



**NATIONAL SENIOR CERTIFICATE/
NASIONALE SENIOR SERTIFIKAAT**

GRADE/GRAAD 12

JUNE/JUNIE 2022

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

MARKS/PUNTE: 75

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

QUESTION/VRAAG 1

- 1.1 B ✓✓ (2)
1.2 B ✓✓ (2)
1.3 A ✓✓ (2)
1.4 C ✓✓ (2)
1.5 D ✓✓ (2)

[10]**QUESTION/VRAAG 2**

- 2.1 An atom or a group of atoms that determine the chemical properties of a molecule./ ✓✓ 'n Atoom of groep atome wat die chemiese eienskappe van 'n molekule bepaal ✓✓

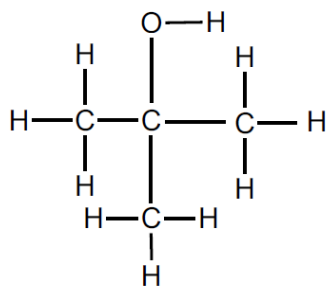
OR/OF

An atom or a group of atoms that determine(s) the physical and chemical properties of a group of organic compounds./ ✓✓ 'n Atoom of groep atome wat die fisiese en chemiese eienskappe van 'n groep organiese verbindings bepaal. ✓✓

(2)

- 2.2 2.2.1 D ✓ (1)
2.2.2 B ✓ (1)
2.2.3 F ✓ (1)
2.2.4 E ✓ (1)
2.2.5 A and/en B ✓ (1)
2.2.6 C and/en D ✓ (1)
2.3 2.3.1 Butan-2-ol ✓ (1)
2.3.2 Propanone/Propanoon ✓ (1)
2.3.3 Ethyl propanoate/Etielpropanoaat ✓ (1)

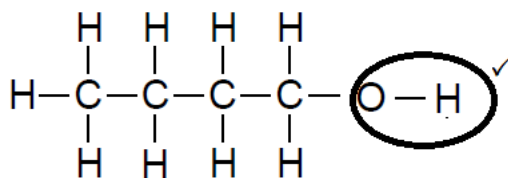
2.4 2.4.1



✓✓

(2)

2.4.2

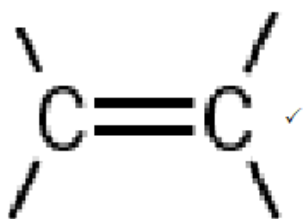


(1)

2.4.3 C₅H₁₂ ✓

(1)

2.4.4



(1)
[16]

QUESTION/VRAAG 3

- 3.1 3.1.1 Carboxylic acid/*Karboksielsuur* ✓ (1)
- 3.1.2 Ketone /*Ketoon* ✓ (1)
- 3.2 Van der Waals forces / *Van der Waals-kragte* ✓ (1)
- 3.3 Hydrogen bond / *Waterstofbinding* ✓ (1)
- 3.4 Alcohol has **one site for a hydrogen bond** and carboxylic acid has **two bond sites for hydrogen bonds** ✓ which causes carboxylic acid to have **stronger** intermolecular forces than alcohol. ✓ The **stronger the intermolecular forces the higher the boiling point.** ✓
Alkohol het een punt vir 'n waterstofbinding en karboksielsuur het twee verbindingspunte vir waterstofbinding ✓ wat veroorsaak dat die karboksielsuur **sterker intermolekulêre kragte** as alkohol het. ✓ **Hoe sterker die intermolekulêre kragte, hoe hoër die kookpunt.** ✓ (3)

[7]

QUESTION/VRAAG 4

4.1 Homologous series is a series of organic compounds that can be described by the same general formula and where each member differs from the next by a CH_2 -group. ✓✓

'n Homoloë reeks is 'n reeks organiese verbindings wat deur dieselfde algemene formule beskryf kan word en waar elke lid verskil van die volgende deur 'n CH_2 -groep. ✓✓

(2)

4.2 4.2.1 C ✓

(1)

4.2.2 A ✓

(1)

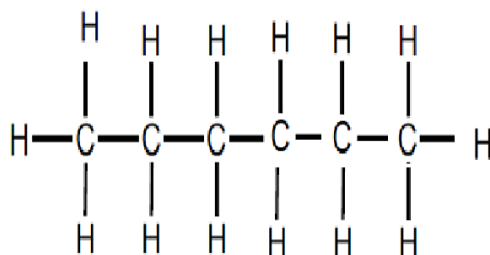
4.2.3 B ✓

(1)

4.2.4 A ✓

(1)

4.3



(2)

4.4 Increase in number of carbon atoms, increases chain length/molecular mass/size/surface area. ✓

Toename in aantal koolstof atome vermeerder die kettinglengte/molekulêre massa/grootte/oppervlakte. ✓

