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GLOBAL SCHOOL

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TEST 1 AC 2 ORGANIC CHEMISTRY

GRADE 12

MEMORANDUM

2024-04-25

QUESTION 1

Answer question 1 by placing a cross over the letter which you think is the correct answer. Answer all questions on this question paper.

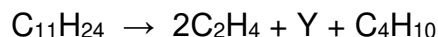
QUESTION 1				
1.1	A	B	C	D
1.2	A	B	C	D
1.3	A	B	C	D

QUESTION 1

1.1 Which one of the following statements is **correct**? Alkenes.....

- A have the general formula C_nH_{2n+2} .
- B are unsaturated hydrocarbons.
- C readily undergo substitution reactions.
- D have only single bonds between carbon atoms.

1.2 The following equation represents the cracking of a hydrocarbon at high temperature and pressure with no catalyst:



Which one of the following is the IUPAC name of product Y?

- A Propene
- B Propane
- C Ethene
- D Ethane

- 1.3 When 2-chlorobutane is strongly heated in the presence of concentrated sodium hydroxide, the product formed could be:

A buta -1,2- diene
 B but-2-ene
 C butane
 D butan-2-ol

[6]

QUESTION 2

Consider the organic compounds represented by the letters A to F shown below.

A	2,2,4-trimethylhexane	B	pentan-2-ol
C	$\text{CH}_3\text{CH}(\text{CH}_3)\text{CHClCHBrCH}_3$	D	$\text{C}_3\text{H}_6\text{O}_2$
E	methylethanoate	F	C_4H_8

- 2.1 Write down the letter that represents the following:

2.1.1 an alcohol. (1)

B ✓

2.1.2 an unsaturated compound. (1)

F ✓

2.1.3 an ester. (1)

E ✓

- 2.2 Write down the IUPAC name of:

2.2.1 compound C. (3)

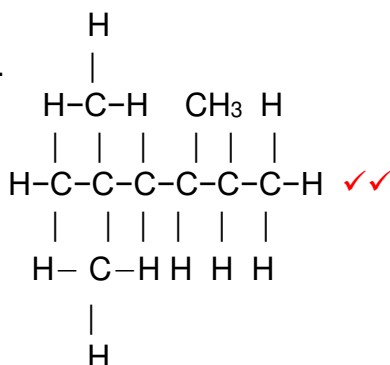
2-bromo-3-chloro-4-methylpentane

2.2.2 compound F. (1)

butene ✓

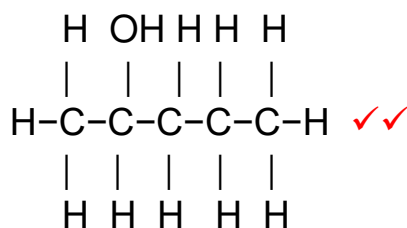
- 2.3 Draw the structural formula of:

2.3.1 compound A. (2)



2.3.2 compound B.

(2)



2.4 The table contains compounds which are functional isomers.

2.4.1 Define the term *functional isomers*.

(2)

Functional isomers are molecules that have the same molecular formula but different functional groups. ✓✓

2.4.2 Write down the letters of two compounds that are functional isomers.

(2)

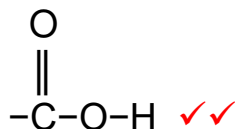
D and E ✓✓

[15]**QUESTION 3**3.1 Give a reason why alkanes are called *saturated* hydrocarbons. (2)

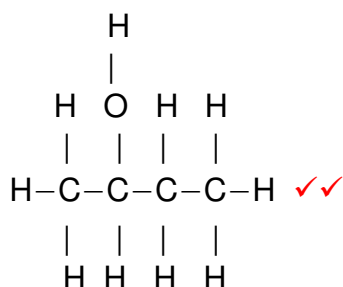
Saturated because every carbon atom is bonded to 4 other atoms/maximum number of other atoms OR only single bonds between carbon atoms. ✓✓

3.2 Write down the structural formula of:

3.2.1 the functional group of the carboxylic acids. (2)



3.2.2 an alcohol that is a positional isomer of butan-1-ol. (2)



- 3.3 Some students investigate the factors that influence the boiling points of the alkanes and the alcohols. In one of the investigations, they determine the boiling points of the first three alkanes.

Fully explain why the boiling point increases from methane to propane.

(5)

- The intermolecular forces in all the molecules are London forces. ✓
- Propane has a larger electron cloud than methane, ✓ greater distortion of electron cloud, stronger and more frequent momentary dipoles. ✓
- Stronger London forces between molecules of propane. ✓
- More energy is needed to separate the molecules. ✓

- 3.4 The students also find that the boiling point of propan-1-ol is higher than that of propane.

