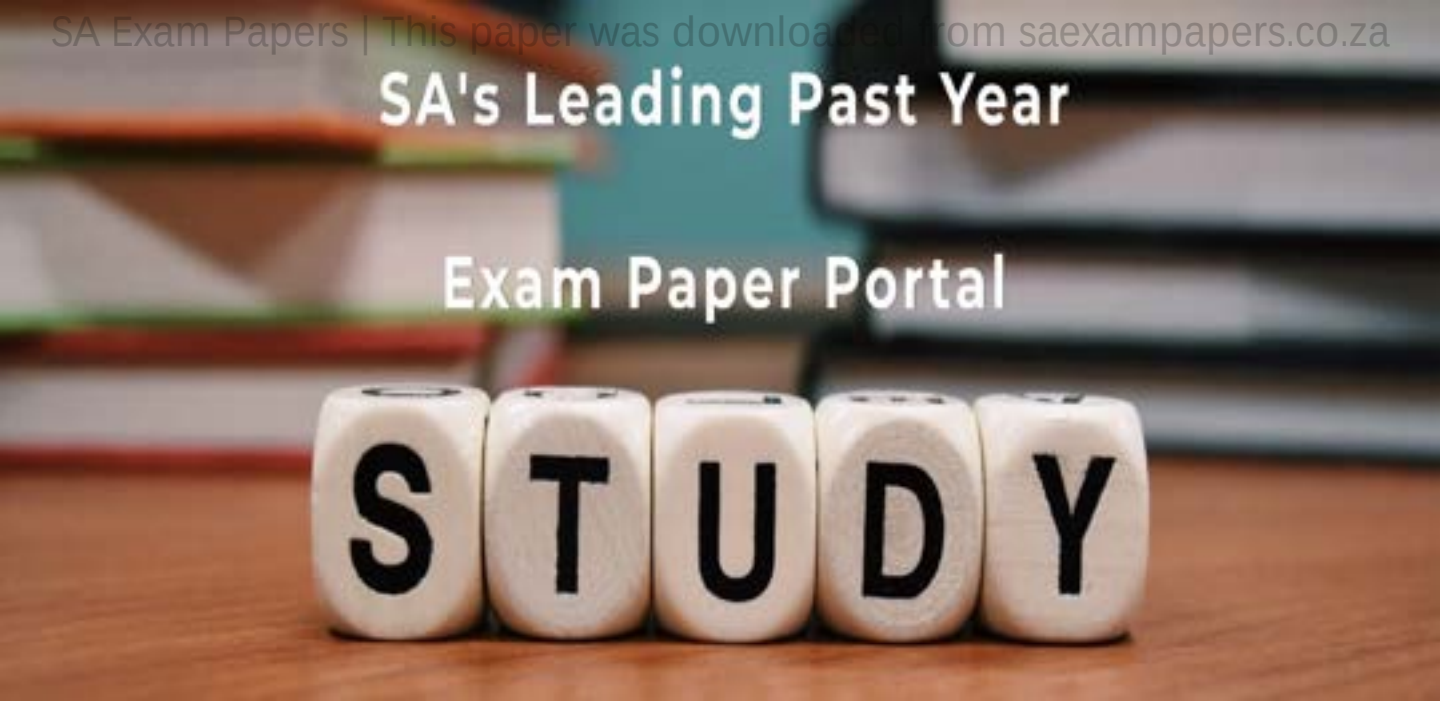

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GRADE/*GRAAD* 12

SEPTEMBER 2023

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

MARKS/*PUNTE*: **75**

This marking guideline consists of 7 pages./
Hierdie nasienriglyn bestaan uit 7 bladsye.

