



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE EXAMINATIONS/
NATIONAL SENIOR CERTIFICATE EXAMINATIONS/
SENIORSERTIFIKAAT-EKSAMEN/
NASIONALE SENIORSERTIFIKAAT-EKSAMEN**

TECHNICAL SCIENCES P2/TEGNIJSE WETENSKAPPE V2

MAY/JUNE/MEI/JUNIE 2024

MARKING GUIDELINES/NASIENRIGLYNE

MARKS/PUNTE: 75

**These marking guidelines consist of 6 pages.
*Hierdie nasienriglyne bestaan uit 6 bladsye.***

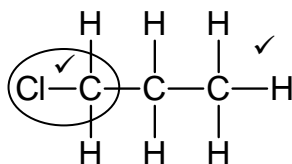
QUESTION/VRAAG 1

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

QUESTION/VRAAG 2

- 2.1 Organic compounds that consist of hydrogen and carbon (atoms) only. ✓✓
Organiese verbindings bestaan slegs uit waterstof en koolstof(atome) (2)
- 2.2 A ✓ and/en F ✓ (2)
- 2.3.1 $C_nH_{2n}O_2$ ✓ (1)
- 2.3.2 C_nH_{2n} ✓ (1)
- 2.4.1 Methyl✓ ethanoate ✓
Metieletanoaat (2)
- 2.4.2 Pent✓ane ✓
Pentaan (2)

2.5.1

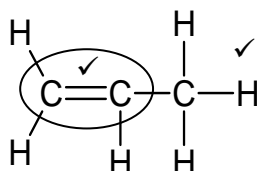


Marking criteria/Nasienkriteria:

- Correct functional group/Korrekte funksionele groep
- The whole structure correct/Volledige struktuur korrek
- If a bond or hydrogen is missing $\frac{1}{2}$ / Indien 'n binding of waterstof weggelaat word $\frac{1}{2}$

(2)

2.5.2



Marking criteria/Nasienkriteria:

- Correct functional group/Korrekte funksionele groep
- The whole structure correct/Volledige struktuur korrek
- If a bond or hydrogen is missing $\frac{1}{2}$ / Indien 'n binding of waterstof weggelaat word $\frac{1}{2}$

(2)

[14]

QUESTION/VRAAG 3

3.1 Alkanes ✓
Alkane (1)

3.2 Organic molecules with the same molecular formula ✓ but different structural formulae. ✓
Organiese molekules met dieselfde molekulêre formule, maar verskillende struktuurformule. (2)

3.3 Chain (isomers) ✓
Ketting(isomere) (1)

3.4 London forces ✓/Induced dipole forces/dispersion forces
Londonkragte/Geïnduseerde dipoolkragte/dispersiekragte (1)

3.5 A ✓ (1)


3.6 **NEGATIVE MARKING FROM QUESTION 3.5/NEGATIEWE NASIEN VANAF VRAAG 3.5**

Compound **A**/Butane is less branched than compound **B**/
2-methyl propane. ✓✓

*Verbinding **A**/Butaan is minder vertak as verbinding **B**/2-metielpropaan.*

OR/OF

Compound **B**/2-methyl propane is more branched than compound
A/Butane. ✓✓

*Verbinding **B**/2-metielpropaan is meer vertak as verbinding **A**/Butaan.*

OR/OF

Compound **A**/Butane has a longer chain length than compound **B**/
2-methyl propane.

*Verbinding **A**/Butaan het 'n langer ketting as verbinding **B**/2-metielpropaan.*

OR/OF

Compound **B**/2-methyl propane has a shorter chain length than compound
A/Butane.

*Verbinding **B**/2-metielpropaan het 'n korter ketting as verbinding **A**/Butaan.*

OR/OF

Compound **A**/Butane has a larger surface area than compound **B**/
2-methyl propane.

*Verbinding **A**/Butaan besit 'n groter oppervlaksarea as verbinding **B**/
2-metielpropaan.*

OR/OF

Compound **B**/2-methyl propane has a smaller surface area than compound
A/Butane.

*Verbinding **B**/2-metielpropaan besit 'n kleiner oppervlaksarea as verbinding
A/Butaan.*

(2)

3.7 The pressure exerted by a vapour at equilibrium with its liquid ✓ in a closed system. ✓

Die druk uitgeoefen deur 'n damp by ewewig met sy vloeistof in 'n geslote sisteem.