Strength of intermolecular forces increases/ more sites for London forces

Sterkte van die intermolekulêre kragte neem toe/meer punte vir

Londonkragte. ✓

More energy is required to overcome intermolecular forces; therefore, the boiling point is higher. ✓

Meer energie word benodig om die intermolekulêre kragte te oorkom dus is die kookpunt hoër. ✓

(3)

[11]

QUESTION/VRAAG 5

5.1 5.1.1 Pent-2-ene /Pent-2-*een* ✓✓ (2)

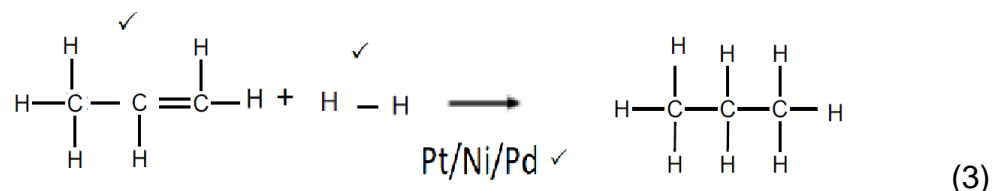
5.1.2 Addition reaction/ hydrolysis✓
Addisie reaksie/hidrolise (1)

5.1.3 Excess water (H₂O) **OR**
Conc. sulphuric acid (H₂SO₄) **OR** ✓
Dilute sulphuric acid (H₂SO₄) }
Oormaat water (H₂O) **OF**
Gekon. swawelsuur (H₂SO₄) **OF** ✓
Verdunde swawelsuur (H₂SO₄) } (Any one) (1)

5.1.4 Secondary alcohol /Sekondêre alkohol ✓ (1)

5.1.5 Major product/Hoof produk ✓ (1)

5.2 5.2.1



5.2.2 Hydrogenation / Hidrogenasie ✓ (1)

5.2.3 C_nH_{2n} ✓ (1)

5.3 Contains only single bonds between carbon atoms. ✓✓
Bevat slegs enkelbindings tussen koolstof atome. ✓✓ (2)

5.4 5.4.1 Chlorine /Chloor (Cl or/of Cl₂ 0/1) ✓ (1)

5.4.2



5.4.3 2-chlorobutane /2-chlorobutaan ✓ (1)

5.5 Polymer is a large molecule composed of smaller monomer units covalently bonded to each other in a repeating pattern. ✓✓
Polimeer is 'n groot molekule wat saamgestel is uit kleiner monomeer eenhede wat kovalent in 'n herhalende patroon aan mekaar verbind is. ✓✓ (2)

5.6 Plastic bags /Plastiese sakke }
Plastic bottles /Plastiese bottels }
Cling wrap /Kleef plastiek } (Any ONE / Enige EEN) ✓ (1)

[20]

QUESTION/VRAAG 6

- 6.1 6.1.1 An intrinsic semiconductor is a pure semiconductor. ✓✓
’n Intrinsieke halfgeleier is ’n suiwer halfgeleier. ✓✓ (2)
- 6.1.2 Doping is the process of adding impurities to intrinsic semiconductors. ✓✓
Doktering is die proses van die toevoeging van onsuiverhede by intrinsieke halfgeleiers. ✓✓ (2)
- 6.2 6.2.1 Semiconductor /Halfgeleier 2 ✓ (1)
- 6.2.2 Semiconductor /Halfgeleier 1 ✓ (1)
- 6.2.3 A is an extra electron ✓ and B is a positive hole. ✓
A is ’n ekstra elektron ✓ en B is ’n positiewe holte. ✓ (1)
- 6.3 The p-n junction is formed when:
- a p-doped semiconductor (with positive holes) is connected to an n-doped semiconductor (with spare electrons). In the p-region electrons fill some holes and the holes become neutral. ✓
 - The p-region becomes negatively charged – it has gained electrons and the n-region becomes positively charged because it has lost some electrons. ✓
 - There is potential difference between the two sides of the diode. ✓
- ’n p-n verbinding word gevorm wanneer:
 ’n p-gedokteerde halfgeleier (met positiewe holtes) aan ’n n-gedokteerde halfgeleier (met spaar elektrone) verbind word. In die p-gebied vul elektrone die holtes en sommige holtes word neutral.* ✓
- *Die p-gebied word negatief gelaai – dit verkry elektrone en die n-gebied word positief gelaai want dit het sommige elektrone verloor.* ✓
 - *Daar is ’n potensiaal verskil tussen die twee kante van die diode.* ✓ (3)
- [11]**

TOTAL/TOTAAL: 75