



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

CHEMISTRY N5

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This marking guideline consists of 4 pages.

QUESTION 1

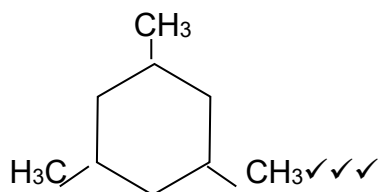
- 1.1 False
 1.2 True
 1.3 True
 1.4 False
 1.5 False

(5 × 1) [5]

QUESTION 2

- 2.1 2.1.1 B: 4-Ethyl-3-methylheptane
 C: 3-Ethyl-4,7-dimethylnonane (3 × 2) (6)
- 2.1.2 $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_3$ (2)
- 2.1.3 None (1)
- 2.1.4 C_9H_{20} (2)
- 2.1.5 $\text{C}_n\text{H}_{2n+2}$ (1)
- 2.1.6 None. ✓ Alkanes are insoluble in water. ✓ (2)
- 2.1.7 $\text{C}_{10}\text{H}_{22} + 33/2\text{O}_2(\text{g}) \rightarrow 10\text{CO}_2(\text{g}) + 11\text{H}_2\text{O}(\ell)$ (4)
- 2.1.8
- Alkanes are classified as saturated hydrocarbons.
 - Their boiling points increase with an increase in molecular weight.
 - Alkanes up to butane exist as gases at ordinary temperature and pressure.
 - Alkanes from $n = 5$ up to $n = 16$ are liquids at ordinary temperatures and pressures, and those with more than 16 carbon atoms are waxy solids.
 - Alkanes are non-polar and does not dissolve in water.
- (Any 4 × 1) (4)

2.2



[25]

QUESTION 3

- 3.1 3.1.1
$$\begin{array}{c} \text{CH}_2\text{CH}_3 \\ | \\ \text{CH}_3\text{CH}_2\text{CH}_2\text{C}=\text{CH}_2 \end{array} \checkmark\checkmark\checkmark \quad (3)$$
- 3.1.2 C_6H_{12} (1)
- 3.1.3 C_nH_{2n} (1)
- 3.1.4 Methanal
3-Hexanone (2 × 2) (4)
- 3.1.5
$$\begin{array}{c} \text{CH}_2\text{CH}_3 \\ | \\ \text{CH}_3\text{CH}_2\text{CH}_2\text{C}=\text{CH}_2 \end{array} + \text{H}_2 \rightarrow \begin{array}{c} \text{CH}_2\text{CH}_3 \\ | \\ \text{CH}_3\text{CH}_2\text{CH}_2\text{CH}-\text{CH}_3 \end{array} \checkmark\checkmark\checkmark \quad (3)$$
- 3.2 A Lindlar catalyst is a finely divided palladium metal \checkmark precipitated onto a calcium carbonate support \checkmark and then deactivated by treatment with lead acetate \checkmark and quinoline and aromatic amine. \checkmark (4)
- 3.3 3.3.1 $\text{CH}_2=\text{CHCH}=\text{CH}_2$
3.3.2 $\text{CH}_3\text{CH}_2\text{C}\equiv\text{CCH}_2\text{CH}_3$ (2 × 2) (4)
- [20]**

QUESTION 4

- 4.1 4.1.1
$$\begin{array}{c} \text{OH} \\ | \\ \text{CH}_3\text{CH}_2\text{CH}_2-\text{C}-\text{CH}_3 \\ | \\ \text{CH}_3 \end{array} \checkmark\checkmark \quad \text{2-Methyl-2-pentanol} \checkmark\checkmark \quad (4)$$
- 4.1.2 Tertiary alcohol (1)
- 4.1.3 Grignard reagent (1)
- 4.1.4 $\text{CH}_3\text{Br} + \text{Mg} \rightarrow \text{CH}_3\text{MgBr}$ (3)
- 4.1.5
- Alcohols containing up to 12 carbon atoms are liquid at ordinary temperature and pressure.
 - The boiling point of alcohols increases with an increase in molecular mass.
 - The high boiling points of alcohols results from hydrogen bonding.
 - Methanol, ethanol and propanol are soluble in water at ordinary temperature and pressure.
 - Solubility in water decreases with an increase in molecular mass.

4.2	4.2.1	Fermentation is a process or reaction in which sugars and carbohydrates✓ are broken down into ethanol and carbon dioxide.✓ The reaction is catalysed by certain enzymes that are found in yeast.✓	(3)
	4.2.2	In alcohols, hydrogen is directly bonded to the highly electronegative oxygen atom.✓ The hydrogen atom in one molecule is bonded to the oxygen end of a neighbouring molecule,✓ and the phenomenon is called hydrogen bonding.✓ This results in alcohols having higher boiling points than their corresponding alkanes.✓	(4)
4.3	4.3.1	Pentyl ethanoate	
	4.3.2	Ethyl butanoate	
	4.3.3	Octyl ethanoate	
			(3 × 2) (6)
			[30]

QUESTION 5

5.1	5.1.1	It is the removal of hydrogen from a molecule.	(2)
	5.1.2	Secondary alcohol.✓ Ketones are prepared by the dehydrogenation of secondary alcohols (-CHOH).✓	(2)
	5.1.3	2-Propanol	(3)
	5.1.4	<ul style="list-style-type: none"> • Potassium dichromate or $K_2Cr_2O_7$ • Potassium permanganate or $KMnO_4$ 	(2)
	5.1.5	$ \begin{array}{ccc} \text{OH} & & \text{O} \\ & & \\ \text{CH}_3\text{CHCH}_3 & \xrightarrow[\text{Cu/Ag catalyst}]{(550 - 600\text{ }^\circ\text{C})} & \text{CH}_3 - \text{C} - \text{CH}_3\checkmark\checkmark\checkmark \end{array} $	(3)
	5.1.6	To an unknown solution, add a few drops of Tollens' reagent or a silver salt solution.✓ If the silver ion is reduced to metallic silver, which forms a shiny mirror on the sides of the reaction tube,✓ it is a positive test for aldehydes.✓	(3)
5.2	5.2.1	Aniline	
	5.2.2	Acetamide	
	5.2.3	Urea	
	5.2.4	Methylamine	
	5.2.5	Methanal or formalin	
			(5 × 1) (5)
			[20]

TOTAL: 100