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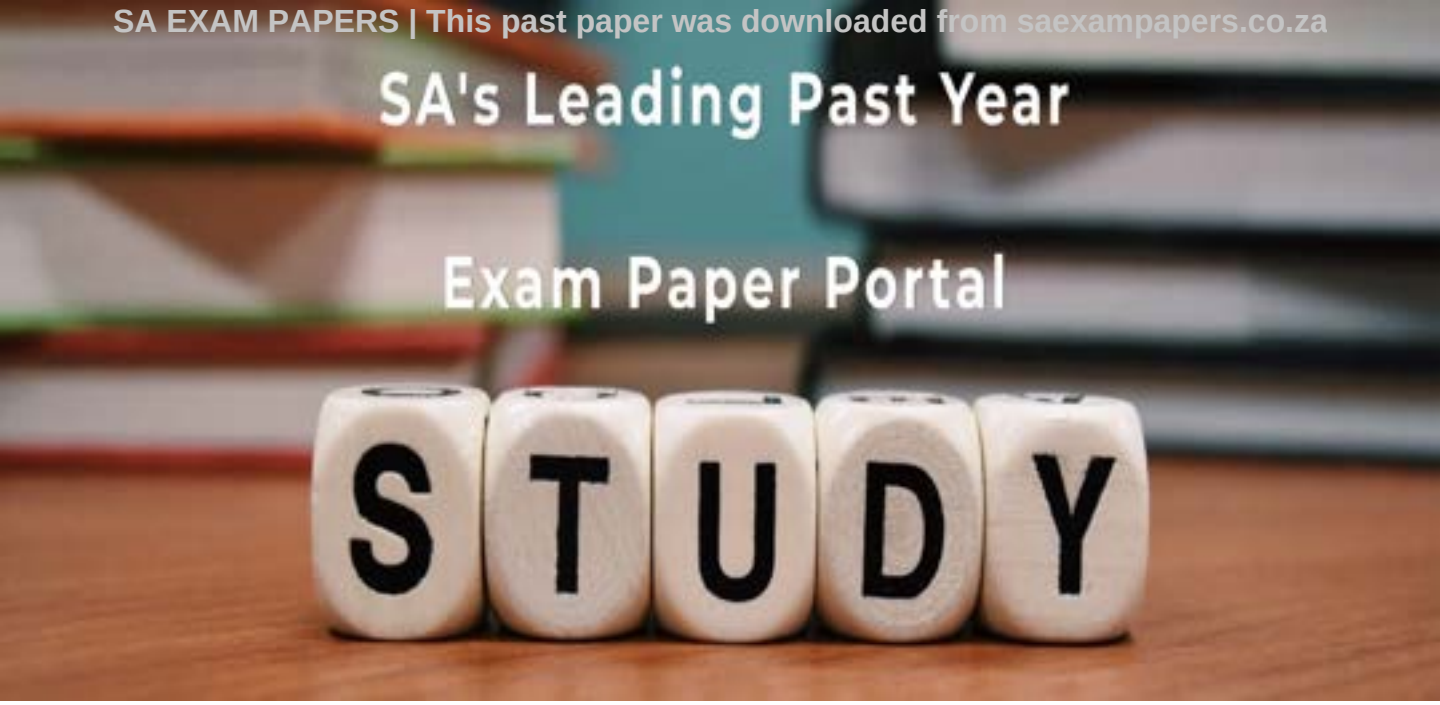

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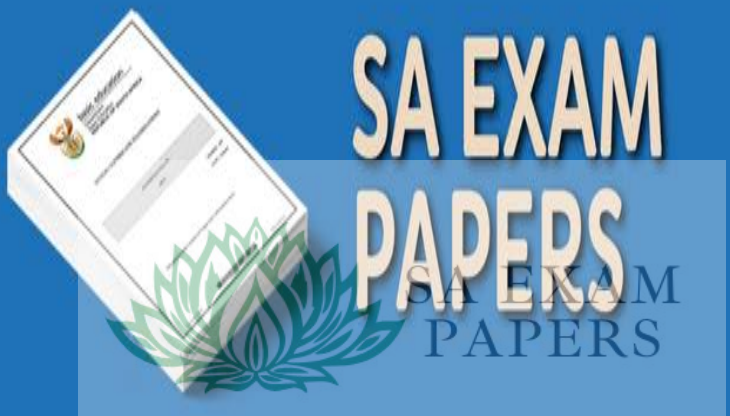

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Porafensie Ya Kapa Botjahabela: Lefapha la Thuto

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIORSERTIFIKAAT*

GRADE/*GRAAD* 12

SEPTEMBER 2024

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

MARKS/*PUNTE*: **75**

This marking guideline consists of 10 pages./
Hierdie nasienriglyn bestaan uit 10 bladsye.

