



higher education  
& training

Department:  
Higher Education and Training  
REPUBLIC OF SOUTH AFRICA

# MARKING GUIDELINE

NATIONAL CERTIFICATE

CHEMISTRY N5

19 April 2021

This marking guideline consists of 5 pages.

**QUESTION 1**

- 1.1 C (1)
- 1.2 D (1)
- 1.3 Ketones (1)
- 1.4  $C_nH_{2n+2}$  (1)
- 1.5 A: 1-propene  
B: Phenol  
F: Propanone (3 × 2) (6)
- 1.6  $\begin{array}{c} CH_3 \\ | \\ CH_3 - CH - CH_2 - CH_2 - CH_3 \end{array}$  ✓ 2-methylpentane ✓
- $\begin{array}{c} CH_3CH_3 \\ | \quad | \\ CH_3 - CH - CH - CH_3 \end{array}$  ✓ 2,3-dimethylbutane ✓
- $\begin{array}{c} CH_3 \\ | \\ CH_3 - CH_2 - CH - CH_2 - CH_3 \end{array}$  ✓ 3-methylpentane ✓
- $\begin{array}{c} CH_3 \\ | \\ CH_3 - C - CH_2 - CH_3 \\ | \\ CH_3 \end{array}$  ✓ 2,2-dimethylbutane ✓ (Any 3 × 2) (6)
- 1.7  $C_4H_6 + 11/2O_2(g) \rightarrow 4CO_2(g) + 3H_2O(l)$  (4)
- 1.8 Addition reaction. (1)
- 1.9 C1:  $Sp^3$   
C2:  $Sp$  (2)
- 1.10 • Compound B: ✓ Alcohols are soluble in water, but the extent of its solubility is limited. ✓  
• Compound F: ✓ Acetone is soluble in water. ✓ (Any 2 × 1) (2)

**[25]**

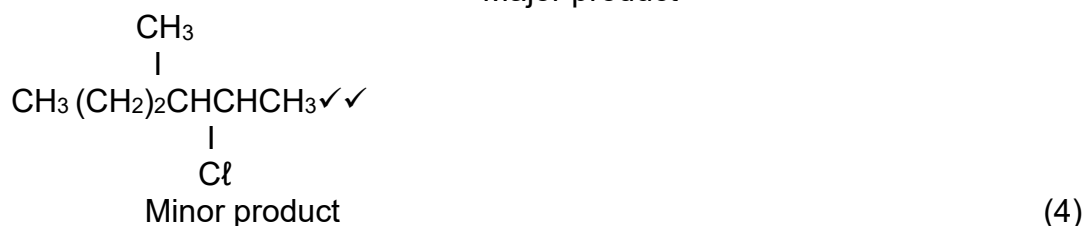
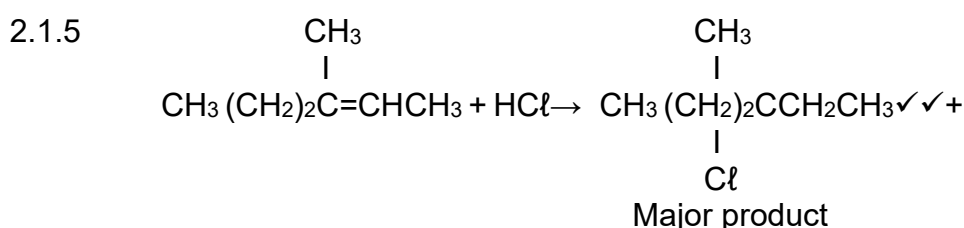
**QUESTION 2**

2.1 2.1.1  $C_7H_{14}$  (1)

2.1.2  $C_nH_{2n}$  (1)

2.1.3 It is nonpolar. ✓ Alkenes are nonpolar compounds. ✓ (2)

2.1.4 Markovnikov's rule states that during the addition of HX to an alkene, the H attaches itself to the carbon atom with fewer alkyl substituents and the X will attach itself to a carbon atom with more alkyl substituents. (2)



