**Unit 1 Chemistry: Topic Test 5 Organic compounds. Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**SECTION A – Multiple-choice questions**

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| **Instructions for Section A**  Answer **all** questions.  Choose the response that is **correct** or **best answers** the question.  A correct answer scores 1, an incorrect answer scores 0.  No mark will be given if more than one answer is completed for any question.  Marks will **not** be deducted for incorrect answers. |

**Question 1**

Which of the following lists contains alkenes only?

1. butene, C4H10, C6H12
2. propene, CH2CHCH2CH3, C3H6
3. hexane, C4H8, C7H14
4. octane, CH2CHCH2CH3, C4H8

**Question 2**

Ethanoic acid can be produced by the action of bacteria on rotting fruit waste. Red wine vinegar is produced in this way. The production of red wine vinegar is an example of

**A**. production using fossil fuels.

**B**. a non-renewable production technique.

**C**. fractional distillation of crude oil.

**D**. plant-sourced biomass.

**Question 3**

Select the alternative that provides the correct name for the respective molecules below.



**A**. ethanol, ethanoic acid, butene

**B**. ethanol, ethanoic acid, but-2-ene

**C**. ethan-1-ol, 1-propanoic acid, butene

**D**. ethanol, propanoic acid, but-2-ene

**Question 4**

Select the correct statement about the boiling points of compounds in the same homologous series.

**A**. The boiling points of all members will be similar as each member has the same bonds.

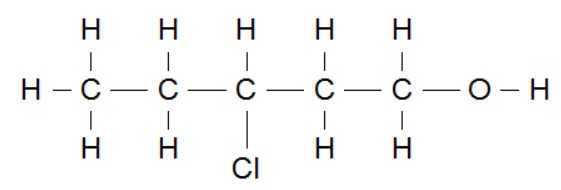
**B**. The boiling points increase as the number of carbon atoms increase.

**C**. The trend in boiling points in a series is often very different from the trend in melting points.

**D**. The boiling points of any compound with the same number of carbon atoms will be similar.

**Question 5**

What is the correct IUPAC name for this molecule?



**A**. 3-chloropentan-1-ol

**B**. 3-chloropentan-5-ol

**C**. 1-chloropentan-3-ol

**D**. 1-alco-3-chloropentane

**Question 6**

A hydrocarbon is 80% carbon by mass. The hydrocarbon could be

**A**. methane

**B**. ethane

**C**. ethene

**D**. propane

**Question 7**

Which of the alternatives given is an isomer of the molecule drawn below?



**A**. 2-methylpropane

**B**. butane

**C**. pentane

**D**. 2,3-dimethylbutane

**Question 8**

The percentage mass of carbon in an alkene is compared to that of the corresponding alkane. The percentage mass of carbon in the alkene will be

**A**. less than that of the alkane

**B**. equal to that of the alkane

**C**. greater than that of the alkane

**D**. vary with the particular alkene in question

**Question 9**

The molecular formula of butanoic acid is

**A**. C3H6O2

**B**. C4H8O2

**C**. C4H10O

**D**. C4H10O2

**Question 10**

Which of the following molecules will have the highest boiling point?

**A**. propane

**B**. butane

**C**. 1-chloropropane

**D**. propan-1-ol

**SECTION B- Short-answer questions**

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| **Instructions for Section B**  Questions must be answered in the spaces provided in this book. To obtain full marks for your responses you should   * Give simplified answers with an appropriate number of significant figures to all numerical questions; unsimplified answers will not be given full marks. * Show all workings in your answers to numerical questions. No credit will be given for an incorrect answer unless it is accompanied by details of the working.   Make sure chemical equations are balanced and that the formulas for individual substances include an indication of state; for example, H2(g); NaCl(s) |

**Question 1**

1. There are several different representations used for organic molecules. For octane; 3 marks  
   * 1. what is the molecular formula? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     2. what is the empirical formula? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
     3. draw octane.
2. Many organic compounds need to be manufactured to meet demand for them.

**i**. Name one non-renewable source of raw materials for carbon compounds and give one example of a

compound made from this raw material. 2 marks

Raw material: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Compound: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ii**. Name one non-renewable source of raw materials for carbon compounds and give one example of a

compound made from this raw material. 2 marks

Raw material: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Compound: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Draw and name the three alkanes with a molecular formula C5H12. 3 marks

**Question 2**  (6 marks)

**a**. Draw each of the following molecules. 1 + 1 + 1 = 3 marks

**i**. propan-2-ol

**ii**. methanoic acid

**iii**. methylbutane

**b**. Draw 1-chlorobut-2ene.

1 mark

1. Explain why each of the following names are not correct systematic names. 1 + 1 = 2 marks

**i**. 1-butanoic acid \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**ii**. butene \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Question 3** (10 marks)

**a. i**. Draw but-1-ene. 1 + 2 = 3 marks

**ii**. What properties would you expect but-1-ene to have?

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1 + 2 = 3 marks

**b**. Draw and name two isomers of but-1-ene.

Name isomer 1: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Name isomer 2: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4 marks

**c. i**. Calculate the molar mass of but-1-ene. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1 + 2 = 3 marks

**ii**. Determine the percentage carbon in but-1-ene.

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**Question 4** (4 marks)

**a**. Draw two alkenes with the empirical formula CH2.

2 marks

**b.** Draw and name an alcohol with the empirical formula C3H8O.

2 marks

**Question 5** (10 marks)

**a**. Write the semi-structural formulas for

**i**. 2-chloropentane \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 1 + 1 + 1 = 3 marks

**ii**. pent-2-ene \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**iii**. propan-2-ol \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**b**. The boiling point of chloroethane is different from that of ethane. Explain how the boiling points will

differ and provide an explanation as to the reason for the difference. Your answer should include a

diagram of both molecules. 4 marks

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**c**. Name and draw two members of the carboxylic acid homologous series. Explain how the boiling points

of the two molecules you chose will differ and why. 3 marks

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