Hillcrest High School | Grade 12

Physical Science | Organic Chemistry test

Available from 10am on 09/04/2020 to 10 am 10/04/2020

Instructions

- ✓ Spelling counts
- ✓ Only leave one space between 2 words
- ✓ Leave no spaces inbetween dashes, words and numbers in organic names
  Eg 2-methylbut-2-ene
- ✓ No spaces in between ester names
  Eg methylpropanoate

Question 1: Multiple choice

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Write only the letter (A – D) next to the question number (1.1 – 1.3) on your answer sheet.

1.1 The monomer used to make polyethylene is:

Ethene

Propene

Ethane

Propane

1.2

Which ONE of the following pairs of reactants can be used to prepare the ester propyl butanoate in the laboratory?

A Butan-1-ol and propanoic aid

B Propan-1-ol and butanoic acid

C Butan-1-ol and propanal

D Propan-1-ol and butanal **[2 x 2 =4]**

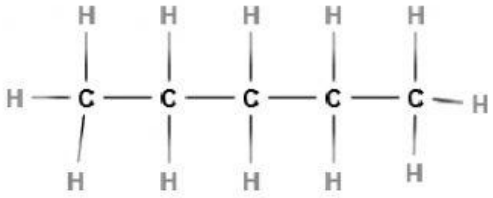
LIVEWORKSHEETS

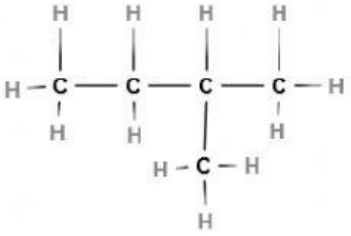
SECTION B

Question 2: one word/term answers (spelling does count)

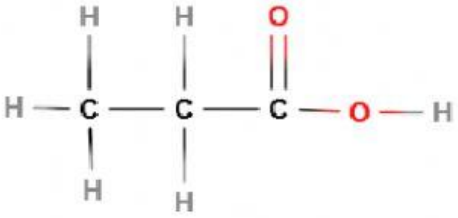
2.1 State which type of isomers the following are

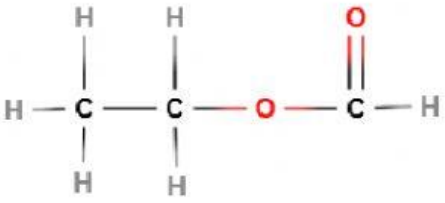
a)



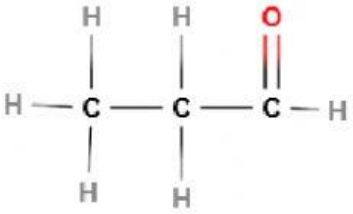


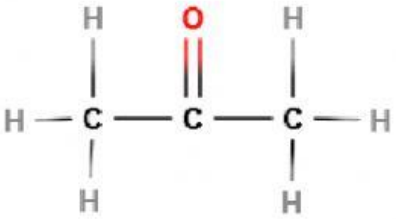
b)



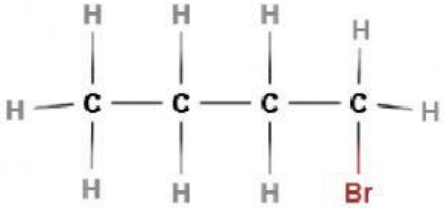


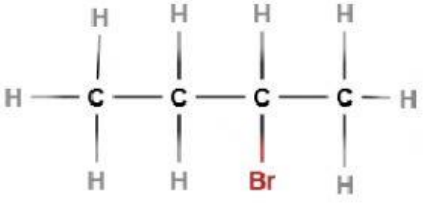
c)





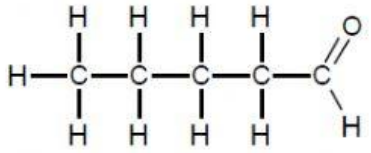
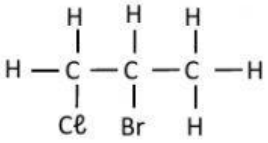
d)





LIVEWORKSHEETS

2.2 Consider the following organic compounds represented by the letters A to F and answer the questions that follow:

A	CH_3 - CH_2 -CH_2-CH_3	**B**	2-chlorobutane
C	3,3 – dibromobut–1–ene	**D**	
E		**F**	$CHCl_3$

