



Province of the  
**EASTERN CAPE**  
EDUCATION

Iphondo leMpuma Kapa: Isebe leMfundo  
Provinsie van die Oos Kaap: Departement van Onderwys  
Porafensie Ya Kapa Botjhabela: Lefapha la Thuto

**NATIONAL  
SENIOR CERTIFICATE/  
NASIONALE  
SENIORSERTIFIKAAT**

**GRADE/GRAAD 12**

**SEPTEMBER 2024**

**TECHNICAL SCIENCES P2/  
TEGNIESE WETENSKAPPE V2  
MARKING GUIDELINE/NASIENRIGLYN**

**MARKS/PUNTE: 75**

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This marking guideline consists of 10 pages./  
*Hierdie nasienriglyn bestaan uit 10 bladsye.*

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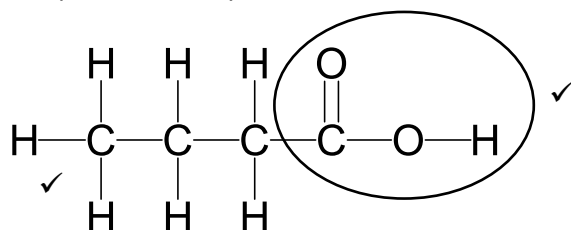
**QUESTION 1/VRAAG 1: MULTIPLE-CHOICE QUESTIONS/  
MEERVOUDIGEKEUSE-VRAE**

- 1.1 B ✓✓ (2)
- 1.2 C ✓✓ (2)
- 1.3 C ✓✓ (2)
- 1.4 A ✓✓ (2)
- 1.5 D ✓✓ (2)
- [10]**

**QUESTION 2/VRAAG 2**

- 2.1 2.1.1 A ✓ (1)
- 2.1.2 D ✓ (1)
- 2.1.3 B (and/en) E ✓ (1)
- 2.2 Butan✓-2-one ✓ (2-Butanone)  
Butan-2-oon (2-Butanoon) (2)

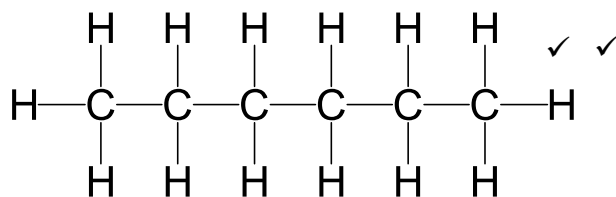
2.3 2.3.1



- Functional group correct/
- Whole structure correct/
- *Funksionele groep korrek*
- *Hele struktuur korrek*

(2)

2.3.2



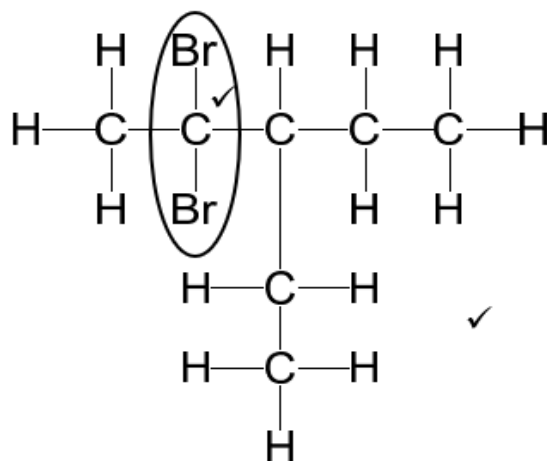
- Functional group correct
- Whole structure correct
- *Funksionele groep korrek*
- *Hele struktuur korrek*

(2)

2.4 2.4.1  $C_nH_{2n}$  ✓

(1)

2.4.2



- Functional group correct.
- Whole structure correct
- *Funksionele groep korrek*
- *Hele struktuur korrek*

(2)  
[12]

**QUESTION 3/VRAAG 3**

3.1 The temperature at which the vapor pressure of a liquid equals the atmospheric pressure. ✓✓/

*Die temperatuur waarby die dampdruk van 'n vloeistof gelyk is aan die atmosferiese druk.* (2)

3.2 Alkynes/Alkyne ✓ (1)

3.3 3.3.1 Chain length/Kettinglengte ✓ (1)

