Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 12

SEPTEMBER 2022

TECHNICAL SCIENCES: CHEMISTRY P2/ *TEGNIESE WETENSKAPPE: CHEMIE V2* MARKING GUIDELINE/*NASIENRIGLYN*

MARKS/ *PUNTE*: 75

This marking guideline consists of 6 pages./
Hierdie nasienriglyn bestaan uit 6 bladsye.

QUESTION/*VRAAG* 1

1.1 A ✓✓ (2)

1.2 A ✓✓ (2)

1.3 D ✓✓ (2)

1.4 C ✓✓ (2)

1.5 B ✓✓ (2)

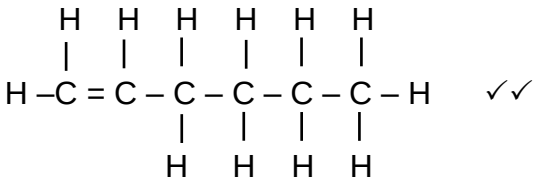
[10]

QUESTION/*VRAAG* 2

2.1 Hydrocarbons are organic compounds containing *ONLY* carbon atoms and hydrogen atoms. ✓✓
Koolwaterstowwe is organiese verbindings wat uit SLEGS koolstofatome en waterstofatome bestaan. ✓✓ (2)

2.2 2.2.1 Organic molecules with the same molecular formula, but different structural formula. ✓✓
Organiese molekules met dieselfde molekulêre formule maar verskillende struktuurformules. (2)

2.2.2



✓✓ (2)

2.2.3 Aldehydes/*Aldehiede* ✓ (1)

2.2.4 1-chloro-2-methyl-Prop-1-ene ✓✓/
1-*chloro-2-metiel-Prop-1-een* ✓✓

OR/*OF*

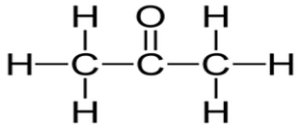
2-chloro-2-methyl-Prop-1-ene ✓✓/
2-chloro-2-metiel-Prop-1-een ✓✓ (2)

2.3. Monomers are <u>small organic molecules that can be covalently bonded to each other</u> ✓in a <u>repeating pattern</u> to form a macromolecule. ✓
Monomere is <u>klein organiese molekules wat kovalent met mekaar verbind</u> is in 'n <u>herhalende patroon</u> ✓om 'n makromolekule te vorm. ✓ (2)

[11]

QUESTION/*VRAAG* 3

3.1 C_nH_{2n+2} ✓ (1)

3.2  ✓✓ (2)

3.3 Propanal / *Propanaal* ✓ (1)

3.4 3.4.1 Hydrogen bonds/*Waterstofbindings* ✓ (1)

3.4.2 London forces/*Londonkragte* ✓ (1)

3.5 As the strength of the intermolecular forces become stronger (increases) ✓ the vapour pressure will become lower ✓ (decrease).
Indien die sterkte van die intermolekulêre kragte sterker word (toeneem) ✓ *sal die dampdruk laer wees (afneem).* ✓

OR/*OF*

As the strength of intermolecular forces become weaker, ✓ the vapour pressure will become higher. ✓(increase).
Indien die sterkte van die intermolekulêre kragte swakker word (afneem) ✓ *sal die dampdruk hoër wees (toeneem).* ✓ (2)

3.6 Ethanoic acid. ✓ There are 2 sites between ethanoic acid molecules to form hydrogen bonds and only 1 between propan-1-ol. ✓ The intermolecular forces are stronger between ethanoic acid molecules, therefore the boiling point is higher, and the vapour pressure is lower. ✓/
Etanonoësuur. ✓ Tussen *etanonoësuur-molekules kan 2 waterstofbindings vorm en tussen propan-1-ol molekules slegs een.* ✓ *Dus is die intermolekulêre kragte sterker tussen etanonoësuur se molekules en dus is die kookpunt hoër en dampdruk laer.* ✓ (3)

[11]

QUESTION/*VRAAG* 4

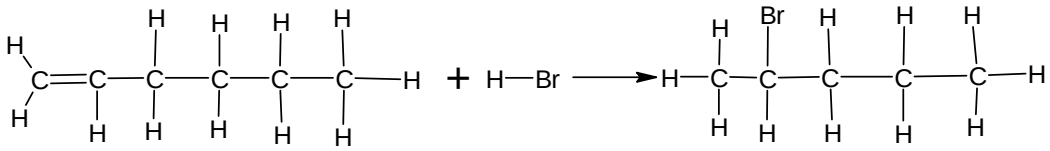
4.1 4.1.1 Addition (Hydration)/*Addisie (Hidrasie)* ✓ (1)

