



**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

JUNE 2026/JUNIE 2026

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

MARKS/PUNTE: 75

This marking guideline consists of 8 pages./
Hierdie nasienriglyn bestaan uit 8 bladsye.

QUESTION/VRAAG 1

- 1.1 C ✓✓ (2)
- 1.2 B ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 D ✓✓ **ACCEPT/ AANVAAR C** (2)
- 1.5 B ✓✓ (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 $(-)\text{CH}_2$ ✓✓
’n Reeks organiese verbindings wat beskryf kan word deur dieselfde algemene formule en waar elke lid van die volgende met $(-)\text{CH}_2$ verskil. (2)
- 2.2 2.2.1 Alkene / Alkeen ✓ (1)
- 2.2.2 C_5H_{10} ✓ (1)
- 2.2.3 Hydroxyl (group) ✓ / Hidroksiel (groep) (1)
- 2.2.4 2-methyl ✓ / -1-butanol ✓ / 2-methyl ✓ / butan-1-ol ✓
2-metiel ✓ / butan-1-ol ✓ / 2-metiel ✓ / -1-butanol ✓

MARKING CRITERIA/NASIENKRITERIA:

- 1 mark for 2- methyl and 1 mark for butan-1-ol
Penalise if hyphen is not used
- 1 punt vir 2- metiel en 1 punt vir butan-1-ol
Penaliseer as koppelteken nie gebruik is nie. (2)

- 2.2.5 A ✓

APPLY NEGATIVE MARKING/TOEPASSING VAN NEGATIEWE NASIEN

It contains a carbon-carbon double bond ✓
Dit bevat koolstof-koolstof dubbelbinding

OR/OF

It contains a $\text{C}=\text{C}$ double bond / *Dit bevat $\text{C}=\text{C}$ dubbel binding.*
 It is an alkene. / *Dit is ’n alkeen*

OR/ OF

*It contains a double bond/ multiple bond between carbon atoms.
 Dit bevat ’n dubbel binding/verskeie binding tussen die koolstof atome.* (2)

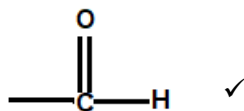
- 2.3 2.3.1 (Organic molecules) with the same molecular formula ✓ but with different structural formulae. ✓
 (Organiese molekules) met dieselfde molekulêre formules, maar met verskillende struktuur formules. (2)
- 2.3.2 Functional (isomers) ✓ / *Funksionele (isomere)* (1)
- 2.3.3 D ✓ (1)

2.3.4 propan ✓ al ✓ / propaan al

MARKING CRITERIA/NASIENKRITERIA:

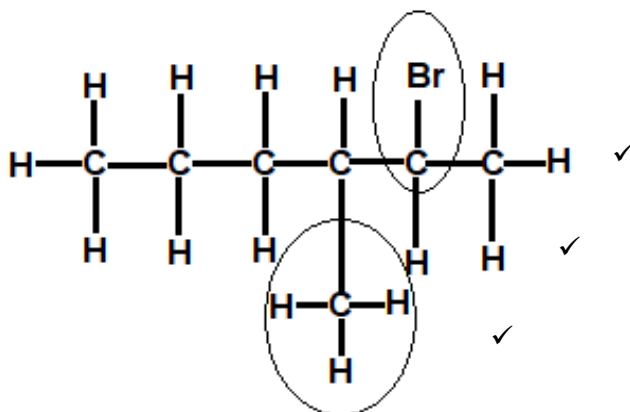
- 1 mark for propan/ 1 punt vir propaan
- 1 mark for al / 1 punt vir al

2.3.5



(1)

2.4



MARKING CRITERIA/ NASIENKRITERIA:

- Correct functional group ✓ / Korrekte funksionele groep
- Correct methyl substituent ✓ / Korrekte metiel substitusie
- Whole structure correct ✓ / Die hele struktuur is korrek

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

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

(3)
[19]

QUESTION/VRAAG 3

- 3.1 The temperature at which the vapour pressure is equal to the atmospheric pressure. ✓✓ /
Die temperatuur waarteen die dampdruk gelyk is aan die atmosferiese druk. (2)
- 3.2 Alkanes ✓ / *Alkane* (1)
- 3.3
- Both compound D/butane and compound A/methane contain London forces/Induced dipole forces/dispersion forces. ✓
 - Compound D/ butane has a longer chain length/higher number of carbon atoms than compound A/methane. ✓
 - The longer the chain length /Higher the number of carbon atoms the stronger the intermolecular forces. ✓
 - More energy is needed to overcome the intermolecular forces /bonds in compound D/butane than in compound A/methane. ✓
- 1 mark for either bullet 2 or 3