QUESTION/*VRAAG* 1

1.1 C ✓✓ (2)

1.2 D ✓✓ (2)

1.3 B ✓✓ (2)

1.4 B ✓✓ (2)

1.5 A ✓✓ (2)
[10]

QUESTION/*VRAAG* 2

2.1 An atom or a group of atoms that determines the chemistry of a molecule. ✓✓

OR

An atom or a group of atoms that determine(s) the physical and chemical properties of a group of organic compounds. ✓✓

'n Atoom of 'n groep atome wat die chemie van 'n molekuul bepaal. ✓✓

OF

'n Atoom of 'n groep atome wat die fisiese en chemiese eienskappe van 'n groep organiese verbindings bepaal. ✓✓ (2)

2.2 2.2.1 **F** ✓ (1)

2.2.2 Carboxyl group/*Karboksielgroep* ✓✓ (1)

2.2.3 Aldehyde / *Aldehied* ✓ (1)

2.2.4 (2-bromo-1,4-dichloro) ✓ butane / *butaan* ✓ (2)

2.2.5 Polythene/*Politeen* ✓
ACCEPT: Polyethene
AANVAAR: Poliëteen (1)

2.2.6 $2C_6H_{14} + 19O_2 \rightarrow 12CO_2 + 14H_2O$

Reactants ✓	Products ✓	Balancing ✓
Reaktante ✓	*Produkte* ✓	*Balansering* ✓

(3)

2.2.7 2-Methyl butan-1-ol ✓ (2-methyl ✓ 1-butanol) /
2-metiel ✓ butan-1-ol (*2-metiel ✓ 1-butanol*) (2)

2.2.8 $C_nH_{2n}O_2$ ✓ (1)

2.3.1 The reddish-brown (bromine water) solution decolourises. ✓

OR

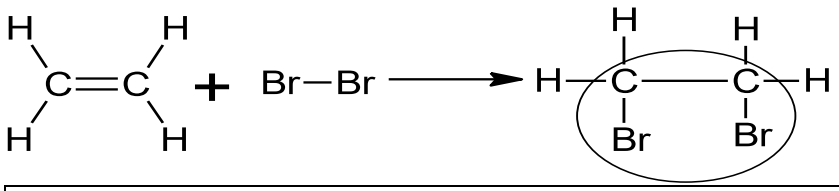
The reddish-brown colour disappears. ✓

Die rooibruin (broomwater) oplossing verkleur. ✓

OF

Die rooibruin kleur verdwyn. ✓ (1)

2.3.2



Marking guidelines / *Nasienriglyne*	
✓ Alkene	✓ *Alkeen*
✓ Bromine (accept Br_2)	✓ *Broom (Aanvaar Br_2)*
✓ Functional group of product	✓ *Funksionele groep van produk*
✓ Whole structure of product correct	✓ *Hele struktuur van produk korrek*

(4)
[19]

QUESTION/*VRAAG* 3

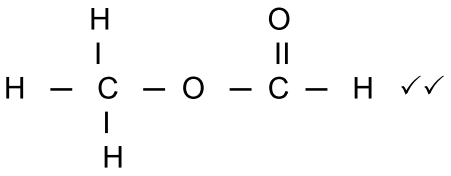
3.1 Structural isomers are organic molecules with the same molecular formula, but different structural formulae. ✓✓
Strukturele isomere is organiese molekules met dieselfde molekules formule maar verskillende struktuurformules. ✓✓ (2)

3.2 3.2.1 Higher than/*Hoër as* ✓ (1)

3.2.2 Ethanoic acid/*Etanoësuur* ✓ (1)

3.2.3 Esters ✓ (1)

3.2.4



Methyl methanoate/*Metiel-metanoaat* ✓ (3)

3.2.5 Compound **P** has strong hydrogen bonds, ✓ and compound **Q** has weak dipole-dipole Van der Waal forces. ✓ More energy is needed to overcome the Intermolecular forces in compound **P** than in compound **Q**. ✓
*Verbinding **P** het sterk waterstofbindings ✓en verbinding **Q** het swak dipool-dipool Van der Waalskragte.* ✓ *Meer energie is nodig om die intermolekulêre kragte in verbinding **P** te breek as in verbinding **Q**.* ✓ (3)
[11]

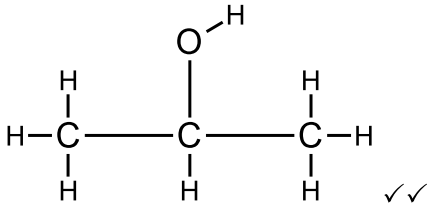
QUESTION/*VRAAG* 4

4.1 4.1.1 H_2 ✓ (1)

4.1.2 HCℓ ✓ (1)

4.2 4.2.1 Hydration (Addition) ✓
Hidrasie (Addisie) ✓ (1)