Explain this observation by referring to the type of intermolecular forces present in each of these compounds.

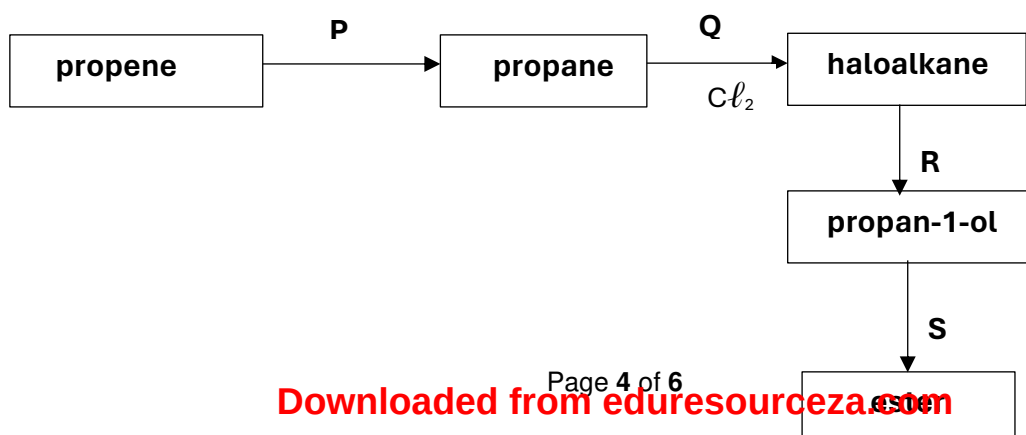
(3)

- In propane London forces, in propanol there are hydrogen bonds. ✓
- Hydrogen bonds are stronger than London forces. ✓
- More energy is needed to separate the molecules. ✓

[14]

QUESTION 4

The flow diagram below shows the preparation of an ester using prop-1-ene as a starting reagent. **P**, **Q**, **R** and **S** represent different organic reactions.



4.1 Write down the general type of reaction represented by:

4.1.1 Q

Substitution ✓

4.1.2 R

(2)

Substitution ✓

4.2 For reaction P, write down the:

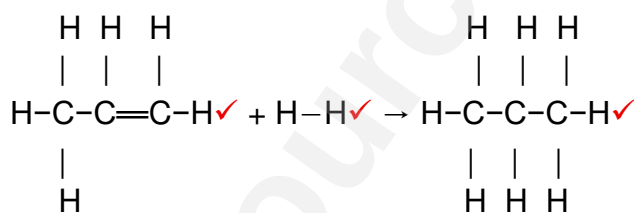
4.2.1 type of addition reaction.

(1)

Hydrogenation ✓

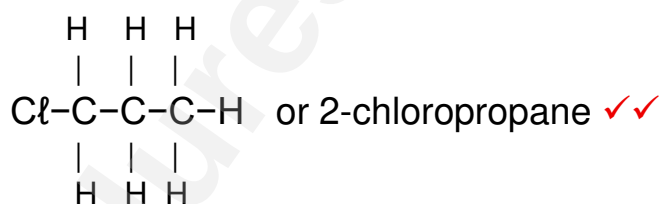
4.2.2 balanced equation using structural formulae.

(3)



4.3 Write down the structural formula of the haloalkane formed in reaction Q.

(2)



4.4 In reaction S, propan-1-ol reacts with ethanoic acid to form the ester.

For this reaction, write down the:

4.4.1 specific **name** of the reaction that takes place.

(1)

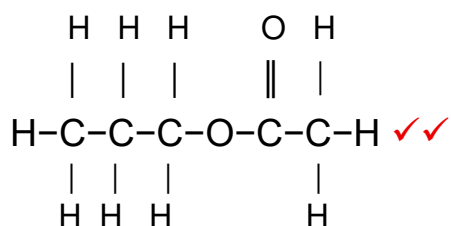
Esterification ✓

4.4.2 **name** of the catalyst needed.

(1)

(Concentrated) sulfuric acid ✓

4.4.3 structural formula of the ester formed. (2)



4.4.4 IUPAC name of the ester formed. (2)

Propylethanoate $\checkmark \checkmark$

4.5 The propan-1-ol formed in reaction R can be converted to propene. Write down the name or formula of the inorganic reagent needed. (1)

Sulfuric acid/ H_2SO_4 OR H_3PO_4 $\checkmark$

[15]

END

TOTAL MARKS: 50