OR

- Both compound A/methane and compound D/butane contain London forces/Induced dipole forces/dispersion forces. ✓
 - Compound A/methane has a shorter chain length/lower number of carbon atoms than compound D/butane. ✓
 - The shorter the chain length /Lower the number of carbon atoms the weaker the intermolecular forces. ✓
 - Less energy is needed to overcome the intermolecular forces /bonds in compound A/methane than in compound D/butane. ✓/
- 1 mark for either bullet 2 or 3
- *Beide verbinding D/butaan en verbinding A/metaan bevat London-kragte/geïnduseerde dipoolkragte/dispersiekragte.*
 - *Verbinding D/butaan het 'n langer kettinglengte/Hoër aantal koolstofatome as verbinding A/metaan.*
 - *Hoe langer die kettinglengte/Hoër die aantal koolstofatome, hoe sterker die intermolekulêre kragte.*
 - *Meer energie is nodig om die intermolekulêre kragte/bindings in verbinding D/butaan te oorkom as in verbinding A/metaan.*
- 1 punt vir kolpunt 2 of 3

OF

- *Beide verbinding A/metaan en verbinding D/butaan bevat London-kragte/geïnduseerde dipoolkragte/dispersiekragte.*
 - *Verbinding A/metaan het 'n korter kettinglengte/laer aantal koolstofatome as verbinding D/butaan.*
 - *Hoe korter die kettinglengte/Laer die aantal koolstofatome, hoe swakker die intermolekulêre kragte.*
 - *Minder energie is nodig om die intermolekulêre kragte/bindings in verbinding A/metaan te oorkom as in verbinding D/butaan.*
- 1 punt vir kolpunt 2 of 3
- (3)

3.4 Compound D ✓ / Butane / *Verbinding D / Butaan*

**APPLY NEGATIVE MARKING/
TOEPASSING VAN NEGATIEWE NASIEN**

It has the *highest boiling point*. ✓ / *Dit het die hoogste kookpunt.*

OR/OF

It has the strongest intermolecular forces. / *Dit het die sterkste intermolekulêre kragte.*

OR/OF

The higher the boiling point the higher the viscosity. / *Hoe hoër die kookpunt, hoe hoër die viskositeit*

(2)

3.5 Compound A / Methane ✓ / *Verbinding A / Metaan*

**APPLY NEGATIVE MARKING /
TOEPASSING VAN NEGATIEWE NASIEN**

It has the lowest boiling point. ✓ / *Dit het die laagste kookpunt.*

OR/OF

It has the weakest intermolecular force. / *Dit het die swakste intermolekulêre kragte.*

OR/OF

The lower the boiling point the higher the vapour pressure. / *Hoe laer die kookpunt, hoe hoër die dampdruk.*

(2)

3.6 HIGHER ✓ / *HOËR*

(1)

[11]

QUESTION/VRAAG 4

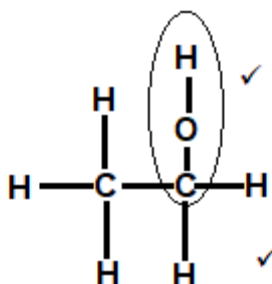
- 4.1 4.1.1 Hydrogenation ✓ / *Hidrogenasie* (1)
- 4.1.2 Hydration ✓ / *Hidrasie* (1)
- 4.1.3 Hydrohalogenation ✓ / *Hidrohalogenasie* (1)
- 4.2 4.2.1 Pt(Platinum)/Pd(Palladium)/Ni(Nickel/ *Nikkel*) ✓ (1)
- 4.2.2 Ethane ✓✓ / *Etaan* (2)
- 4.3 4.3.1 Oxidation **OR** Combustion ✓ / *Oxidasie OF Verbranding* (1)
- 4.3.2 $2C_2H_6 + 7O_2 \checkmark \rightarrow 4CO_2 + 6H_2O \checkmark$ **balancing** ✓ / *balansering*. (1)

MARKING CRITERIA/ NASIENKRITERIA

- 1 mark for reactants ✓ / *1 punt vir reagense*
- 1 mark for products ✓ / *1 punt vir produkte*
- 1 mark for balancing ✓ / *1 punt vir gebalanseer*

(3)

- 4.4 4.4.1

**MARKING CRITERIA/ NASIENKRITERIA**

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

NOTE: If a bond or hydrogen is missing $\frac{1}{2}$ **LET WEL:** As 'n binding of waterstof ontbreek is $\frac{1}{2}$

(2)

- 4.4.2 PRIMARY ALCOHOL ✓ / *PRIMÊRE ALKOHOL*
NEGATIVE MARKING / NEGATIEWE NASIEN

It is an organic compound in which the carbon atom to which the hydroxyl/OH group is attached, ✓ is bonded to only ONE other carbon atom. ✓ /

Dit is 'n organiese verbinding waarin die koolstofatoom waaraan die hidroksiel/OH-groep geheg is, aan slegs EEN ander koolstofatoom gebind is.