3.3.2 Homologous series (Accept functional group) ✓/  
*Homoloë reeks (Aanvaar funksionele groep)* (1)

3.4 - Only London forces are present in compound A and compound C. ✓  
- Compound A has a longer chain length than compound C. }  
- The longer the chain length the stronger the intermolecular forces. ✓ }  
- More energy is needed to overcome the bonds/intermolecular forces in compound A than in compound C. ✓

*- Verbinding A en verbinding C het beide slegs London-kragte.  
- Verbinding A het 'n langer kettinglengte as verbinding C.  
- Hoe langer die kettinglengte, hoe sterker is die intermolekulêre kragte.  
- Meer energie word benodig om die bindings/intermolekulêre kragte in verbinding A te oorkom as in verbinding C.*

**OR/OF**

- Only London forces are present in compound A and compound C.  
- Compound C has a shorter chain length than compound A.  
- The shorter the chain length the weaker the intermolecular forces.  
- Less energy is needed to overcome the intermolecular forces in C than in A.

*- Verbinding A en verbinding C het beide slegs London kragte.  
- Verbinding C het 'n korter kettinglengte as verbinding A.  
- Hoe korter die kettinglengte, hoe swakker is die intermolekulêre kragte.  
- Minder energie word benodig om die bindings/intermolekulêre kragte in verbinding C te oorkom as in verbinding A.* (3)

3.5 Compound C. ✓

The lower the boiling point/intermolecular forces, the higher the vapour pressure. ✓

**OR**

The higher the boiling point/intermolecular forces, the lower the vapour pressure.

*Verbinding C.*

*Hoe hoër die kookpunt/intermolekulêre kragte, hoe laer die dumpdruk.*

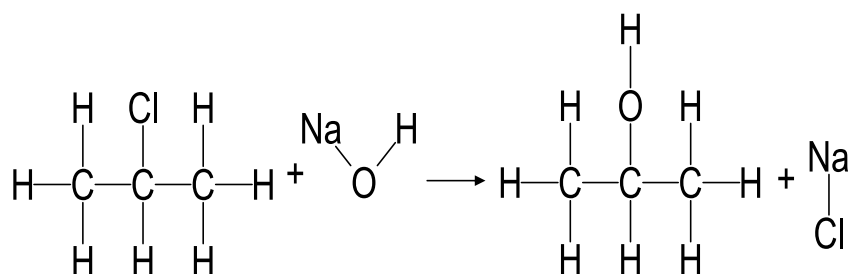
**OF**

*Hoe laer die kookpunt/intermolekulêre kragte, hoe hoër die dumpdruk is.*

(2)  
**[10]**

**QUESTION 4/VRAAG 4**

- 4.1 4.1.1 Addition/Hydrogenation ✓/  
*Addisie/hidrogenasie/hidrogenering* (1)
- 4.1.2 Substitution/Halogenation of alkanes ✓  
*Substitusie/Halogenasie/Halogenering van alkane* (1)
- 4.2 4.2.1 H<sub>2</sub>/Hydrogen gas/Diatomic Hydrogen ✓  
*H<sub>2</sub>/Waterstofgas/Diatomiese Waterstof* (1)
- 4.2.2 2-chloro✓propane ✓/*2-chloropropaan* (2)
- 4.2.3 Pt/Pb/Ni ✓ (1)
- 4.3 4.3.1 Hydrolysis (of haloalkanes) ✓/*Hidroliese (van haloalkane)* (1)



4.3.2

- |  |
|--|
| <ul style="list-style-type: none"> <li>• Reactants/<i>Reaktante</i></li> <li>• Products/<i>Produkte</i></li> <li>• Balancing/<i>Balansering</i></li> </ul> |
|--|

(3)

- 4.4  $2\text{C}_4\text{H}_{10} + 13\text{O}_2 \rightarrow 8\text{CO}_2 + 10\text{H}_2\text{O}$  ✓✓

- |  |
|--|
| <ul style="list-style-type: none"> <li>• Products/<i>Produkte</i></li> <li>• Balancing/<i>Balansering</i></li> </ul> |
|--|

(2)  
[12]