2.2 Is compound **A,** a saturated or unsaturated hydrocarbon? (1)

2.3 Write down name of the homologous series to which compound **D** belongs. (1)

2.4 Is compound **B** a PRIMARY, SECONDARY or TERTIARY haloalkane? (1)

2.5 Compound **F** is commonly known as chloroform. What is its IUPAC name?

(1)

2.6 Write down the IUPAC name of compound E. (1)

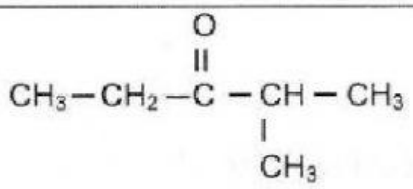
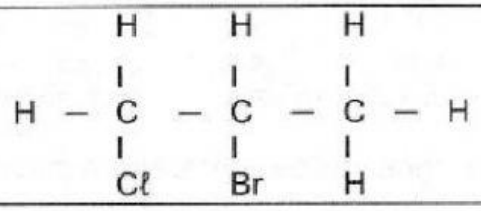
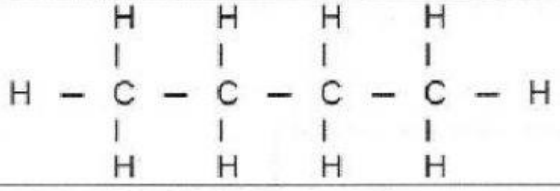
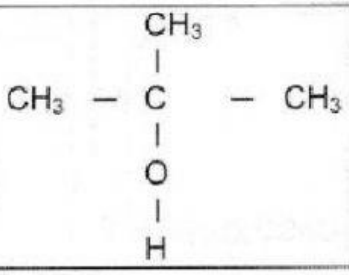
2.7 Write the name of the products that form when compound A combusts. (2)

[9]

LIVEWORKSHEETS

Question 3

Consider the following representation of organic molecules A to F listed in the table below:

A		**B**	
C		**D**	Methanal
E	2-methylhex-3-yne	**F**	

3.1 Write down the letter that represents a compound that:

3.1.1 Is an aldehyde (1)

3.1.2 Is a saturated hydrocarbon (1)

3.1.3 Has a general formula of C_nH_{2n-2} (1)

3.2 Write down the homologous series to which each of the following compounds belong:

3.2.1 A (1)

3.2.2 B (1)

3.2.3 F (1)

3.3 Compound C belongs to a group of organic compounds, commonly used as: (1)

[7]

LIVEWORKSHEETS

Question 4

There are 3 structural isomers of for the organic compound with a molecular formula of C_4H_8O.

4.1 Write the IUPAC name of the 2 possible compounds (2)

[2]

Question 5

2-methylhexane, 2,3-dimethylpentane and 2,2,3-trimethylbutane are three **structural isomers**.

5.1 Write down which of 2-methylhexane, 2,3-dimethylpentane and 2,2,3-trimethylbutane has the lowest boiling point. (1)

5.2 Select from the following keywords, to explain your answer to 5.1

Largest surface area

Smallest surface area

Weakest IMF

Stronger IMF

Hydrogen bonding

Van der waals, London

Van der Waals, dipole-dipole

Thus more energy needed to weaken IMF

Thus more likely to be a vapour

Thus higher resistance to flow

Thus less energy needed to weaken IMF

Thus less likely to be a vapour

Thus less resistance to flow (4)

LIVEWORKSHEETS

5.3 Which one of the three compounds would you expect to have the highest viscosity? Explain your answer.

Largest surface area

Smallest surface area

Weakest IMF

Stronger IMF

Hydrogen bonding

Van der waals, London

Van der Waals, dipole-dipole

Thus more energy needed to weaken IMF

Thus more likely to be a vapour

Thus higher resistance to flow

Thus less energy needed to weaken IMF

Thus less likely to be a vapour

Thus less resistance to flow (4)

[9]

Question 6

An experiment is conducted to determine the boiling point of organic compounds with similar molecular mass from three different homologous series, indicated with letters **A to C**, determined under the same conditions. The results are given in the table below:

ORGANIC COMPOUND	MOLECULAR FORMULA	BOILING POINT (°C)
A	$CH_3CH_2CH_2OH$	+ 97
B	$CH_3CH_2CH_2CH_3$	- 1
C	CH_3CH_2CHO	+ 48

LIVEWORKSHEETS

6.1 Write the NAME of the homologous series to which **A** belong. (1)

6.2 Identify the:

6.2.1 DEPENDENT variable for this investigation. (1)

6.2.2 INDEPENDENT variable for this investigation. (1)

6.3 Write down the IUPAC name for compound **C**. (1)

6.4 Which one of the compounds given in the table (write only A, B or C) will have the highest **Vapour pressure**. State the answer and then select the correct key words to explain your answer.

Largest surface area

Smallest surface area

Weakest IMF

Stronger IMF

Hydrogen bonding

Van der waals, London

Van der Waals, dipole-dipole

Thus more energy needed to weaken IMF

Thus more likely to be a vapour

Thus higher resistance to flow

Thus less energy needed to weaken IMF

Thus less likely to be a vapour

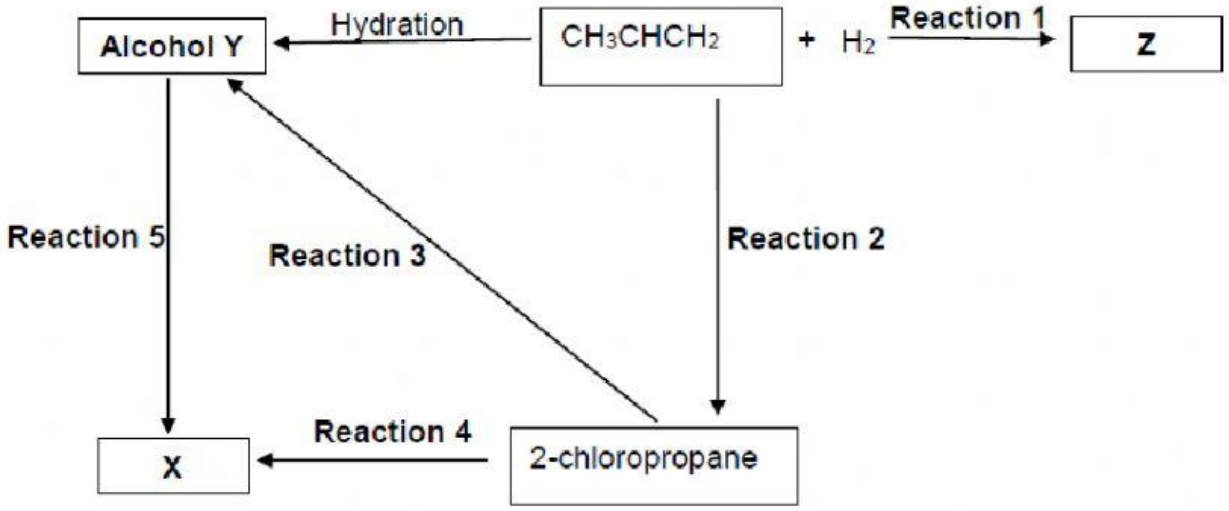
Thus less resistance to flow (3)

[7]

LIVEWORKSHEETS

Question 7

Study the flow diagram below, which represents various organic reactions, and answer the questions that follow.



7.1 **Reaction 1** is an example of an addition reaction. For **Reaction 1** write down:

7.1.1 The type of addition reaction (1)

7.1.2 The FORMULA of a suitable catalyst (1)

7.2 Write down the IUPAC name of compound **Y.** (1)

7.3 **Reaction 5** is an elimination reaction. For **Reaction 5** write down:

7.3.1 the name of the catalyst needed (1)

7.3.2 The IUPAC name of compound **X** (1)

LIVEWORKSHEETS

7.4 Name the type of reaction represented by reaction 4. Once again state addition, substitution or elimination and then the specific type. (2)

7.5 Both **Reactions 3** and **4** take place in the presence of an inorganic reagent.

7.5.1 Name the type of reaction represented by **Reaction 3**. (2)

7.5.2 Write down the TWO reaction conditions which would favour **Reaction 3** instead of **Reaction 4.** (2)

[11]

Ensure to do the next worksheet (second half of the test)

LIVEWORKSHEETS