | | | |
| **Test #** | **Description of test / observation** | | | **Inferences** |
| 1 | Add 2 drops of CaCO3 (s) => N.V.R | | | Does not react with a carbonate – not an acid |
| 2 | Add 3 drops of dilute KMnO3(aq) => N.V.R | | | Does not oxidise hence not a primary or secondary alcohol |
| 3 | Add 2 drops of universal indicator => green colour | | | Neutral solution. No presence of H+ or OH- ions. |
| 4 | Add 2 mL of glacial acid and 2 drops of concentrated H2SO4 => N.V.R | | | No esterification taking place. Therefore anything but an alcohol. |
| 5 | Add 2 mL to 10 mL of water => fully soluble in water – nail polish remover smell | | | Polar molecule |
| **Name the functional group present** | | | Ketone (propanone – acetone) | |
| **Drawing and name of a possible structure that matches all data:**  See the source image **propanone** | | | | |

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| **Criteria** | | **Marks** |
| Clarity in logic | | \_\_\_ / 2 |
| Correct functional group | | \_\_\_ / 1 |
| Structure | | \_\_\_ / 1 |
| Name | | \_\_\_ / 1 |
| **Substance: B** | | **Molecular formula**: C3H8O | | | | |
| **INFORMATION GAINED FROM CHEMICAL TESTS AND OTHER OBSERVATIONS** | | | | | | |
| **Test #** | **Description of test / observation** | | | | **Inferences** | |
| 1 | Add 2 drops of CaCO3 (s) => N.V.R | | | | Does not react with a carbonate – not an acid | |
| 2 | Add 3 drops of dilute KMnO3(aq) => discolours the purple solution to pale pink | | | | Does oxidise hence is either a primary or secondary alcohol | |
| 3 | Add 2 drops of universal indicator => green colour | | | | Neutral solution. No presence of H+ or OH- ions. | |
| 4 | Add 2 mL of glacial acid and 2 drops of concentrated H2SO4 => fruity smell | | | | Esterification taking place. Therefore an alcohol present. | |
| 5 | Add 2 mL to 10 mL of water => fully soluble in water (easily) | | | | Polar molecule – hydrogen bonding (-OH group with an alcohol) | |
| **Name the functional group present** | | | Alcohol (propan-1-ol or propan-2-ol) | | | |
| **Drawing and name of a possible structure that matches all data:**  See the source image **propan-1-ol** **propan-2-ol** | | | | | | |

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| **Criteria** | | **Marks** |
| Clarity in logic | | \_\_\_ / 2 |
| Correct functional group | | \_\_\_ / 1 |
| Structure | | \_\_\_ / 1 |
| Name | | \_\_\_ / 1 |
| **Substance: C** | | **Molecular formula**: C8H8O3 | | | | |
| **INFORMATION GAINED FROM CHEMICAL TESTS AND OTHER OBSERVATIONS** | | | | | | |
| **Test #** | **Description of test / observation** | | | | **Inferences** | |
| 1 | Add 2 drops of CaCO3 (s) => N.V.R | | | | Does not react with a carbonate – not an acid | |
| 2 | Add 3 drops of dilute KMnO3(aq) => N.V.R | | | | Does not oxidise hence not a primary or secondary alcohol | |
| 3 | Add 2 drops of universal indicator => slight purple colour | | | | Basic solution - slight. Presence of OH- ions. | |
| 4 | Add 2 mL of glacial acid and 2 drops of concentrated H2SO4 => N.V.R | | | | No esterification taking place. Therefore anything but an alcohol. | |
| 5 | Add 2 mL to 10 mL of water => limited solubility in water | | | | Low polarity molecule due to shape or complexity of the molecule – hence a triple bonded cyclic compound | |
| **Name the functional group present** | | | Ester and alcohol (methyl salicylate) | | | |
| **Drawing and name of a possible structure that matches all data:**  See the source image **methyl salicylate - similar with identical functional groups** | | | | | | |

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| **Criteria** | | **Marks** |
| Clarity in logic | | \_\_\_ / 1 |
| Correct functional group | | \_\_\_ / 1 |
| Structure | | \_\_\_ / 1 |
| Name | | \_\_\_ / 1 |
| **Substance: D** | | **Molecular formula**: C4H8O2 | | | | |
| **INFORMATION GAINED FROM CHEMICAL TESTS AND OTHER OBSERVATIONS** | | | | | | |
| **Test #** | **Description of test / observation** | | | | **Inferences** | |
| 1 | Add 2 drops of CaCO3 (s) => colourless bubbles | | | | Does react with a carbonate – is an acid | |
| 2 | Add 3 drops of dilute KMnO3(aq) => N.V.R | | | | Does not oxidise hence not a primary or secondary alcohol | |
| 3 | Add 2 drops of universal indicator => slight orange colour | | | | Acidic solution - slight. Presence of H+ ions. | |
| 4 | Add 2 mL of glacial acid and 2 drops of concentrated H2SO4 => N.V.R | | | | No esterification taking place. Therefore anything but an alcohol. | |
| 5 | Add 2 mL to 10 mL of water => fully soluble in water (easily) | | | | Polar molecule – hydrogen bonding (-OH group with an alcohol) | |
| **Name the functional group present** | | | Acid (butanoic acid) | | | |
| **Drawing and name of a possible structure that matches all data:**  See the source image **butanoic acid** | | | | | | |

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| **Criteria** | **Marks** |
| Clarity in logic | \_\_\_ / 2 |
| Correct functional group | \_\_\_ / 1 |
| Structure | \_\_\_ / 1 |
| Name | \_\_\_ / 1 |