



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

CHEMISTRY N5

9 APRIL 2018

This marking guideline consists of 5 pages.

QUESTION 1

- 1.1 Ethane
- 1.2 Amides
- 1.3 Dehydration
- 1.4 Iodopropane
- 1.5 Butanoi
- 1.6 2-Butyne
- 1.7 Methylpropane
- 1.8 Methanoic acid
- 1.9 Aniline
- 1.10 Propyne

(10 × 1) [10]

QUESTION 2

- 2.1 2.1.1 sp^2 hybridization (1)
- 2.1.2 $C_2H_6(g) + Cl_2(g) \rightarrow C_2H_5Cl(g) + HCl(g)$ (4)
- 2.1.3 Radicals (1)
- 2.1.4 Heterolytic bond cleavage. ✓ It is a symmetrical bond cleavage, after the bond is broken, each atom leaves with an unpaired electron. ✓ (2)
- 2.1.5 It is an unsaturated hydrocarbon. (1)
- 2.1.6 $C_2H_6(g) + O_2(g) \rightarrow CO_2(g) + H_2O(l)$ (4)
- 2.1.7
 - They are nonpolar
 - They are insoluble in water and soluble in nonpolar compounds.
 - The boiling points of alkanes increase with an increase in molecular size.
 - Alkanes from $n=1$ to $n=4$ are gases at ordinary temperatures and pressures.
 - Alkanes from $n=5$ to $n=16$ are liquids at ordinary temperatures and pressures.
 - Those with more than 16 carbon atoms exists as waxy solids.
 (Any THREE) (3)

- 2.2 2.2.1 $C_2H_4(g) + HBr(g) \rightarrow C_2H_5Br(g)$ (3)
- 2.2.2
- An **electrophile** is an **electron lover** or a substance that accepts an electron pair from a nucleophile.
 - An **nucleophile** is an **electron rich** or a substance that donates a pair of electrons to an electrophile. It is also called a nucleus lover. (4)
- 2.2.3 It is a nonpolar compound. ✓ Generally alkenes are classified as nonpolar compounds. ✓ (2)
- [25]**

QUESTION 3

- 3.1
- $$\begin{array}{c} \text{H} \quad \text{O} \\ | \quad || \\ \text{H}-\text{C}-\text{C}-\text{OH} \\ | \\ \text{H} \end{array} \quad \text{and} \quad \begin{array}{c} \text{H} \quad \text{O} \\ | \quad || \\ \text{H}-\text{C}-\text{O}-\text{C}-\text{H} \\ | \\ \text{H} \end{array}$$
- Ethanoic acid ✓✓ Methylmethanoate ✓✓ (4)

- 3.2
- $$\begin{array}{c} \text{H} \quad \text{Br} \quad \text{H} \quad \text{H} \\ | \quad | \quad | \quad | \\ \text{H}-\text{C}-\text{C}-\text{C}-\text{C}-\text{H} \\ | \quad | \quad | \quad | \\ \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \end{array} \xrightarrow[\text{C}_2\text{H}_5\text{OH}]{\text{C}_2\text{H}_5\text{ONa}^+} \begin{array}{c} \text{H} \quad \text{H} \quad \text{H} \quad \text{H} \\ | \quad | \quad | \quad | \\ \text{H}-\text{C}-\text{C}=\text{C}-\text{C}-\text{H} \\ | \quad \quad \quad | \\ \text{H} \quad \quad \quad \text{H} \end{array} \checkmark\checkmark\checkmark\checkmark\checkmark$$
- 2-Bromobutane 2-Butene (5)

- 3.3 It is a carbon atom that has gained an electron, i.e. a carbon anion. (2)

- 3.4 3.4.1 RCOOH or $\text{R}-\overset{\text{O}}{\parallel}{\text{C}}-\text{OH}$ ✓ (1)
- 3.4.2 Addition reaction (1)
- 3.4.3 Alcohol (1)
- 3.4.4 Carboxylic acids (1)
- 3.4.5 $C_4H_6(g) + O_2(g) \rightarrow CO_2(g) + H_2O(l)$ (3)
- 3.4.6
- A Butene
 - B 2-propanol
 - C Ethene
 - D 1,2-Chloroethane
 - E Propanoic acid (5)

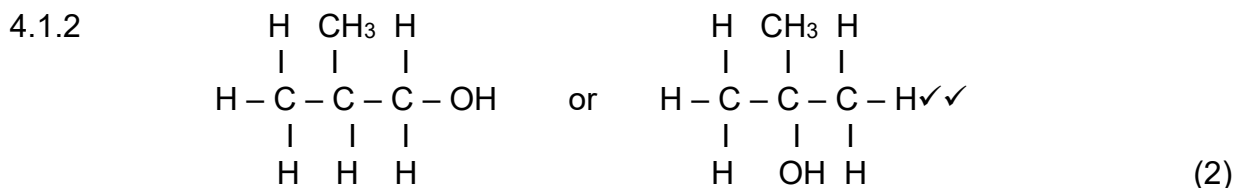
3.5



(2)
[25]

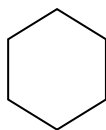
QUESTION 4

4.1 4.1.1 2-Methyl-1-propanol or 2-methyl-2-propanol (2)



4.1.3 Alcohols (1)

4.1.4 $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2\text{OH}$



(2)

4.2 4.2.1 $\text{CH}_3 - \text{CH}_2\text{OH}$ (2)

4.2.2 Primary alcohol. ✓ The $-\text{OH}$ functional group is bonded to a carbon atom that contains three hydrogen atoms. ✓ (2)

4.2.3 To remove water from the alcohol. (1)

4.3 Alcohols have strong intermolecular forces (hydrogen bonds) whereas alkanes does not have those strong intermolecular forces. (2)

4.4 4.4.1 $\text{MgBrCH}_2 - \text{CH}_3$

4.4.2 Ethylmagnesiumbromide

4.4.3 2-Methyl-2-butanol

(2 × 2) (6)
[20]

QUESTION 5

- 5.1 5.1.1 Carboxylic acid (1)
- 5.1.2 Ethanoic acid (2)
- 5.1.3
$$\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{O} - \overset{\text{O}}{\parallel}{\text{C}} - \text{CH}_3 + \text{water}$$
 (3)
- 5.1.4 Propylethanoate✓✓ + water✓✓ (4)
- 5.1.5 Esterification reaction (1)
- 5.2 5.2.1 Diethyl ether
- 5.2.2 Trimethyl amine
- 5.2.3 Ethanamide (3 × 2) (6)
- 5.3 $\text{NH}_2(\text{CH}_3)_2(\text{aq}) + \text{H}_2\text{O}(\ell) \rightarrow \text{CH}_3\text{NH}_3^+(\text{aq}) + \text{OH}^-(\text{aq})$ (3)

[20]**TOTAL: 100**