



**NATIONAL
SENIOR CERTIFICATE/
NATIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

JUNE/JUNIE 2025

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

MARKS/PUNTE: 75

This marking guideline consists of 7 pages./
Hierdie nasienriglyn bestaan uit 7 bladsye.

QUESTION/VRAAG 1

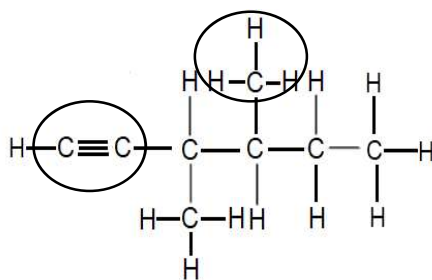
- 1.1 B ✓✓ (2)
- 1.2 C ✓✓ (2)
- 1.3 A ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 D ✓✓ (2)
- [10]**

QUESTION/VRAAG 2

- 2.1 A series of organic compounds that can be described by the same general formula and where each member differs from the next by a CH₂ group. ✓✓
'n Reeks organiese verbindings wat deur dieselfde algemene formule beskryf kan word en waarin die een lid van die volgende met 'n CH₂-groep verskil. (2)
- 2.2 2.2.1 Halo alkanes/Haloalkane ✓ (Accept: Alkyl halides/Aanvaar: Alkielhaliede) (1)
- 2.2.2 Alcohols/Alkohole ✓ (1)
- 2.3 2.3.1 G ✓ (1)
- 2.3.2 C ✓ (1)
- 2.3.3 E ✓ (1)
- 2.3.4 A ✓ (1)
- 2.3.5 F ✓ (1)
- 2.4 2.4.1 Organic molecules with the same molecular formula, but different structural formulae. ✓✓
Organiese molekule met dieselfde molekulêre formule, maar verskillende struktuurformules. (2)
- 2.4.2 Functional isomers/ Funksionele isomere ✓ (1)
- 2.5 PRIMARY/ PRIMÊRE ✓
The hydroxyl group/ OH-group/ Functional group is connected to a carbon atom that is connected to only one other carbon atom. ✓✓
Die hidroksielgroep/ OH-groep/ Funksionele groep is aan 'n koolstofatoom verbind wat aan net een ander koolstofatoom verbind is. (3)

2.6 2.6.1 Methyl ✓ propanoate ✓ / *Metielpropanoaat* (2)

2.6.2



MARKING CRITERIA/NASIENKRITERIA:

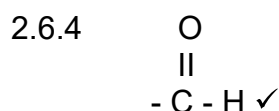
- Correct functional group/ *Korrekte funksionele groep* ✓
- Both substituents correct/ *Beide substituentte korrek* ✓
- Whole structure correct/ *Hele struktuur korrek* ✓

NOTE: If a bond or hydrogen is missing 2/3

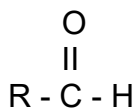
LET WEL: As 'n binding of waterstof ontbreek 2/3

(3)

2.6.3 Carbonyl (group) / *Karboniel (groep)* ✓ (1)



ACCEPT/AANVAAR:



(1)

2.7 2.7.1 A chemical reaction in which monomer molecules join to form a polymer ✓✓

'n Chemiese reaksie waarin monomeermolekule verbind om 'n polimeer te vorm

(2)

2.7.2 Polyethylene/ Polythene ✓✓
Poliëtileen/ Politeen

(2)

[26]

QUESTION/VRAAG 3

- 3.1 The temperature at which the vapour pressure equals atmospheric pressure. ✓✓

Die temperatuur waarby die dampdruk aan atmosferiese druk gelyk is. (2)

- 3.2 3.2.1 (London forces and) Dipole-dipole forces ✓

(London-kragte en) Dipool-dipoolkragte (1)

- 3.2.2 (London forces and) Hydrogen bonds ✓

(London-kragte en) Waterstofbindings (1)

- 3.3 Both compounds A and B/propane and butane have London forces. ✓
Compound B/butane has a longer chain length/larger surface area than compound A/propane. ✓
Compound B/butane has stronger intermolecular forces/London forces than compound A/propane. ✓
More energy is needed to overcome the intermolecular forces/ London forces/bonds in compound B/butane than in compound A/propane. ✓

