



# basic education

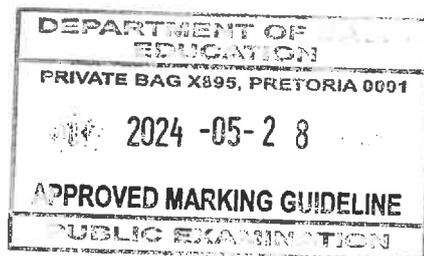
Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

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

**TECHNICAL SCIENCES P2/TEGNIESE 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.**

DBE IM  
21/05/2024

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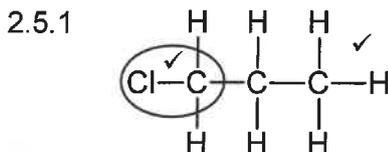
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**QUESTION/VRAAG 1**

- 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)

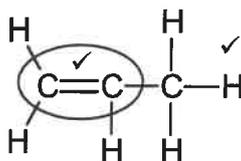


**Marking criteria/Nasienkriteria:**

- 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



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- Correct functional group/Korrekte funksionele groep
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(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.

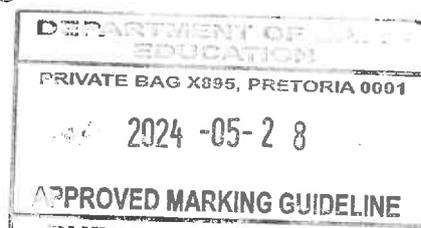
Verbinding **A**/Butaan besit 'n groter oppervlaksarea as verbinding **B**/  
2-metielpropaan.

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.

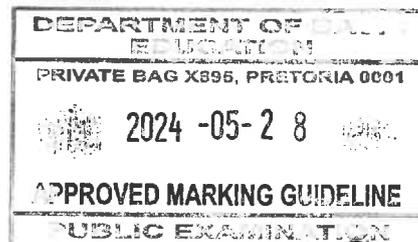
(2)



- 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-metielpropan (1)
- [12]**

**QUESTION/VRAAG 4**

- 4.1.1 Substitution ✓ /Hydrolysis  
*Substitusie/Hidrolise* (1)
- 4.1.2 CH<sub>3</sub>CH<sub>2</sub>OH ✓✓ (2)
- 4.1.3 Primary (alcohol) ✓  
*Primêre (alkohol)* (1)
- 4.2.1  $2\text{C}_2\text{H}_2 + 5\text{O}_2 \rightarrow 4\text{CO}_2 + 2\text{H}_2\text{O}$  ✓ + 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]**

*[Handwritten signatures]*

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

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

**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.

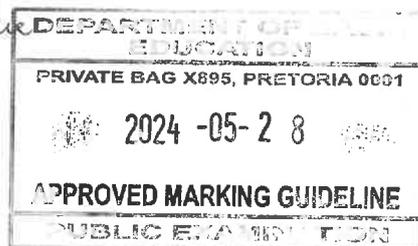
OR/OF

• 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 6

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

**Marking criteria/Nasienkriteria:**

- 1 mark for formula (Accept alternative formulae only from data sheet). / *1 punt vir formule (Aanvaar alternatiewe formules slegs vanaf gewensblad).*
- 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  $2\text{Al (s)} + 3\text{Pb}^{2+}(\text{aq}) \checkmark \rightarrow 2\text{Al}^{3+}(\text{aq}) + 3\text{Pb (s)} \checkmark$  (Balancing ✓ / *Balansering*)

**Marking criteria/Nasienkriteria:**

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

(3)

[12]

TOTAL/TOTAAL: 75

