



Province of the
EASTERN CAPE

EDUCATION

O.R. TAMBO INLAND DISTRICT

GRADE 12

PHYSICAL SCIENCES

TOPIC TEST : (ORGANIC REACTIONS)

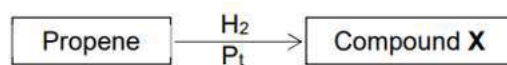
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March 2025

MARKS: 30

DURATION: 36 MINUTES

QUESTION 1

1.1 Consider the flow diagram below:



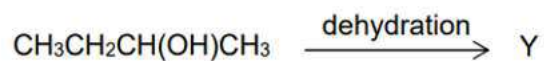
Compound X is:

- A Propyne
- B Propan-1-ol
- C Propane
- D Propan-2-ol

(2)

1.2

During the dehydration of butan-2-ol represented below, a major organic compound (Y) is formed.



Which of the following is the correct condensed structural formula for compound Y?

- A $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_3$
- B $\text{CH}_3\text{CHCHCH}_3$
- C $\text{CH}_3\text{CH}_2\text{CH}(\text{OH})\text{CH}_3$
- D $\text{CH}_3\text{CH}_2\text{CHCH}_2$

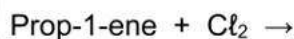
(2)

[4]

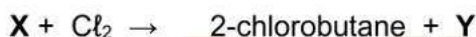
QUESTION 2

- 2.1 Prop-1-ene, an UNSATURATED hydrocarbon, and compound **X**, a SATURATED hydrocarbon, react with chlorine, as represented by the incomplete equations below.

Reaction I



Reaction II



- 2.1.1 Give a reason why prop-1-ene is classified as unsaturated. (1)
- 2.1.2 What type of reaction (ADDITION or SUBSTITUTION) takes place in the following: (1)
- (a) Reaction I (1)
- (b) Reaction II (1)
- 2.1.3 Write down the structural formula of the product formed in Reaction I. (2)
- 2.1.4 Write down the reaction condition necessary for Reaction II to take place. (1)
- 2.1.5 Write down the IUPAC name of reactant **X**. (1)
- 2.1.6 Write down the name or formula of product **Y**. (1)
- 2.2 2-chlorobutane can either undergo ELIMINATION or SUBSTITUTION in the presence of a strong base such as sodium hydroxide.
- 2.2.1 Which reaction will preferably take place when 2-chlorobutane is heated in the presence of CONCENTRATED sodium hydroxide in ethanol? Write down only SUBSTITUTION or ELIMINATION. (1)
- 2.2.2 Write down the IUPAC name of the major organic compound formed in QUESTION 5.2.1. (2)
- 2.2.3 Use structural formulae to write down a balanced equation for the reaction that takes place when 2-chlorobutane reacts with a DILUTE sodium hydroxide solution. (5)
- 2.2.4 Write down the name of the type of substitution reaction that takes place in QUESTION 5.2.3. (1)
- 2.2.4 use condensed structural formulae to write down a balanced equation for the reaction that takes place when 2-chlorobutane reacts with CONCENTRATED sodium hydroxide (5)
- 2.3.1 use condensed structural formulae to write down a balanced equation for the reaction that takes place when the POSITIONAL isomer of ORGANIC PRODUCT formed in 2.2.3 reacts with C₃H₆O₂ (4)



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MARKING GUIDELINES

TOPIC: ORGANIC MOLECULES

(ORGANIC REACTIONS)

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MARCH 2025

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QUESTION 1

1.1 C ✓✓ (2)

1.2 B ✓✓ (2)

[4]

QUESTION 2

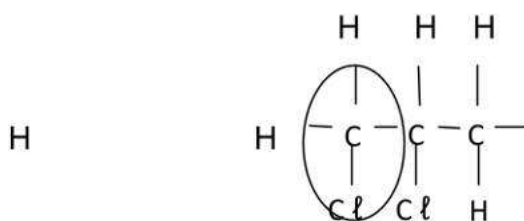
2.1.1 It contains a double bond (C = C) between two carbon atoms in its hydrocarbon chain. ✓ (1)

2.1.2

(a) Addition ✓ (1)

(b) Substitution ✓ (1)

2.1.3



Functional group encircled ✓

Molecule correct ✓

Condensed or semi-structural formula: Max. $\frac{1}{2}$

Molecular formula: $\frac{0}{2}$

2.1.4 Heat / sunlight / ultraviolet light ✓ (1)

2.1.5 Butane ✓ (1)

2.1.6 Hydrogen chloride / HCl ✓ (1)

Accept: Hydrochloric acid ✓ (1)

2.2.1 Elimination ✓ (1)

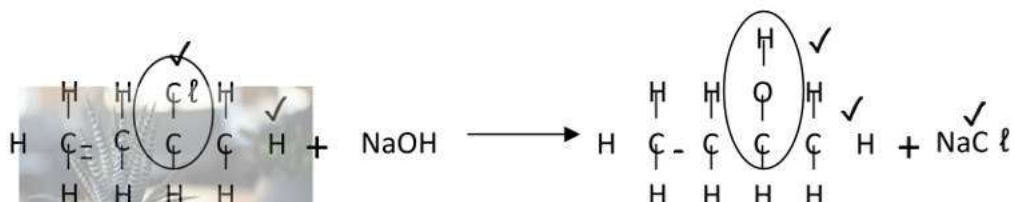
2.2.2 But-2-ene OR 2-butene ✓✓

(2)



2.2.3

- If an equation is written and the arrow is left out: -1 mark
- Marking rule 3.11



Ignore: =

Functional group circled ✓
Molecule correct ✓

Accept: -OH condensed in structural formula.

Condensed/semi-structural formulae or mixture of both Max $\frac{4}{5}$

Molecular formula for all structures, Eg. C_3H_7Cl Max $\frac{2}{5}$

Any additional reactant or products:
Max $\frac{4}{5}$

Everything correct, **wrong balancing**
Max $\frac{4}{5}$

2.2.4 Hydrolysis ✓

(1)

2.2.5

