higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

CHEMISTRY N5

(15040015)

19 April 2021 (X-paper)
09:00–12:00

This question paper consists of 6 pages and 1 periodic table.

231Q1A2119

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
CHEMISTRY N5
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Start each question on a new page.
5. Use only a black or blue pen.
6. Write neatly and legibly.

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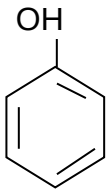
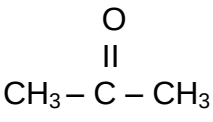
QUESTION 1

The table below represents six organic compounds.

A	$CH_2 = CH_2 – CH_3$	**B**	
C		**D**	$CH_3(CH_2)_4CH_3$
E	$CH_3 – C \equiv C – CH_3$	**F**	

1.1 Which compound is classified as heterocyclic? (1)

1.2 Which compound is classified as a saturated hydrocarbon? (1)

1.3 To which functional group does compound F belong to? (1)

1.4 Write the general formula of compound D. (1)

1.5 Write the IUPAC names of compounds A, B and F. (3 × 2) (6)

1.6 Draw and name all possible structural isomers of compound D. (3 × 2) (6)

1.7 Write a balanced reaction equation for the combustion of compound E. (4)

1.8 Give the type of reaction that occurs when compound A reacts with bromine. (1)

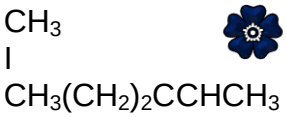
1.9 Give the type of hybridisation that occurs at C1 and C2 at compound E. (2)

1.10 Which compound is soluble in water? Explain the answer. (2)

[25]

QUESTION 2

2.1 Consider the structure:



2.1.1 Write the molecular formula of the compound. (1)

2.1.2 What is the general formula of the compound? (1)

2.1.3 Is the compound polar or nonpolar? Substantiate the answer. (2)

2.1.4 State Markovnikov's rule. (2)

2.1.5 The compound reacts with hydrogen chloride to form two products.

Apply Markovnikov's rule and write an equation for the reaction. (4)

2.1.6 Name the TWO products formed in QUESTION 2.1.5. (2 × 2) (4)

2.1.7 Name the TWO products formed when the compound reacts with ozone. (2 × 2) (4)

2.2 Draw the structure of an alkyne with four hydrogen atoms. (3)

2.3 Draw the structural formula of each of the compounds:

2.3.1 *p*-bromotoluene

2.3.2 1,3,5-trinitrobenzene

(2 × 2) (4)

[25]

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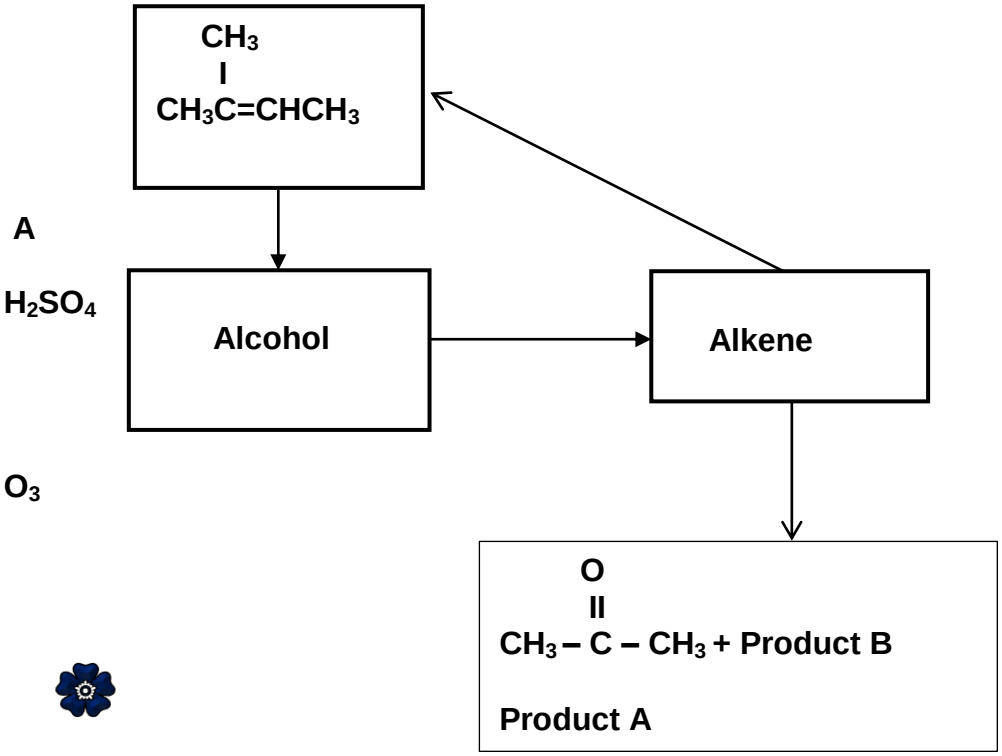
QUESTION 3

3.1



3.1.1 Draw the structural formula of the alcohol. (3)

3.1.2 Classify the alcohol as a primary, secondary or tertiary alcohol. Substantiate the answer. (2)

3.1.3 Which reagent is indicated as A on the reaction? (1)

3.1.4 Write the IUPAC name of the alcohol. (2)

3.1.5 The alcohol is converted to the alkene by adding sulphuric acid.

Which type of reaction is this? (1)

3.1.6 What is the general formula of compound A? (1)

3.1.7 Write the IUPAC name of product B. (2)

3.1.8 List FIVE properties of alcohols. (5)

3.2 If wine is exposed to air, bacteria enter and catalyse the oxidation of ethanol to form acetic acid and water.

Write an equation for the reaction. (4)

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3.3 Name each of the compounds:

3.3.1 

3.3.2 COH_2

(2 × 2) (4)
[25]

QUESTION 4

4.1 A group of students must prepare a compound that smells like oranges (octyl ethanoate).

4.1.1 Name the carboxylic acid they will use to prepare the ester. (2)

4.1.2 Draw the structure of the alcohol needed for the reaction. (3)

4.1.3 What is the homologous series of octyl ethanoate? (1)

4.1.4 Write a reaction for the preparation of octyl ethanoate. (4)

4.1.5 What is the general formula of carboxylic acid? (1)

4.2 Draw the structures of each of the compounds:

4.2.1 Propionic acid

4.2.2 Methyl ethyl ether

4.2.3 Trimethyl amine

(3 × 2) (6)

4.3 Write an equation for the dissociation of acetic acid in water. (4)

4.4 Give ONE term for each of the descriptions by writing it next to the question number (4.4.1–4.4.4) in the ANSWER BOOK.

4.4.1 Common name of an aldehyde with one carbon atom

4.4.2 Common name of an aromatic amine

4.4.3 5% solution of acetic acid in water

4.4.4 Amide that is a major component of animal waste found in urine

(4 × 1) (4)
[25]

TOTAL: 100

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THE PERIODIC TABLE OF ELEMENTS
DIE PERIODIEKE TABEL VAN ELEMENTE