4.1.2 Substitution (Halogenation)(bromination) ✓
Substitusie (Halogenering)(brominering) ✓ (1)

4.1.3 Addition (Hydrogenation)/*Addisie (Hidrogenering)* ✓ ✓ (1)

4.2 4.2.1 Sodium hydroxide / Potassium hydroxide ✓
Natriumhidroksied / Kaliumhidroksied ✓ (1)

4.2.2 A dilute strong base ✓ and mild heat ✓
'n Verdunde sterk basis ✓*en matige hitte* ✓ (2)



One mark for each product and reactant ✓✓✓
Een punt vir elke produk en reaktant ✓✓✓ (3)

4.3 $C_5H_{12} + 8O_2$ ✓→ $5CO_2 + 6H_2O$ ✓ ✓ balance/*balanseer* (3)

[12]

QUESTION/*VRAAG* 5

5.1 A semiconductor is a material that has electrical conductivity between that of a conductor and an insulator. ✓✓
'n Halfgeleier is 'n materiaal wat elektriese geleiding het tussen 'n geleier en 'n isolator. ✓✓ (2)

5.2 5.2.1 Doping/*Dotering* ✓ (1)

5.2.2 N-type. ✓ The mobile charge carriers have a negative charge. ✓/
N-tipe. ✓ *Die mobiele ladingdraers het 'n negatiewe lading.* ✓ (2)
[5]

QUESTION/*VRAAG* 6

6.1 An electrolyte is a substance of which the aqueous solution contains ions. ✓✓/
'n Elektroliet is 'n stof waarvan die waterige oplossing ione bevat. ✓✓

OR/*OF*

A substance that dissolves in water to give a solution of ions that conduct electricity. ✓✓/
'n Stof wat in water oplos om 'n oplossing ione te gee wat elektrisiteit gelei. ✓✓

OR/*OF*

A substance that forms free ions when melted. ✓✓/
'n Stof wat vrye ione vorm wanneer dit smelt. ✓✓ (2)

6.2 6.2.1 $2\ Cl^- \rightarrow Cl_2 + 2e^-$ ✓✓ (2)

6.2.2 $Cu^{2+} + 2e^- \rightarrow Cu$ ✓✓ (2)

6.3 Electrical energy to chemical energy. ✓/
Elektriese energie na chemiese energie. ✓ (1)

6.4 **Q**. ✓ Reduction takes place / *Reduksie vind plaas* ✓ (2)

6.5 6.5.1 Cu is a stronger reducing agent ✓ than Cl^- ions. Cu will be oxidised to Cu^{2+} ions ✓ resulting in the plate becoming eroded. ✓/
Cu is 'n sterker reduseermiddel ✓*as* Cl^- *ione. Cu word geoksideer na* Cu^{2+} *ione* ✓*wat veroorsaak dat die plaat roes (erodeer).* ✓ (3)

6.5.2 Non-spontaneous / *Nie-spontaan* ✓ (1)
[13]

QUESTION/*VRAAG* 7

7.1 Chemical energy is converted to electrical energy/ ✓
Chemiese energie word na elektriese energie omgesit. ✓ (1)

7.2 It maintains electrical neutrality. ✓/
Dit behou elektriese neutraliteit ✓

OR/*OF*

It separates the two compartments, so that they do not mix. ✓/
Dit skei die twee oplossings, sodat hulle nie meng nie. ✓

OR/*OF*

It completes the circuit. ✓
Dit voltooi die stroombaan. ✓ (1)

7.3 $Cd \rightarrow Cd^{+2} + 2e^{-}$ ✓✓ (2)

7.4 From Cd to Sn / *Vanaf Cd na Sn* ✓ (1)

7.5 $Cd + Sn^{+2} \rightarrow Cd^{+2} + Sn$ ✓✓ ✓ Balance/*Balanseer* (3)

7.6 $E^{\theta}_{cell} = E^{\theta}_{cathode} - E^{\theta}_{Anode}$ / $E^{\theta}_{sel} = E^{\theta}_{katode} - E^{\theta}_{anode}$ ✓

= (-0,14) – (-0,40) ✓
= +0,26 V ✓ (3)

7.7 It means they did not take the measurements at standard conditions ✓ where the temperature is 298 K (25 °C) ✓ and the concentrations of the solutions are 1 $mol.dm^{-3}$. ✓
Dit beteken dat nie al die meetings by standardtoestande geneem is nie waar die temperatuur 298 K (25 ˚C) is en die konsentrasie van die oplossings 1 $mol.dm^{-3}$ moet wees. (2)
[13]

TOTAL/*TOTAAL*: 75