*Beide verbindings A en B/propaan en butaan het London-kragte. ✓
Verbinding B/butaan het 'n langer kettinglengte/groter oppervlakte as verbinding A/propaan. ✓
Verbinding B/butaan het sterker intermolekulêre kragte/London-kragte as verbinding A/propaan. ✓
Meer energie is nodig om die intermolekulêre kragte/ London-kragte/bindings in verbinding B/butaan te oorkom as in verbinding A/propaan. ✓*

OR/OF

Both compounds A and B/propane and butane have London forces.
Compound A/propane has a shorter chain length/smaller surface area than compound B/butane.
Compound A/propane has weaker intermolecular forces/London forces than compound B/butane.
Less energy is needed to overcome the intermolecular forces/London forces/bonds in compound A/propane than in compound B/butane.

*Beide verbindings A en B/propaan en butaan het London-kragte.
Verbinding A/propaan het 'n korter kettinglengte/kleiner oppervlakte as verbinding B/butaan.
Verbinding A/propaan het swakker intermolekulêre kragte/London-kragte as verbinding B/butaan.
Minder energie is nodig om die intermolekulêre kragte/London-kragte/bindings in verbinding A/propaan te oorkom as in verbinding B/butaan. (4)*

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

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

(2)

- 3.5 Propane/ Compound A ✓ *Propaan/Verbinding A*

It has the weakest intermolecular force. ✓

Accept: It has the lowest boiling point

Dit het die swakste intermolekulêre krag.

Aanvaar: *Dit het die laagste kookpunt*

(2)

- 3.6 Butan-1-ol/ Compound E ✓ *Butan-1-ol/ Verbinding E*

(1)

[13]

QUESTION/VRAAG 4

4.1 4.1.1 Addition/Hydrogenation ✓
Addisie/Hidrogenasie/Hidrogenering (1)

4.1.2 Addition/Hydrohalogenation ✓
Addisie/Hidrohalogenasie/Hidrohalogenering (1)

4.1.3 Substitution/Hydrolysis of haloalkanes ✓
Substitusie/Hidrolise van haloalkane (1)

4.2 4.2.1 H₂ ✓ (1)

4.2.2 Pt(Platinum)/Pd(Palladium)/Ni(Nickel/Nikkel) ✓ (1)

4.3 4.3.1

CCCCBr

(2)

MARKING CRITERIA/NASIENKRITERIA:

- Correct functional group/ Korrekte funksionele groep ✓
- Whole structure correct/ Hele struktuur korrek ✓

NOTE: If a bond or hydrogen is missing 1/2

LET WEL: As 'n binding of waterstof ontbreek 1/2

4.3.2 2-Bromo ✓ butane ✓
2-Bromobutaan (2)

4.4 4.4.1 Hydration ✓✓
Hidrasie (2)

4.4.2 Butan ✓-2-ol ✓ (2)

4.4.3 Excess water ✓
Strong acid/ H₂SO₄/ Sulfuric acid/ H₃PO₄/ Phosphoric acid ✓

Oormaat water

Sterk suur/ H₂SO₄/ Swaelsuur/ H₃PO₄/ Fosforsuur

(2)
[15]

QUESTION/VRAAG 5

- 5.1 A pure semiconductor. ✓✓
'n Suiwer halfgeleier. (2)
- 5.2 Diamond / Si(Silicon) / Ge(Germanium) / Sn(Gray tin)
Diamant / Si(Silicon) / Ge(Germanium) / Sn(Grys tin)
Any ONE/Enige EEN ✓ (1)
- 5.3 REVERSE BIAS / TEENVOORSPANNING ✓
The p-type material is connected to the negative terminal of the cell and the n-type is connected to the positive terminal of the cell. ✓✓
Die p-tipe materiaal is aan die negatiewe terminaal van die sel gekoppel en die n-tipe is aan die positiewe terminaal van die sel gekoppel. (3)
- 5.4 The process of adding impurities to intrinsic semiconductors. ✓✓
Die proses waardeur onsuiverhede by intrinsieke halfgeleiers gevoeg word. (2)
- 5.5 To improve the electrical conducting ability /electrical conductivity
(of intrinsic semiconductors) ✓✓
Om die elektriese geleidingsvermoë (van intrinsieke halfgeleiers) te verbeter (2)
- 5.6 A P-type semiconductor ✓
'n P-tipe halfgeleier (1)
- [11]**
- TOTAL/TOTAAL: 75**