



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE
NASIONALE
SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

SEPTEMBER 2018

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

MARKS:/PUNTE: 150

*This marking guideline consists of 9 pages./
Hierdie nasienriglyn bestaan uit 9 bladsye.*

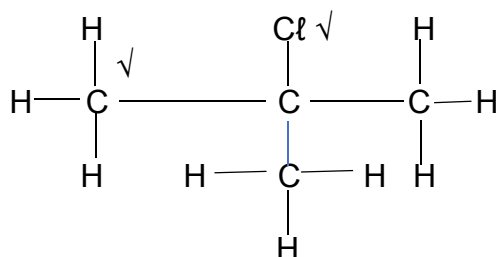
QUESTION 1/VRAAG 1

- 1.1 D ✓✓
 1.2 C ✓✓
 1.3 A ✓✓
 1.4 A ✓✓
 1.5 C ✓✓
 1.6 A ✓✓
 1.7 B ✓✓
 1.8 C ✓✓
 1.9 C ✓✓
 1.10 D ✓✓

[20]**QUESTION 2/VRAAG 2**

- 2.1 2.1.1 A ✓ (or/of B) (1)
 2.1.2 F ✓ (1)
 2.1.3 A ✓ (1)
 2.2 2.2.1 Alkyne /Alkyn ✓ (1)
 2.2.2 Ester ✓ (1)
 2.2.3 Alcohol/Alkohol ✓ (1)

2.3

**Marking criteria/Merk Kriteria**

- Whole structure correct/
Hele Struktuur korrek 2/2
- Only functional group(Cl) correct / *Slegs funksionele groep (Cl) korrek 1/2*

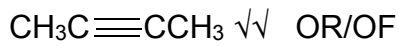
(2)

- 2.4 2.4.1 Propanone ✓✓ Accept propan-2-one OR 2-propanone
Propanoon ✓✓ Aanvaar propan-2-oon OF 2-propanoon (2)
 2.4.2 3,4 ✓-dimethyl ✓ hexan-2-ol ✓ OR 3,4-dimethyl-2-butanol
3,4 ✓-dimetiel ✓ heksan-2-ol ✓ OF 3,4-dimetiel-2-butanol (3)

Marking criteria

- Correct stem/*Korrekte stam*: butan-2-ol/2-butanol
- Side chain/Branch correctly identified (dimethyl)/ *Sytak korrek identifiseer (dimetiel)*
- Side chain/Branch correctly numbered, hyphens and commas correctly used/*Sytak, nommering, koppeltekens en kommas korrek gebruik*

2.5

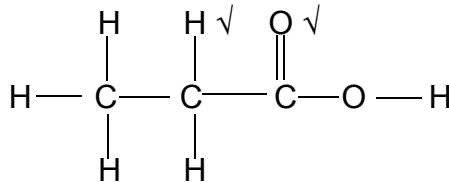
Marking criteria/Merk kriteria

* Whole structure correct / *Hele struktuur korrek* 2/2

* Only functional group correct / *Slegs funksionele groep korrek* 1/2

(2)

2.6.1

Marking criteria

* Whole structure correct / *Hele struktuur korrek* 2/2

* Only functional group correct / *Slegs funksionele groep korrek* 1/2

(2)

2.6.2 Ethyl propanoate / *Etiel propanoaat*

(2)

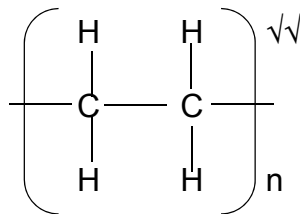
2.7 2.7.1 A molecule that contains a large number of atoms.
in Molekuul wat 'n groot aantal atome bevat.

