

SA's Leading Past Year

Exam Paper Portal



You have Downloaded, yet Another Great Resource to assist you with your Studies 😊

Thank You for Supporting SA Exam Papers

Your Leading Past Year Exam Paper Resource Portal

Visit us @ www.saexampapers.co.za





**NATIONAL SENIOR CERTIFICATE/
NASIONALE SENIORSERTIFIKAAT**

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 molekule 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 / Aldehyd ✓ (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. ✓

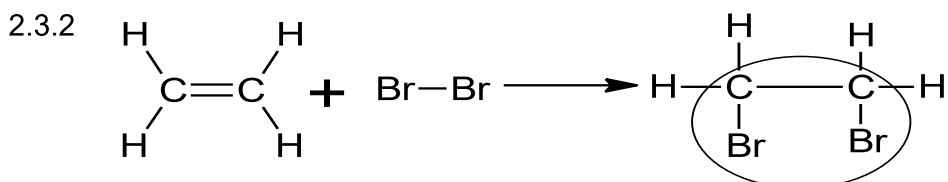
OR

The reddish-brown colour disappears. ✓

Die rooibruin (broomwater) oplossing verkleur. ✓

OF

Die rooibruin kleur verdwyn. ✓ (1)



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
- $$\begin{array}{ccccccc} & & \text{H} & & \text{O} & & \\ & & | & & || & & \\ \text{H} & - & \text{C} & - & \text{O} & - & \text{C} & - & \text{H} & \checkmark\checkmark \\ & & | & & & & & & & \\ & & \text{H} & & & & & & & \end{array}$$
- 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)

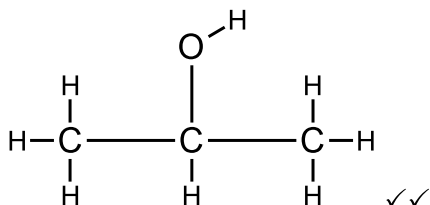
[11]

QUESTION/VRAAG 44.1 4.1.1 H₂ ✓ (1)

4.1.2 HCl ✓ (1)

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

4.2.2



(2)

4.3 C₃H₈ + 5O₂ ✓ → 3CO₂ + 4 H₂O ✓ (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 $\text{Cu}^{2+} + 2\text{e}^- \rightarrow \text{Cu}$ ✓✓ (2)

- 6.4.3 Cu^{2+} (ions)/Copper(II) (ions)/*Cu²⁺ (ione)/Copper(II) (ione)* ✓
 Cu^{2+} (ions) are reduced/gains electrons ✓
Cu²⁺ (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 Cl₂ en Cu²⁺ word na Cu gereduseer. ✓

OF

Cl⁻ verander na Cl₂ en Cu²⁺ 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 aluminium, ✓ 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