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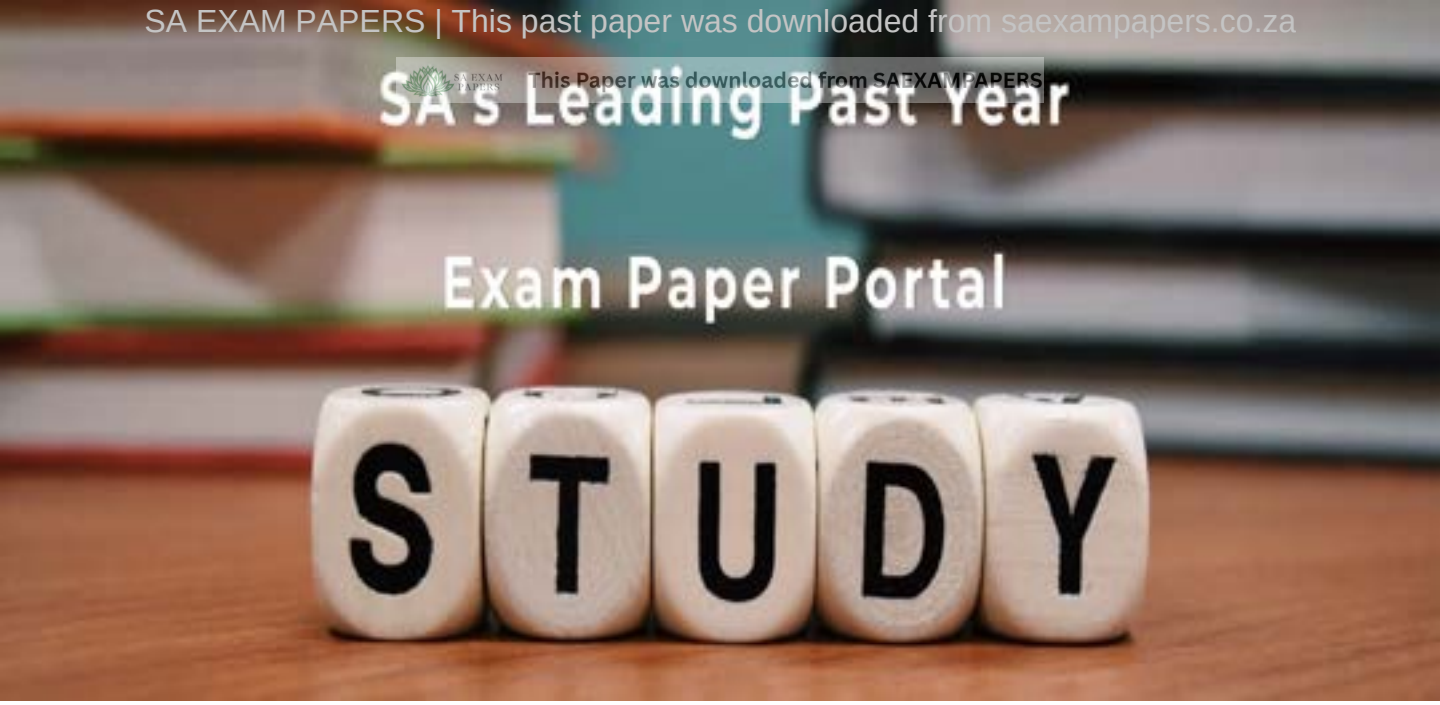

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NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

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.