(2)

2.7.2 Plastics / *Plastieke*

(1)

2.7.3



(2)

[24]

QUESTION 3/VRAAG 3

3.1 Resistance to flow. /*Weerstand teen vloei.* ✓✓ (2)

3.2 C ✓ (1)

3.3 From A to C / *Van A na C*

Chain length/Surface area /Molecular size increases

Kettinglengte / Reaksie oppervlak / Molekulêre grootte neem toe ✓

Strength of intermolecular forces (London forces/induced dipole forces) increases /

Sterkte van intermolekulêre kragte (London-kragte / Geïnduseerde-dipoolkragte) neem toe ✓

More energy needed to overcome intermolecular forces

Meer energie nodig om intermolekulêre kragte te oorkom ✓ (3)

3.4 A ✓ (1)

3.5 Temperature at which vapour pressure is equal to atmospheric pressure. /
Temperatuur waar die dampdruk gelyk is aan die atmosferiese druk. ✓✓ (2)

3.6 $C_5H_{12} + 8O_2 \checkmark \longrightarrow 5CO_2 + 6H_2O \checkmark$ bal ✓ (3)

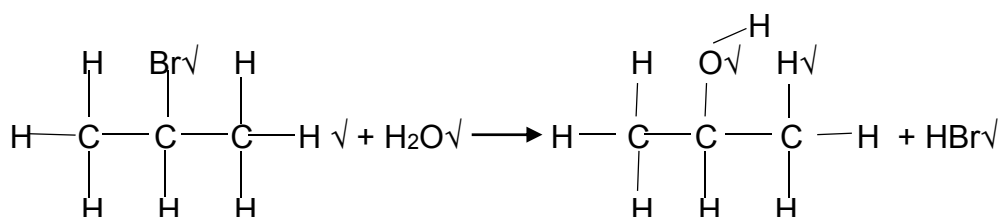
[12]

QUESTION 4 /VRAAG 44.1 Saturated / *Versadig* ✓ (1)4.2 4.2.1 Hydrogenation/*Hidrogensasie* ✓ (1)4.2.2 Hydrohalogenation/*Hidrohalogenasie* ✓ (1)

4.3 4.3.1 Platinum/Palladium/Nickel ✓ (1)

4.3.2 Hydrogen/*Waterstof* ✓ / H₂ (1)4.4 4.4.1 Dilute base ✓ /Dilute KOH/NaOH/Add H₂O/(Mild) Heat
Verdun basis ✓ *Verdun KOH/NaOH/Voeg H₂O by/ Matige hitte* (1)

4.4.2

**MARKING CRITERIA / MERK KRITERIA****Organic reactant / *Organiese reaktante***Whole structure correct / *Hele struktuur korrek* 2/2Only functional group correct/*Slegs funksionele groep korrek*: 1/2**Organic product / *Organiese produk*:**Whole structure correct / *Hele struktuur korrek* 2/2Only functional group correct/*Slegs funksionele groep korrek*: 1/2(6)
[12]**QUESTION 5 /VRAAG 5**5.1 5.1.1 Loss of electrons / *Verlies van elektrone* ✓✓ (2)

5.1.2 +4 ✓ (1)

$$\begin{aligned} 5.1.3 \quad E^{\circ}_{\text{cell}} &= E^{\circ}_{\text{cathode/kaode}} - E^{\circ}_{\text{anode}} \checkmark \\ &= 0,15 \checkmark - 1,07 \checkmark \\ &= -0,92\text{V} \checkmark \end{aligned}$$

Not spontaneous E°_{cell} is negative /*Nie spontaan E°_{sel} is negatief* ✓ (5)5.2 Cell/Sel **S** ✓

Al is the strongest reducing agent ✓ and Au³⁺ is the strongest oxidizing agent ✓
Al is die sterkste reduseermiddel ✓ en Au³⁺ is die sterkste oksideermiddel ✓ (3)

