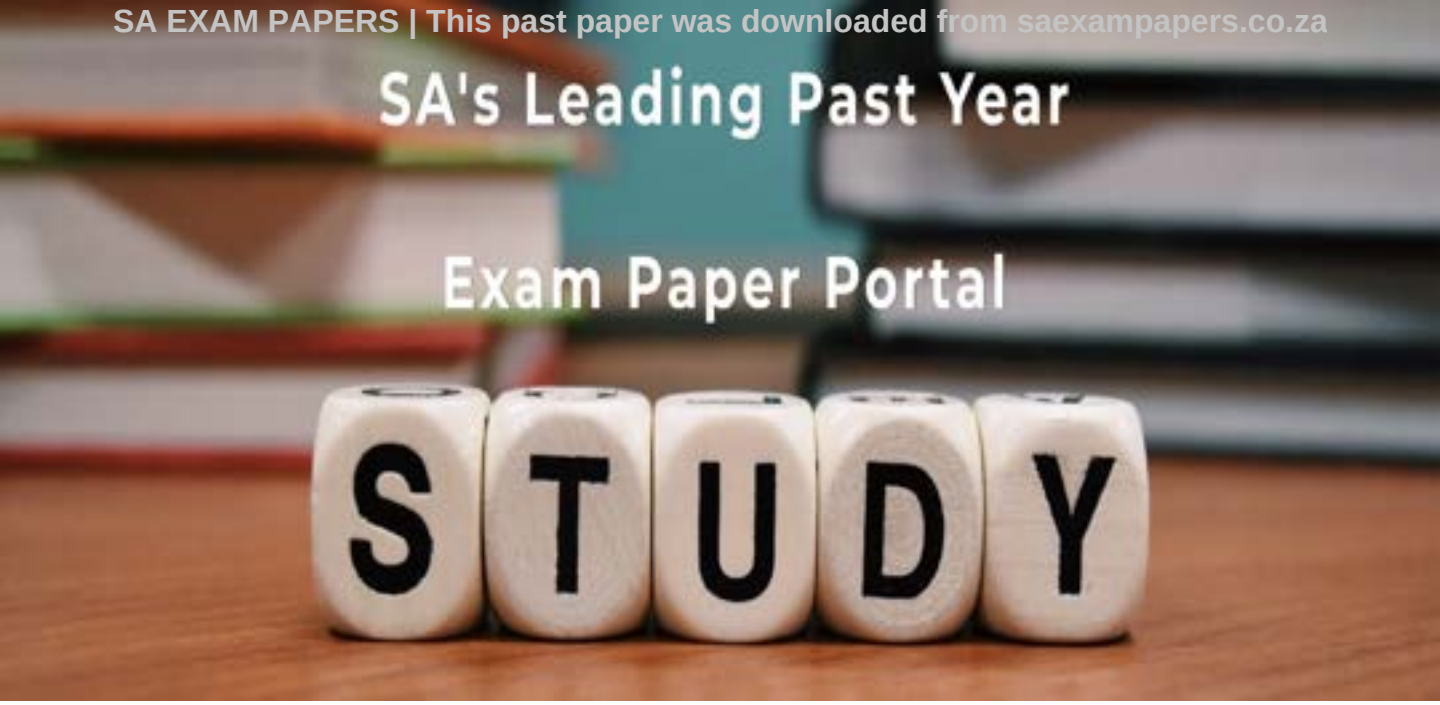


Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIORSERTIFIKAAT*

GRADE/*GRAAD* 12

JUNE/*JUNIE* 2024

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

MARKS/*PUNTE*: **75**

This marking guideline consists of 11 pages./
Hierdie nasienriglyn bestaan uit 11 bladsye.

QUESTION/*VRAAG* 1

1.1 C ✓✓ (2)

1.2 B ✓✓ (2)

1.3 D ✓✓ (2)

1.4 A ✓✓ (2)

1.5 D ✓✓ (2)

[10]

QUESTION/*VRAAG* 2

2.1 An atom or a group of atoms that determine 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 E ✓ (1)

2.2.2 A and/*en* D ✓ (1)

2.2.3 F ✓ (1)

2.2.4 A, D and/*en* H ✓ (1)

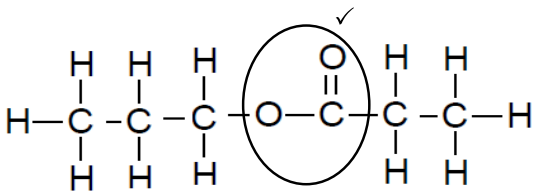
2.2.5 A and/*en* D ✓ (1)

2.3 2.3.1 pent-1-ene ✓ (accept 1-pentene/*aanvaar 1-penteen*)
pent-1-een (1)

