

**Year 12 ATAR Chemistry**

**Practical Test**

**Identifying unknown organic compounds**

**2017**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Teacher: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Marks: /25**

**Pre lab questions**

1. Short chain alcohols such as ethanol are completely miscible with water, whereas hydrocarbons of a similar size can be immiscible. Account for this difference in solubility and include a labelled diagram.

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[4]

1. Describe an account for the reactivity’s of alkanes, alkenes and aromatics.

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[3]

1. Explain what is meant by the term functional group and give formulas for two examples, other than those mentioned in this assessment.

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[2]

1. Write the formula for the following functional groups:
2. Carboxylic acid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Ketone \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Alcohol \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

[3]

**Your Task:**

An organic chemistry research lab has mixed up its bottles of organic compounds and needs you to identify the contents of one of the bottles by analysis.

You will only have **one compound to identify** and we know it must be one of the following:

Alkane Alkene

Carboxylic acid Ester

Ketone Primary alcohol

You will have access to the following reagents to test your sample with in order to identify it.

Distilled water Bromine water

Sulphuric acid Acidified potassium permanganate solution

Sodium Universal indicator solution

Before you begin your analysis you need to draw a dichotomous key that details how the organic chemist could use the reagents above to identify **all** of the organic compounds. The dichotomous key has been started for you:

Alkane, alkene, primary alcohol, ketone, ester, carboxylic acid

Is the compound soluble in water?

[5]

Fill in the results sheet to record what happens in each of the experiments **that you undertake** on your compound.

**Results Sheet:**

**Sample label: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Physical Properties:**

**State: \_\_\_\_\_\_\_\_\_\_\_\_ Solubility: \_\_\_\_\_\_\_\_\_\_\_\_**

**Colour: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Odour: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Chemical tests:**

**Test:** Universal indicator

**Observation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Test:** Bromine water

**Observation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Test:** Sodium

**Observation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Test:** Sulphuric acid

**Observation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Test:** Acidified potassium permanganate

**Observation:** \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**Conclusion:**

State what you believe the substance is (type) and explain what led you to this conclusion.

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**Marking rubric**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Physical Properties** | Correct recording of all physical properties  **[1]** |  |  |  |
| **Test observations** | Uses appropriate tests only and records complete and correct observations in each case  **[3]** | Includes one irrelevant test or records an incomplete or incorrect observation  **[2]** | Includes more than one inappropriate test or has multiple incomplete or incorrect observations **[1]** | Substantially incomplete and incorrect    **[0]** |
| **Compound identified** | Correct identification **[1]** |  |  |  |
| **Conclusion** | A statement to support identification and two equations to support it **[3]** | A simple statement and an equation to support it  **[2]** | A simple statement to justify the identity of the compound  **[1]** | Incorrect conclusion      **[0]** |