- 5.3 5.3.1 Al ✓ (1)
- 5.3.2 $2\text{Al} + 3\text{Ni}^{2+} \checkmark \longrightarrow \text{Al}^{3+} + \text{Ni} \checkmark \text{Bal} \checkmark$ (3)
- 5.4 5.4.1 Chemical energy changes to electrical energy /
Chemiese energie omgesit na elektriese energie ✓✓ (2)
- 5.4.2 $T = 25\text{ }^\circ\text{C} \checkmark / 298\text{ K}$ and/en $c = 1\text{ mol}\cdot\text{dm}^{-3} \checkmark$ (2)
- 5.4.3 Completes the circuit / *Voltooi die stroombaan* ✓
Ensures electrical neutrality / *Verseker elektriese neutraliteit* ✓ (2)
- 5.4.4 $\text{Zn} / \text{Zn}^{2+} \checkmark // \text{Cu}^{2+} / \text{Cu} \checkmark$
✓ (3)
- 5.5 5.5.1 Less pollution / Renewable ✓
Minder besoedeling / Herwinbaar ✓ (1)
- 5.5.2 More expensive / *Duurder* ✓ (1)

[26]

QUESTION 6 / VRAAG 6

- 6.1 A process of breaking down a compound using electricity /
'n Proses om 'n verbinding af te breek deur elektrisiteit te gebruik ✓✓
OR/OF
A process of using electrical energy to produce a chemical change /
'n Proses waar elektriese energie gebruik om 'n chemiese verandering te verkry. ✓✓ (2)
- 6.2 DC/GS ✓ (1)
- 6.3 Towards/Na **B** ✓ (1)
- 6.4 To set ions free to move / *Om lone vry te stel om te beweeg* ✓✓ (2)
- 6.5 6.5.1 Bubbles (of gas/chlorine) / *Borrels (van gas/chloor)* ✓ (1)
- 6.5.2 $\text{Cu}^{2+} \checkmark$ OR Copper(II) ion OF *Koper(II)ioon* (1)
- 6.6 $\text{Cu}^{2+} + 2\text{e} \longrightarrow \text{Cu} \checkmark \checkmark$ (2)

Marking criteria / Merk kriteria

- $\text{Cu} \leftarrow \text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \left(\frac{2}{2} \right)$ $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \rightleftharpoons \text{Cu} \left(\frac{1}{2} \right)$
 $\text{Cu} \rightleftharpoons \text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \left(\frac{0}{2} \right)$ $\text{Cu}^{2+}(\text{aq}) + 2\text{e}^- \leftarrow \text{Cu} \left(\frac{0}{2} \right)$
- Ignore if charge omitted on electron. / *Ignoreer as lading op elektron uitgelaat is.*
- If (+) charge omitted on Cu^{2+} , As (+) lading op Cu^{+2} uitgelaat is
 Max/Maks. $\frac{1}{2}$

[10]

QUESTION 7 /VRAAG 7

- 7.1 The change in direction of a wave upon striking the interface between two materials. $\checkmark\checkmark$
Die verandering in rigting van 'n golf indien dit die oppervlak tussen twee stowwe tref. $\checkmark\checkmark$ (2)
- 7.2 7.2.1 **X** Incident ray / *Invalsstraal* \checkmark (1)
- 7.2.2 **Y** Emergent ray / *Uitvalsstraal* \checkmark (1)
- 7.2.3 **R** Reflected ray/ *Weerkaatste straal* \checkmark (1)
- 7.2.4 Angle of incidence / *Invalshoek* \checkmark (1)
- 7.2.5 Total internal reflection / *Totale interne weerkaatsing* \checkmark (1)
- 7.2.6 Refraction / *Refraksie of breking* \checkmark (1)
- 7.3 Angle of incidence must be greater than the critical angle. \checkmark
 Light must travel from a medium of higher optical density to a medium of lower optical density.
Die invalshoek moet groter wees as die grenshoek. \checkmark
Lig moet beweeg van 'n medium van hoër optiese digtheid na 'n medium van laer optiese digtheid. \checkmark (2)
- 7.4 Towards the normal / *Na die normaal* \checkmark
 Light travels from a medium of lower optical density to a medium of higher optical density $\checkmark\checkmark$
Lig beweeg van 'n medium van laer optiese digthei na 'n medium van hoër optiese digtheid. $\checkmark\checkmark$ (3)
- 7.5 SMALLER THAN / *KLEINER AS* \checkmark
 Total internal reflection occurs when angle of incidence is higher than the critical angle as in **diagram 1** $\checkmark\checkmark$
*Totale interne weerstand vind plaas indien die invalshoek hoër is as die grenshoek soos in **diagram 1*** (3)