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QUESTION 1/*VRAAG* 1: MULTIPLE-CHOICE QUESTIONS/ *MEERVOUDIGEKEUSE-VRAE*

1.1 B ✓✓ (2)

1.2 C ✓✓ (2)

1.3 C ✓✓ (2)

1.4 A ✓✓ (2)

1.5 D ✓✓ (2)

[10]

QUESTION 2/*VRAAG 2*

2.1 2.1.1 A ✓ (1)

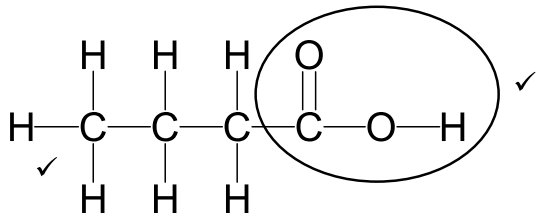
2.1.2 D ✓ (1)

2.1.3 B (and/*en*) E ✓ (1)

2.2 Butan✓-2-one ✓ (2-Butanone)

Butan-2-oon (2-Butanoon) (2)

2.3 2.3.1



- Functional group correct/
- Whole structure correct/

- *Funksionele groep korrek*
- *Hele struktuur korrek*

(2)

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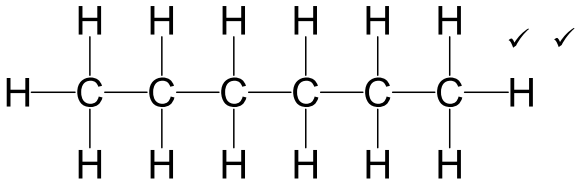
2.3.2



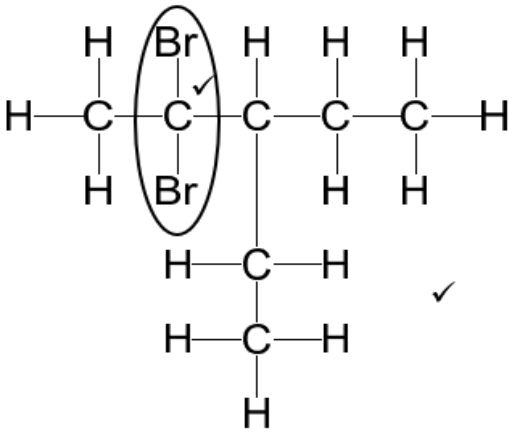
- Functional group correct
- Whole structure correct

- *Funksionele groep korrek*
- *Hele struktuur korrek*

(2)

2.4 2.4.1 C_nH_{2n} ✓ (1)

2.4.2



- Functional group correct.
- Whole structure correct

- *Funksionele groep korrek*
- *Hele struktuur korrek*

(2)
[12]

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QUESTION 3/*VRAAG 3*

3.1 The temperature at which the vapor pressure of a liquid equals the atmospheric pressure. ✓✓/

Die temperatuur waarby die dampdruk van 'n vloeistof gelyk is aan die atmosferiese druk. (2)

3.2 Alkynes/*Alkyne* ✓ (1)

3.3 3.3.1 Chain length/*Kettinglengte* ✓ (1)

3.3.2 Homologous series (Accept functional group) ✓/
Homoloë reeks (Aanvaar funksionele groep) (1)

3.4 - Only London forces are present in compound A and compound C. ✓
- Compound A has a longer chain length than compound C.
- The longer the chain length the stronger the intermolecular forces. ✓
- More energy is needed to overcome the bonds/intermolecular forces in compound A than in compound C. ✓

- *Verbinding A en verbinding C het beide slegs London-kragte.*
- *Verbinding A het 'n langer kettinglengte as verbinding C.*
- *Hoe langer die kettinglengte, hoe sterker is die intermolekulêre kragte.*
- *Meer energie word benodig om die bindings/intermolekulêre kragte in verbinding A te oorkom as in verbinding C.*

OR/*OF*

- Only London forces are present in compound A and compound C.
- Compound C has a shorter chain length than compound A.
- The shorter the chain length the weaker the intermolecular forces.
- Less energy is needed to overcome the intermolecular forces in C than in A.