2.1.6

- 3-chloro-3-methylhexane
- 2-chloro-3-methylhexane

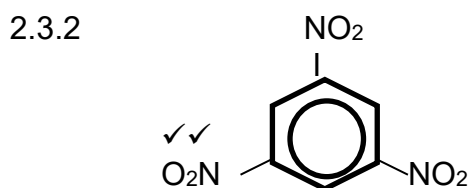
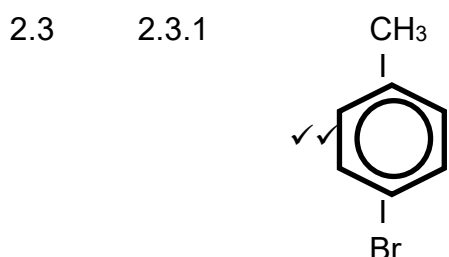
(2 × 2) (4)

2.1.7

- Ketone or 2-pentanone
- Aldehyde/Ethanal

(2 × 2) (4)

2.2  $\text{HC} \equiv \text{CCH}_3$  ✓ (3)



(2 × 2) (4)  
**[25]**

### QUESTION 3

- 3.1 3.1.1
- $$\begin{array}{c} \text{CH}_3 \\ | \\ \text{CH}_3 - \text{CH} - \text{CH} - \text{CH}_3 \\ | \\ \text{OH} \end{array} \checkmark \checkmark \checkmark$$
- (3)
- 3.1.2 Secondary alcohol ✓ The -OH functional group is bonded to a carbon atom with one hydrogen atom. ✓ (2)
- 3.1.3 Water (1)
- 3.1.4 3-methyl-2-butanol (2)
- 3.1.5 Dehydration reaction (1)
- 3.1.6 RCOR (1)
- 3.1.7 Ethanal (2)
- 3.1.8
- Alcohols containing up to 12 carbon atoms are liquid.
  - The boiling point of alcohols increases with an increase in molecular mass.
  - The high boiling points of alcohols result 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.
- (5)
- 3.2  $\text{CH}_3\text{CH}_2\text{OH} (\text{aq}) + \text{O}_2 (\text{g}) \rightarrow \text{CH}_3\text{COOH} (\text{aq}) + \text{H}_2\text{O} (\ell)$  (4)
- 3.3 3.3.1 Cyclopropanone  
3.3.2 Methanal (2 × 2) (4)
- [25]**

#### QUESTION 4

- 4.1 4.1.1 Ethanoic acid (2)
- 4.1.2  $\text{CH}_3(\text{CH}_2)_6\text{CH}_2\text{OH}$  (3)
- 4.1.3 Ester (1)
- 4.1.4  $\text{CH}_3(\text{CH}_2)_6\text{CH}_2\text{OH} + \text{CH}_3\text{COOH} \rightarrow \text{CH}_3\text{COOCH}_2(\text{CH}_2)_6\text{CH}_3 + \text{H}_2\text{O}$  (4)
- 4.1.5  $\text{RCOOR}$  (1)
- 4.2 4.2.1 
$$\begin{array}{c} \text{O} \\ \parallel \\ \text{CH}_3 - \text{CH}_2 - \text{C} - \text{OH} \end{array}$$
- 4.2.2  $\text{CH}_3 - \text{CH}_2 - \text{O} - \text{CH}_3$
- 4.2.3  $(\text{CH}_3)_3\text{N}$  (3 × 2) (6)
- 4.3  $\text{CH}_3\text{COOH} (\text{aq}) + \text{H}_2\text{O} (\ell) \rightarrow \text{CH}_3\text{COO}^- (\text{aq}) + \text{H}_3\text{O}^+ (\text{aq})$  (4)
- 4.4 4.4.1 Formalin
- 4.4.2 Aniline
- 4.4.3 Vinegar
- 4.4.4 Urea (4 × 1) (4)

[25]

**TOTAL: 100**