2.3.2 Propanone / *Propanoon* ✓ (1)

2.3.3 Hexanoic Acid / *Heksanoësuur* ✓ (1)

2.4 2.4.1



✓ ✓

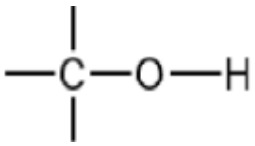
MARKING CRITERIA:
- Correct functional group ✓
- Whole structure correct ✓

NOTE: If a bond or hydrogen is missing ½

NASIENKRITERIA:
- *Korrekte funksionele groep*
- *Hele struktuur korrek*

LET WEL: Indien 'n binding of waterstof ontbreek ½. (2)

2.4.2

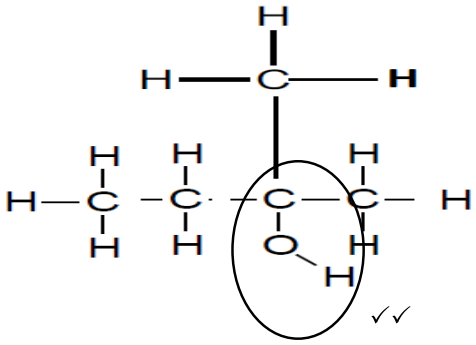


✓ (1)

2.4.3 C_5H_{11} ✓ (1)

2.4.4 Carboxyl group / Karboksiel-groep ✓ (1)

2.4.5



✓✓

MARKING CRITERIA:
- Correct functional group ✓
- *Whole* structure correct ✓

NOTE: If a bond or hydrogen is missing ½

NASIENKRITERIA:
- *Korrekte funksionele groep*
- *Hele struktuur korrek*

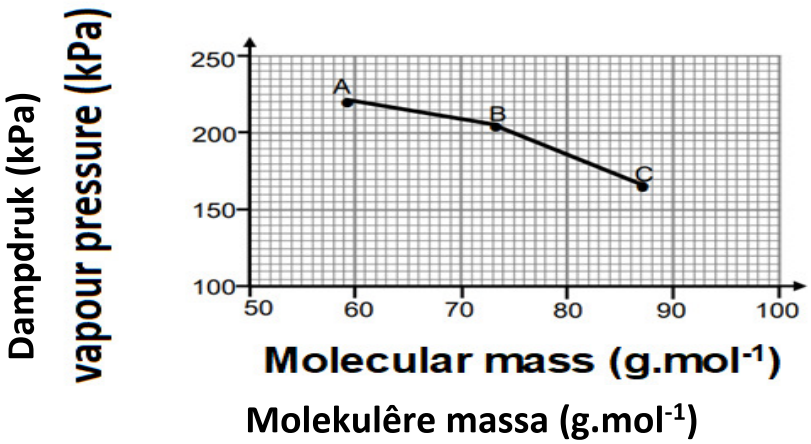
LET WEL: Indien 'n binding of waterstof ontbreek ½ (2)

[17]

QUESTION/*VRAAG* 3

3.1 The pressure exerted by a vapour at equilibrium with its liquid phases of a substances are at equilibrium. ✓✓/
Die druk uitgeoefen deur 'n damp in ewewig met sy vloeistof in 'n geslote sisteem. (2)

3.2



Marking criteria	
1 mark	Both axes correctly labelled ✓
1 mark	All points indicated ✓
1 mark	Shape of the graph ✓

Nasienkriteria	
1 punt	*Beide asse korrek benoem* ✓
1 punt	*Alle punte aangedui* ✓
1 punt	*Vorm van die grafiek* ✓

(3)

3.3 The greater the molecular mass of organic compounds/alkanes, the lower the vapour pressure. ✓/
Hoe groter die molekulêre massa van organiese verbindings/alkane, hoe laer is die dampdruk. (1)

3.4 Used as fuels/*Word as brandstof gebruik* ✓ (1)

3.5

- Compound **Z** / pentane has 5 carbon atoms which makes it to have a longer chain / greater molecular mass than compound **Y** / butane which has 4 carbon atoms which makes it to have a shorter chain/less molecular mass than compound **Z**. ✓
  *Verbinding **Z** / pentaan het 5 koolstofatome wat maak dat dit 'n langer ketting / groter molekulêre massa as verbinding **Y** het / butaan wat 4 koolstofatome het, wat maak dat dit 'n korter ketting / minder molekulêre massa as verbinding **Z** het.*

- The greater the molecular mass / longer the chain length the stronger the Intermolecular forces / London forces in compound **Z** are stronger than those in compound **Y** which are weaker. ✓
  *Hoe groter die molekulêre massa / langer die kettingslengte, hoe sterker is die intermolekulêre kragte / Londonkragte in verbinding **Z** is sterker as die in verbinding **Y**, wat swakker is.*