**QUESTION 5/VRAAG 5**

- 5.1 The process of adding impurities to intrinsic semiconductors. ✓✓/  
*Die proses waardeur onsuiverhede by intrinsieke halfgeleiers gevoeg word.* (2)
- 5.2 Diamond/Diamant, Ge **OR/OF** Sn ✓ (1)
- 5.3 5.3.1 p-type (semiconductor)/*p-tipe (halfgeleier)* ✓ (1)
- 5.3.2 Doping silicon with a group 3 element, such as gallium will form positive charge carriers (holes). ✓/  
*Om silikon met 'n groep 3 element soos galium te doteer, sal positiewe ladingdraers (holtes) vorm.* (1)
- 5.4 5.4.1 FORWARD BIAS/MEEVOORSPANNEND ✓ (1)
- 5.4.2 The positive terminal of the cell/battery is connected to the p-type semiconductor. ✓/  
*Die positiewe terminaal van die sel/battery is gekoppel aan die p-tipe halfgeleier.* (1)
- [7]**

**QUESTION 6/VRAAG 6**

- 6.1 The decomposition of a substance when an electric current is passed through it. ✓✓

**OR**

The chemical process in which electrical energy is converted to chemical energy.

**OR**

The use of electrical energy to produce a chemical change.

*Die ontbinding van 'n stof wanneer 'n elektriese stroom daardeur gelei word.*

**OF**

*Die chemiese proses waarin elektriese energie omgeskakel word na chemiese energie.*

**OF**

*Die gebruik van elektriese energie om 'n chemiese verandering teweeg te bring.*

(2)

- 6.2 Electrolytic cell/*Elektrolitiese sel* ✓ (1)

- 6.3 6.3.1 Cathode/*Katode* ✓ (1)

- 6.3.2 Anode ✓ (1)

- 6.4 Gas bubbles/*Gasborrels* ✓ (1)

- 6.5  $2Cl^- \rightarrow Cl_2 + 2e^-$  ✓✓



(2)

- 6.6 A substance that is oxidised/loses electrons. ✓✓

**OR**

A substance that undergoes oxidation.

*'n Stof wat geoksideer word/elektrone verloor.*

**OF**

*'n Stof wat oksidasie ondergaan.*

(2)

- 6.7  $Cl^-$  ✓ (1)

**[11]**



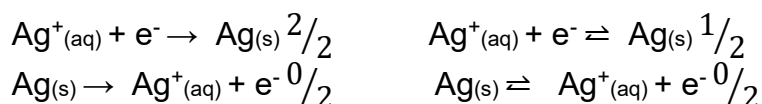
**QUESTION 7/ VRAAG 7**

7.1 The gain of electrons./Die wins van elektrone. ✓✓ (2)

7.2 Salt bridge/Soutbrug ✓ (1)

7.3 7.3.1 Chemical (energy) to electrical (energy). ✓/  
Chemiese (energie) na elektriese (energie) (1)

7.3.2  $\text{Ag}^+(\text{aq}) + \text{e}^- \rightarrow \text{Ag}(\text{s})$  ✓✓

**Marking criteria/Nasienkriteria**

- Do not penalise if phases are omitted./  
Moet nie penaliseer indien fases weggelaat word nie. (2)

7.3.3  $\text{Cu}(\text{s}) \mid \text{Cu}^{2+}(\text{aq}) \checkmark \parallel \checkmark \text{Ag}^+(\text{aq}) \mid \text{Ag}(\text{s}) \checkmark$

**Marking criteria/ Nasienkriteria**

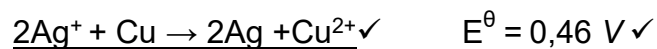
- Do not penalise if phases/concentration omitted./  
Moet nie penaliseer indien fases/konsentrasies weggelaat word nie. (3)

**7.4 OPTION/OPSIE 1**

$$E_{\text{cell}/\text{sel}}^{\theta} = E_{\text{cathode}/\text{katode}}^{\theta} - E_{\text{anode}}^{\theta} \checkmark$$

$$E_{\text{cell}/\text{sel}}^{\theta} = 0,80 \checkmark - 0,34 \checkmark$$

$$E_{\text{cell}/\text{sel}}^{\theta} = 0,46 \text{ V} \checkmark$$

**OPTION/OPSIE 2****Marking criteria/ Nasienkriteria**

- Penalise once if unconventional or incomplete formula is used/  
*Penaliseer een keer as onkonvensionele of onvolledige formule gebruik word.*
- Accredited any of the relevant formulae taken from the data book/  
*Aanvaar enige van die relevante formules wat uit die databoek geneem is.*

(4)  
[13]

**TOTAL/TOTAAL: 75**