(2)

3.8.1 A ✓ or/of Butane/Butaan

(1)

3.8.2 B ✓ or/of 2-methylpropane/2-metielpropaan

(1)

[12]

QUESTION/VRAAG 4

4.1.1 Substitution ✓ /Hydrolysis
Substitusie/Hidrolise

(1)

4.1.2 CH₃CH₂OH ✓✓

(2)

4.1.3 Primary (alcohol) ✓
Primêre (alkohol)

(1)

4.2.1 2C₂H₂ + 5O₂ → 4CO₂ + 2H₂O ✓ + heat/hitte

(1)

4.2.2 Exothermic ✓ / Eksotermies
Heat (energy) is released. ✓✓ /Hitte (energie) word vrygestel.

(3)

4.3.1 Hydrogenation ✓
Hidrogenering/Hidrogenasie

(1)

4.3.2 But✓ane✓
Butaan

(2)

4.3.3 Platinum (Pt) ✓ / Palladium (Pd) / Nickel (Ni)
Platinum (Pt) / Palladium (Pd) / Nikkel (Ni)

(1)

4.4.1 A large molecule composed of smaller monomer units ✓ covalently bonded to each other in a repeating pattern. ✓

'n Groter molekule bestaande uit kleiner monomeer-eenhede wat kovalent verbind is met mekaar in 'n herhalende patroon.

(2)

4.4.2 Ethene ✓
Eteen

(1)

[15]

QUESTION/VRAAG 5

5.1 (Electrochemical) cell that converts electrical energy into chemical energy. ✓✓
(Elektrochemiese) sel wat elektriese energie omskakel na chemiese energie. (2)

5.2 Cr ✓ or/of Chromium/Chroom (1)

5.3 B ✓
It is an electrode where reduction takes place. ✓
Dit is 'n elektrode waar reduksie plaasvind.

OR/OF

It is an electrode which gains electrons./ Dit is 'n elektrode waar 'n wins van elektrone plaasvind. (2)

5.4.1 $\text{Cr} \rightarrow \text{Cr}^{3+} + 3\text{e}^-$ ✓✓

Marking criteria/Nasienkriteria:



Note/Let wel: Do not penalise if the phases are omitted./Moenie penaliseer indien die fases weggelaat word nie. (2)

5.4.2 $\text{Cr}^{3+} + 3\text{e}^- \rightarrow \text{Cr}$ ✓✓

Marking criteria/Nasienkriteria:



Note/Let wel: Do not penalise if the phases are omitted./Moenie penaliseer indien die fases weggelaat word nie. (2)

5.5 To provide (electrical) energy. ✓
Om (elektriese) energie te verskaf. (1)

5.6 • To ensure that oxidation and reduction half reactions do not occur at the same electrode (during different cycles/periods) ✓✓
Om te verseker dat oksidasie en reduksie halfreaksies nie by dieselfde elektrode (tydens verskillende siklusse/periodes) plaasvind nie.

OR/OF

- Polarity of the electrodes remains the same.
Polariteit van die elektrodes bly dieselfde.

OR/OF

- To provide current that flows in ONE direction.
Om stroom te voorsien wat in een rigting vloei.

(2)

[12]

QUESTION/VRAAG 66.1 Redox reaction ✓ / *Redoksreaksie*

OR/OF

Exothermic reaction/*Eksotermiese reaksie*

OR/OF

Spontaneous reaction/Spontane reaksie

(1)

6.2 0 (V) ✓ or/of Zero / *Nul*

(1)

6.3.1 $E^{\theta}_{\text{cell/sei}} = E^{\theta}_{\text{cathode/katode}} - E^{\theta}_{\text{anode/anode}}$ ✓
 $= -0,13 \text{ ✓} - (-1,66) \text{ ✓}$
 $= 1,53 \text{ V ✓}$

Marking criteria/Nasienkriteria:

- 1 mark for formula (Accept alternative formulae only from data sheet)./1 punt vir formule (Aanvaar alternatiewe formules slegs vanaf gegewensblad).
- 1 mark for EACH substitution./1 punt vir ELKE substitusie.
- 1 mark for final answer with correct unit./1 punt vir finale antwoord met korrekte eenheid.

(4)

6.3.2 Al ✓It undergoes oxidation. ✓✓ / *Dit ondergaan oksidasie.*

OR/OF

It loses electrons. / *Dit verloor elektrone.*

(3)

6.3.3 $2\text{Al (s)} + 3\text{Pb}^{2+}(\text{aq}) \text{ ✓} \rightarrow 2\text{Al}^{3+}(\text{aq}) + 3\text{Pb(s)} \text{ ✓}$ (Balancing ✓ / *Balansering*)**Marking criteria/Nasienkriteria:**

- Do not penalise if phases are omitted.
- Moenie penaliseer indien fases weggelaat word nie.

(3)

[12]**TOTAL/TOTAAL: 75**