[16]

QUESTION 8 /VRAAG 8

8.1 Upright \checkmark (Erect)/ Virtual \checkmark
Regop \checkmark Virtueel \checkmark (2)

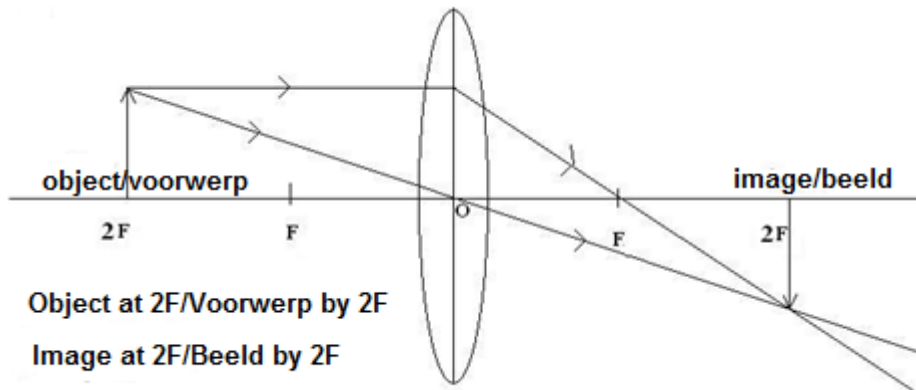
8.2 8.2.1 Distance between the lens and object $\checkmark\checkmark$ /
Afstand tussen die lens en die voorwerp (2)

8.2.2 Use the same lens \checkmark / Use the same object \checkmark
Gebruik dieselfde lens / Gebruik dieselfde voorwerp (2)

8.3 No / Nee \checkmark

When object is at **2F** the size of the image is the same as that of object. \checkmark
*As die voorwerp by **2F** is, is die grootte van die beeld dieselfde as die grootte van die voorwerp.* (2)

8.4



Marking criteria / Merk kriteria

- Image at 2F / Beeld by 2F \checkmark
- Ray passing through the optical centre / *Straal gaan deur optiese middelpunt*
- Ray parallel to the principal axis / *Straal parallel met hoofas*
- Image the same size as the object / *Beeld dieselfde grootte as die voorwerp.* \checkmark

(4)

[12]

QUESTION 9 /VRAAG 9

- 9.1 9.1.1 The phenomenon whereby light breaks up into its component colours ✓✓
Die verskynsel waarby lig in sy komponente opgebreek word. (2)
- 9.1.2 Blue / *Blou* ✓ (1)
- 9.1.3 Violet ✓ (1)
- 9.1.4 A quantum of energy / *'n Kwantum van energie* ✓✓ (2)
- 9.1.5 $E = hf = hc/\lambda$ ✓ (Any one/*Enige een*)
 $7 \times 10^{-19} \text{ ✓} = 6.63 \times 10^{-34} \text{ ✓} \times 3 \times 10^8 \text{ ✓} / \lambda$
 $\therefore \lambda = 2,84 \times 10^{-7} \text{ m ✓}$ (5)
- 9.2 Electric / *Elektries* ✓ (1)
- 9.3 9.3.1 Infra-red / *Infrarooi* ✓ (1)
- 9.3.2 Ultra violet ✓ (1)
- 9.3.3 Microwaves / *Mikrogolwe* ✓ (1)
- 9.4 Visible light / *Sigbare lig* ✓
 Gamma rays / *Gammastrale* ✓
 Radio waves / *Radiogolwe* ✓ (3)

[18]**TOTAL/TOTAAL: 150**