- *Verbinding A en verbinding C het beide slegs London kragte.*
- *Verbinding C het 'n korter kettinglengte as verbinding A.*
- *Hoe korter die kettinglengte, hoe swakker is die intermolekulêre kragte.*
- *Minder energie word benodig om die bindings/intermolekulêre kragte in verbinding C te oorkom as in verbinding A.* (3)

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3.5 Compound C. ✓

The lower the boiling point/intermolecular forces, the higher the vapour pressure. ✓

OR

The higher the boiling point/intermolecular forces, the lower the vapour pressure.

Verbinding C.

Hoe hoër die kookpunt/intermolekulêre kragte, hoe laer die dumpdruk.

OF

Hoe laer die kookpunt/intermolekulêre kragte, hoe hoër die dumpdruk is. (2)
[10]

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QUESTION 4/*VRAAG 4*

4.1 4.1.1 Addition/Hydrogenation ✓/
Addisie/hirdogenasie/hidrogenering (1)

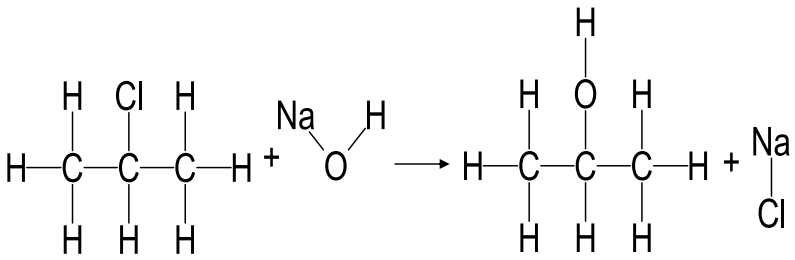
4.1.2 Substitution/Halogenation of alkanes ✓
Substitusie/Halogenasie/Halogenering van alkane (1)

4.2 4.2.1 H_2/Hydrogen gas/Diatomic Hydrogen ✓
H_2/Waterstofgas/Diatomiese Waterstof (1)

4.2.2 2-chloro✓propane ✓/*2-chloropropaan* (2)

4.2.3 Pt/Pb/Ni ✓ (1)

4.3 4.3.1 Hydrolysis (of haloalkanes) ✓/ *Hidroliese (van haloalkane)* (1)



4.3.2

- Reactants/*Reaktante*
- Products/*Produkte*
- Balancing/*Balansering*

(3)

4.4 $2C_4H_{10} + 13O_2 \rightarrow 8CO_2 + 10H_2O$ ✓✓

- Products/*Produkte*
- Balancing/*Balansering*

(2)
[12]

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QUESTION *5/VRAAG 5*

5.1 The process of adding impurities to intrinsic semiconductors. ✓✓/

Die proses waardeur onsuiwerhede by intrinsieke halfgeleiers gevoeg word. (2)

5.2 Diamond/*Diamant*, Ge **OR/*OF*** Sn ✓ (1)

5.3 5.3.1 p-type (semiconductor)/*p-tipe (halfgeleier)* ✓ (1)

5.3.2 Doping silicon with a group 3 element, such as gallium will form positive charge carriers (holes). ✓/
Om silikon met 'n groep 3 element soos galium te doteer, sal positiewe ladingdraers (holtes) vorm. (1)

5.4 5.4.1 FORWARD BIAS/*MEEVOORSPANNEND* ✓ (1)

5.4.2 The positive terminal of the cell/battery is connected to the p-type semiconductor. ✓/
Die positiewe terminaal van die sel/battery is gekoppel aan die p-tipe halfgeleier. (1)
[7]

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QUESTION 6/*VRAAG 6*

6.1 The decomposition of a substance when an electric current is passed through it. ✓✓

OR

The chemical process in which electrical energy is converted to chemical energy.