4.2.2



✓✓ (2)

4.3 $C_3H_8 + 5O_2$ ✓→ $3CO_2 + 4\ H_2O$ ✓ (2)
[7]

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 stof wat die elektriese geleidingsvermoë tussen dié van 'n geleier en 'n isolator het. ✓✓ (2)

5.2 5.2.1 Doping/*Doktering* ✓ (1)

5.2.2 N-type/*N-tipe* ✓ (1)

5.2.3 A semi-conductor material with excess negative charge carriers. ✓

OR

It is doped with a pentavalent element that introduces excess electrons. ✓

'n Halfgeleier met 'n oormaat negatiewe ladingdraers. ✓

OF

Dit word gedokteer met 'n pentavalente element wat 'n oormaat elektrone inbring. ✓ (1)
[5]

QUESTION/*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 waardeur 'n elektriese stroom daardeur gevoer word. ✓✓

OF

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

OF

Die gebruik van elektriese energie om 'n chemiese verandering te produseer. ✓✓ (2)

6.2 **Electrolytic cell:** Converts electrical energy to chemical energy. ✓
Elektrolitiese sel: *Elektriese energie word na chemiese energie omgesit.* ✓ (1)

6.3 **A** ✓ (1)

6.4 6.4.1 Chlorine (gas) / *Chloor(gas)* ✓ (1)

6.4.2 $Cu^{2+} + 2e^- \rightarrow Cu$ ✓✓ (2)

6.4.3 Cu^{2+} (ions)/Copper(II) (ions)/*Cu^{2+} (ione)/Copper(II) (ione)* ✓
Cu^{2+} (ions) are reduced/gains electrons ✓
Cu^{2+} (ione) word gereduseer/ontvang elektrone ✓ (2)

6.4.4 Carbon/Graphite/Platinum ✓
Koolstof/Grafiet/Platinum ✓ (1)

6.5 **DECREASES/*NEEM AF*** ✓

Cl^- is oxidised to Cl_2 and Cu^{2+} is reduced to Cu ✓

OR

Cl^- changes to Cl_2 and Cu^{2+} changes to Cu ✓

Cl^- word geöksideer na Cl_2 en Cu^{2+} word na Cu gereduseer. ✓

OF

Cl^- verander na Cl_2 en Cu^{2+} verander na Cu ✓ (2)
[12]

QUESTION/*VRAAG 7*

7.1 Galvanic cell/*Galvaniese sel* ✓ (1)

7.2 There will be no reading✓✓ **OR** The reading will be zero. ✓✓ **OR** 0 V ✓✓
*Daar is geen lesing ✓✓ **OF** Die lesing sal nul wees ✓✓ **OF** 0 V ✓✓* (2)

7.3 Temperature ✓ and initial concentration ✓ (of the electrolytes)
Temperatuur ✓ en aanvanklike konsentrasie ✓ (van die elektroliete) (2)

7.4 7.4.1 The voltmeter's terminals have been connected incorrectly. ✓✓

OR

Incorrect connection ✓(+ to anode and – to cathode) ✓✓

OR

The reaction is non-spontaneous. ✓✓

OR

Cu will not reduce Al^{+3}. ✓✓

Die voltmeter se terminale is verkeerdelik gekoppel. ✓✓

OF

Verkeerde konneksies (+ aan anode en – aan katode) ✓✓

OF

Die reaksie is nie spontaan nie. ✓✓

OF

Cu sal nie Al^{+3} reduseer nie. ✓✓ (2)

7.4.2 Aluminium is a stronger reducing agent than zinc ✓ and zinc is a stronger reducing agent than copper ✓

OR

Zinc is a stronger oxidising agent than aluminum, ✓ and copper is a stronger oxidising agent than zinc. ✓

Aluminium is 'n sterker reduseermiddel as sink, ✓ en sink is 'n sterker reduseermiddel as koper. ✓

OF

Sink is 'n sterker oksideermiddel as aluminium ✓ en koper is 'n sterker oksideermiddel as sink. ✓ (2)

7.5 7.5.1 Aluminium/Al ✓ (1)

7.5.2 Zinc/(*Sink)/*Zn ✓ (1)

[11]

TOTAL: 75