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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 (–)CH_2 ✓✓

'n Reeks organiese verbindings wat beskryf kan word deur dieselfde algemene formule en waar elke lid van die volgende met (–)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 C=C double bond / *Dit bevat C=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 formule. (2)

2.3.2 Functional (isomers) ✓/ *Funksionele (isomere)* (1)

2.3.3 D ✓ (1)

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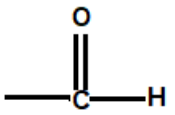
2.3.4 propan ✓ al ✓/*propaan al*

MARKING CRITERIA/*NASIENKRITERIA:*

- 1 mark for propan/ *1 punt vir propaan*
- 1 mark for al / *1 punt vir al* (2)

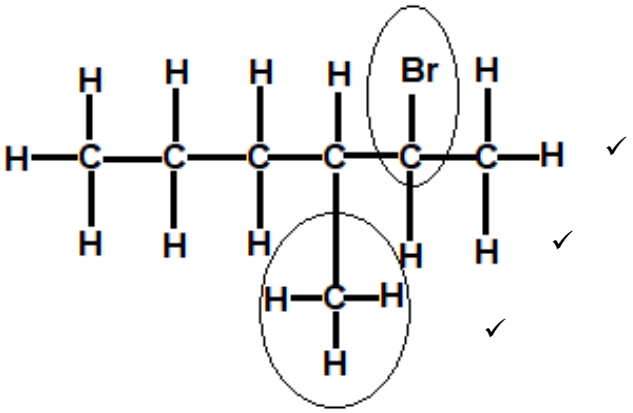
2.3.5



✓

(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]

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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.

✓ 1 mark for either bullet 2 or 3

- More energy is needed to overcome the intermolecular forces /bonds in compound D/butane than in compound A/methane. ✓

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.

✓ 1 mark for either bullet 2 or 3

- Less energy is needed to overcome the intermolecular forces /bonds in compound A/methane than in compound D/butane. ✓/

- *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.*

1 punt vir kolpunt 2 of 3

- *Meer energie is nodig om die intermolekulêre kragte/bindings in verbinding D/butaan te oorkom as in verbinding A/metaan.*

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.*

1 punt vir kolpunt 2 of 3

- *Minder energie is nodig om die intermolekulêre kragte/bindings in verbinding A/metaan te oorkom as in verbinding D/butaan.* (3)

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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]

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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)

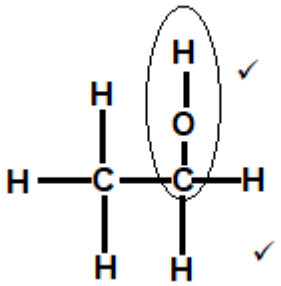
4.3 4.3.1 Oxidation **OR** Combustion ✓ / *Oksidasie **OF** Verbranding* (1)

4.3.2 $2C_2H_6 + 7O_2$✓ $\rightarrow 4CO_2 + 6H_2O$ ✓ **balancing ✓/*balansering.***

MARKING CRITERIA/ *NASIEN*KRITERIA
• 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/ *NASIEN*KRITERIA
• Correct functional group ✓ / *Korrekte funksionele groep* • Whole structure correct ✓ / *Hele struktuur korrek* **NOTE:** If a bond or hydrogen is missing ½ ***LET WEL**: As 'n binding of waterstof ontbreek is ½*

(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)

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

MARKING CRITERIA/ *NASIENKRITERIA*

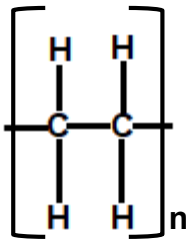
- 1 mark for chloro / *1 punt vir chloro*
- 1 mark for ethane / *1 punt vir etaan* (2)

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 molekuul 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", plastieksake, voering in karton houers*)
- *Spuitgiet (bv. bakke, emmers, kratte, asblikke)*
- *Blaasvorming (bv. spuitbottels) / Extrusie (bv. buigbare waterpype, kabel omhulsels)*
- *Plastiekbottels*

(Aanvaar enige TWEE toepaslike gebruike.) (2)
[25]

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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. ✓✓/
Dokteering is die proses om onsuiwerhede 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-onsuiwerheid is bygevoeg wat bygedra het tot 'n oormaat negatiewe ladings. (3)
[10]

TOTAL / *TOTAAL:* 75

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