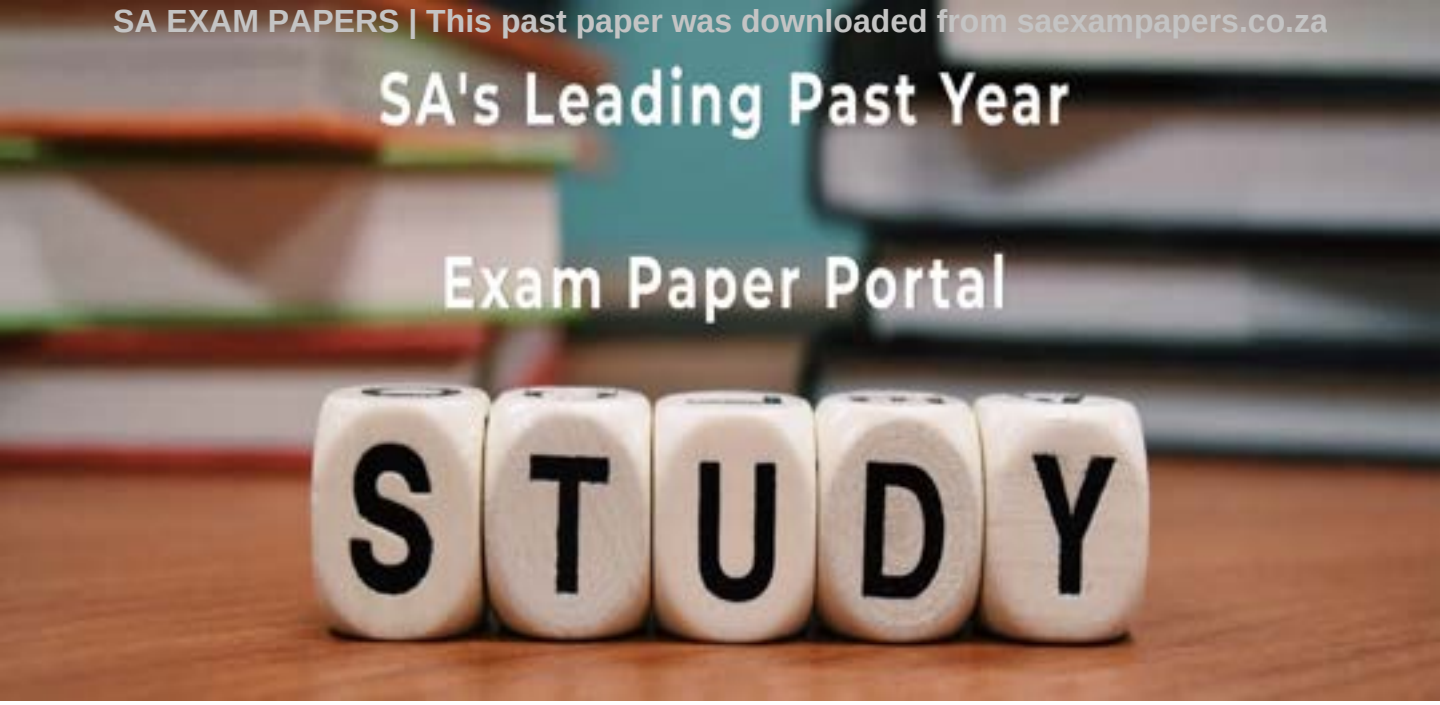

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NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2025

TECHNICAL SCIENCES P2/*TEGNIESE 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)

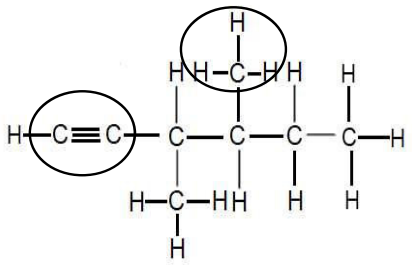
2.5 PRIMARY/ *PRIMÊRE* ✓

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 substituente 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)

2.6.4

O
II
- C - H ✓

ACCEPT/*AANVAAR*:

O
II
R - C - H (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)

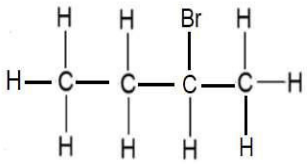
4.1.2 Addition/Hydrohalogenation ✓
Addisie/Hidrohalogenasie/Hidrohalogenering (1)

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

4.2 4.2.1 H_2 ✓ (1)

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

4.3 4.3.1



(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/ H_2SO_4/ Sulfuric acid/ H_3PO_4/ Phosphoric acid ✓

Oormaat water
Sterk suur/ H_2SO_4/ Swaelsuur/ H_3PO_4/ 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 onsuiwerhede 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