(3)

4.5 4.5.1 chloro ✓ ethane ✓ / 1-chloroethane // chloro ✓ etaan ✓ / 1-chloroetaan

MARKING CRITERIA/ NASIENKRITERIA

- 1 mark for chloro / 1 punt vir chloro
- 1 mark for ethane / 1 punt vir etaan

(2)

4.5.2 No water must be present. ✓

Accept: Anhydrous solution

Geen water moet teenwoordig wees nie.

Aanvaar: Watervrye oplossing

(1)

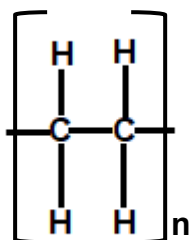
4.6 Substitution (reaction) / Hydrolysis (of haloalkanes) ✓ /
Substitusie (reaksie)/ Hidrolise (van haloalkane)

(1)

4.7 4.7.1 A large molecule composed of smaller monomer units covalently bonded to each other ✓ in a repeating pattern. ✓ /
'n Groot molekule wat bestaan uit kleiner monomer eenhede wat kovalent aan mekaar in herhalende patroon gebind is.

(2)

4.7.2



MARKING CRITERIA/ NASIENKRITERIA:

- 1 mark for correct structure of polyethene ✓ / 1 punt vir korrekte struktuur van politeen
- 1 mark for 'n' ✓ / 1 punt vir 'n'

(2)

4.7.3 Making plastic products such as:

- Film ✓ (eg. "glad wrap", plastic bags, lining in cardboard containers)
 - Injection moulding ✓ (eg. Bowls, buckets, crates, trash cans)
 - Blow moulding (eg. Spray bottles)/ Extrusion (eg. Flexible water pipes, cable sheaths)
 - Plastic Bottles
- (Accept any TWO applicable uses.)

Maak van plastiek produkte soos:

- *Film (bv. "glad wrap", plastiëksake, voering in karton houers)*
 - *Spuigiet (bv. bakke, emmers, kratte, asblikke)*
 - *Blaasvorming (bv. spuitbottels) / Extrusie (bv. buigbare waterpype, kabel omhulsels)*
 - *Plastiekbottels*
- (Aanvaar enige TWEE toepaslike gebruike.)

(2)

[25]

QUESTION/VRAAG 5

- 5.1 A semiconductor is a material which has electrical conductivity between that of a conductor and an insulator. ✓✓
’n Halfgeleier is ’n stof wat geleidingsvermoë tussen ’n geleier en ’n insulator het. (2)
- 5.2 5.2.1 Intrinsic (semiconductor) ✓/ *Intrinsieke (halfgeleier)*
Accept: Pure (semiconductor) or Tetravalent (semiconductor)
Aanvaar: Suiwer (halfgeleier) of Tetravalente (halfgeleier). (1)
- 5.2.2 Doping is the process of adding impurities to intrinsic semi-conductors. ✓✓/ *Doktering is die proses om onsuiverhede by intrinsieke halfgeleiers te voeg.* (2)
- 5.2.3 To improve the electrical conducting ability /electrical conductivity (of intrinsic semiconductors). ✓✓
OR
 To (control and significantly) increase their electrical conductivity.
Om die elektriese geleidingsvermoë / (van intrinsieke halfgeleiers) te verbeter.
OF
Om hul elektriese geleidingsvermoë te (beheer en aansienlik) te verhoog. (2)
- 5.2.4 N-type (semiconductor)✓ / *N-tipe (halfgeleier)*
APPLY NEGATIVE MARKING / TOEPASSING VAN NEGATIEWE MERKING
 Doping silicon with a group 15 element, (such as arsenic) will produce an excess of negative charge carriers(electrons). ✓✓
OR
 During doping there is an excess amount of a negative charge because of the donated unpaired electron.
OR
 Pentavalent element impurity was added which contributed to an excess amount of negative charges.
Doktering van silikon met ’n groep 15-element (soos arseen) sal ’n oormaat negatiewe ladingsdraers (elektrone) produseer.
OF
Tydens doktering is daar ’n oormaat negatiewe lading as gevolg van die geskenkte ongepaarde elektron.
OF
’n Pentavalente element-onsuiverheid is bygevoeg wat bygedra het tot ’n oormaat negatiewe ladings. (3)

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