OR

The use of electrical energy to produce a chemical change.

Die ontbinding van 'n stof wanneer 'n elektriese stroom daardeur gelei word.

OF

Die chemiese proses waarin elektriese energie omgeskakel word na chemiese energie.

OF

Die gebruik van elektriese energie om 'n chemiese verandering teweeg te bring. (2)

6.2 Electrolytic cell/*Elektrolitiese sel* ✓ (1)

6.3 6.3.1 Cathode/*Katode* ✓ (1)

6.3.2 Anode ✓ (1)

6.4 Gas bubbles/*Gasborrels* ✓ (1)

6.5 $2C\ell^- \rightarrow C\ell_2 + 2e^-$ ✓✓

$2C\ell^- \rightarrow C\ell_2 + 2e^-$ $^2/_2$	$2C\ell^- \rightleftharpoons C\ell_2 + 2e^-$ $^1/_2$
$C\ell_2 + 2e^- \rightarrow 2C\ell^-$ $^0/_2$	$C\ell_2 + 2e^- \rightleftharpoons 2C\ell^-$ $^0/_2$

(2)

6.6 A substance that is oxidised/loses electrons. ✓✓

OR

A substance that undergoes oxidation.

'n Stof wat geoksideer word/elektrone verloor.

OF

'n Stof wat oksidasie ondergaan. (2)

6.7 $C\ell^-$ ✓ (1)

[11]

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QUESTION 7/ *VRAAG 7*

7.1 The gain of electrons./*Die wins van elektrone.* ✓✓ (2)

7.2 Salt bridge/*Soutbrug* ✓ (1)

7.3 7.3.1 Chemical (energy) to electrical (energy). ✓/
Chemiese (energie) na elektriese (energie) (1)

7.3.2 $Ag^{+}_{(aq)} + e^{-} \rightarrow Ag_{(s)}$ ✓✓

$Ag^{+}_{(aq)} + e^{-} \rightarrow Ag_{(s)}$ $^{2}/_{2}$	$Ag^{+}_{(aq)} + e^{-} \rightleftharpoons Ag_{(s)}$ $^{1}/_{2}$
$Ag_{(s)} \rightarrow Ag^{+}_{(aq)} + e^{-}$ $^{0}/_{2}$	$Ag_{(s)} \rightleftharpoons Ag^{+}_{(aq)} + e^{-}$ $^{0}/_{2}$

Marking criteria/*Nasienkriteria*

- Do not penalise if phases are omitted./
Moet nie penaliseer indien fases weggelaat word nie. (2)

7.3.3 $Cu_{(s)} \mid Cu^{2+}_{(aq)}$ ✓ ‖ ✓ $Ag^{+}_{(aq)} \mid Ag_{(s)}$ ✓

Marking criteria/ *Nasienkriteria*

- Do not penalise if phases/concentration omitted./
Moet nie penaliseer indien fases/konsentrasies weggelaat word nie. (3)

7.4 **OPTION/*OPSIE* 1**

$E^{\theta}_{cell/sel} = E^{\theta}_{cathode/katode} - E^{\theta}_{anode}$ ✓

$E^{\theta}_{cell/sel} = 0,80$ ✓ $- 0,34$ ✓

$E^{\theta}_{cell/sel} = 0,46$ V ✓

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OPTION/*OPSIE* 2

$Ag^+ + e^- \rightarrow Ag$ ✓ $E^\theta = 0,80\ (V)$

$Cu \rightarrow Cu^{2+} + 2e^-$ ✓ $E^\theta = 0,34\ (V)$

$2Ag^+ + Cu \rightarrow 2Ag + Cu^{2+}$ ✓ $E^\theta = 0,46\ V$ ✓

Marking criteria/ *Nasienkriteria*

- Penalise once if unconventional or incomplete formula is used/

  Penaliseer een keer as onkonvensionele of onvolledige formule gebruik word.

- Accredit any of the relevant formulae taken from the data book/
  Aanvaar enige van die relevante formules wat uit die databoek geneem is. (4)

[13]

TOTAL/*TOTAAL*: 75

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