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**NATIONAL
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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

H	H	H	H	H	H
H – C = C – C – C – C – H	✓✓				
H H H H					

(2)
- 2.2.3 Aldehydes/*Aldehiede* ✓ (1)
- 2.2.4 1-chloro-2-methyl-Prop-1-ene ✓✓/
1-chloro-2-metiel-Prop-1-een ✓✓

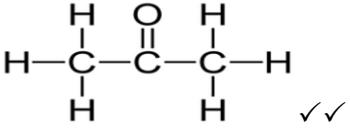
OR/OF

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

- 2.3. Monomers are small organic molecules that can be covalently bonded to each other ✓ in a repeating pattern to form a macromolecule. ✓
Monomere is klein organiese molekules wat kovalent met mekaar verbind is in 'n herhalende patroon ✓ 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. ✓/

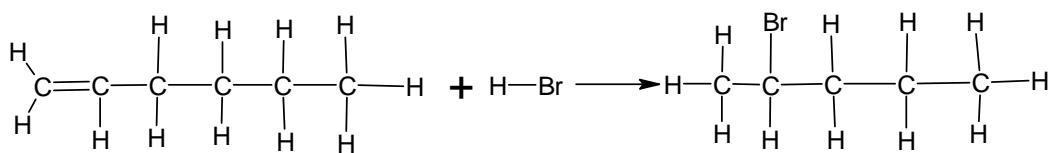
Etanonoësuur. ✓ Tussen etanonoësuur-molekules kan 2 waterstofbindings vorm en tussen propan-1-ol molekules slegs een. ✓ Dus is die intermolekulêre kragte sterker tussen etanonoësuur se molekules en dus is die kookpunt hoër en dampdruk laer. ✓

(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 $\text{C}_5\text{H}_{12} + 8\text{O}_2 \rightarrow 5\text{CO}_2 + 6\text{H}_2\text{O}$ ✓ ✓ 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-type. ✓ *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 geleei. ✓✓

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 $2 \text{Cl}^- \rightarrow \text{Cl}_2 + 2\text{e}^-$ ✓✓ (2)
- 6.2.2 $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$ ✓✓ (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 $\text{Cd} \rightarrow \text{Cd}^{+2} + 2\text{e}^-$ ✓✓ (2)
- 7.4 From Cd to Sn / *Vanaf Cd na Sn* ✓ (1)
- 7.5 $\text{Cd} + \text{Sn}^{+2} \rightarrow \text{Cd}^{+2} + \text{Sn}$ ✓✓ ✓ Balance/Balanseer (3)
- 7.6 $E^\theta_{\text{cell}} = E^\theta_{\text{cathode}} - E^\theta_{\text{Anode}}$ / $E^\theta_{\text{sel}} = E^\theta_{\text{katode}} - E^\theta_{\text{anode}}$ ✓
 $= (-0,14) - (-0,40)$ ✓
 $= +0,26 \text{ V}$ ✓ (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 standertoestande 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