- More energy will be required to overcome intermolecular forces/London forces in Compound **Z** than in compound **Y** where less energy will be required to overcome intermolecular forces. ✓
  *Meer energie sal benodig word om intermolekulêre kragte/Londenkragte in verbinding **Z** te oorkom as in verbinding **Y** waar minder energie nodig sal wees om intermolekulêre kragte te oorkom.*

- (Compound **Z** / pentane will have lower vapour pressure than compound **Y**/butane which will have higher vapour pressure than Compound **Z**.)
- *(Verbinding **Z** / pentaan sal laer dampdruk hê as verbinding **Y** / butaan wat hoër dampdruk as verbinding **Z** sal hê.)*

OR/*OF*

- Compound **Y** / Butane has 4 carbon atoms which makes it to have a shorter chain / lesser molecular mass than compound **Z** / pentane which has 5 carbon atoms which makes it to have a longer chain / greater molecular mass than compound **Y**.
  *Verbinding **Y** / Butaan het 4 koolstofatome wat maak dat dit 'n korter ketting / minder molekulêre massa het as verbinding **Z** / pentaan wat 5 koolstofatome het wat maak dat dit 'n langer ketting / groter molekulêre massa as verbinding **Y** het.*

- The lesser the molecular mass / shorter the chain the weaker the intermolecular forces/London forces in compound **Y** than in Compound **Z** which are stronger.
- *Hoe kleiner die molekulêre massa / korter die ketting hoe swakker is die intermolekulêre kragte/Londen kragte in verbinding **Y** as in verbinding **Z** wat sterker is.*

- Less energy will be required to overcome intermolecular forces/London forces in compound **Y** than in compound **Z** where more energy will be required to overcome intermolecular forces.
  *Minder energie sal benodig word om intermolekulêre kragte/Londen-kragte in verbinding **Y** te oorkom as in verbinding **Z** waar meer energie benodig sal word om intermolekulêre kragte te oorkom*.

- (Compound **Y** / butane will have higher vapour pressure than compound **Z** / pentane which will have lower vapour pressure than Compound **Y**.)
  *(Verbinding **Y** / butaan sal hoër dampdruk hê as verbinding **Z** / pentaan wat laer dampdruk as verbinding **Y** sal hê.)* (3)

3.6 3.6.1 Z ✓ (1)

3.6.2 X ✓ (1)

3.6.3 X ✓ (1)
[13]

QUESTION/*VRAAG* 4

4.1 The temperature at which the vapour pressure is equal to the atmospheric pressure. ✓✓
Die temperatuur waarby die dampdruk gelyk aan die atmosferiese druk is. (2)

4.2 Haloalkanes/alkyl halides/*Haloalkane/alkielhaliede* ✓ (1)

4.3 (London forces and) Dipole-dipole intermolecular forces ✓/
(Londenkragte en) Dipool-dipool intermolekulêre kragte (1)

4.4 The boiling point increase with an increase in the number of chlorine atoms in haloalkanes. ✓/
Die kookpunt verhoog met 'n toename in die aantal chlooratome in haloalkane. (1)

4.5 4.5.1 Tetrachloromethane / *Tetrachlorometaan* ✓ (1)

4.5.2 <u>One independent variable</u> ✓
Accept same chain length / same number of carbons
<u>*Een onafhanklike veranderlike*</u>
Aanvaar dieselfde kettinglengte / dieselfde aantal koolstofstowwe. (1)

4.5.3 The vapour pressure of compound **I** will be lower than the vapour pressure of compound **L**. ✓✓

OR

The vapour pressure of compound **L** will be higher than the vapour pressure of compound **I**.

*Die dampdruk van verbinding **I** sal laer as die dampdruk van verbinding **L** wees.*

OF

*Die dampdruk van verbinding **L** sal hoër as die dampdruk van verbinding **I** wees.* (2)
[9]

QUESTION/*VRAAG* 5

5.1 Weaker/*Swakker* ✓ (1)

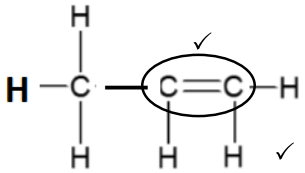
5.2 Propanol ✓ (1)

5.3 5.3.1 Addition reaction/hydration ✓
Addisiereaksie/hidrasie (1)

5.3.2 Substitution reaction/halogenation/bromination ✓
Substitusie reaksie/halogenering/brominering (1)

5.3.3 Combustion/Oxidation ✓/
Verbranding/Oksidasie (1)

5.4 5.4.1



✓ ✓

MARKING CRITERIA :

- Correct functional group ✓
- *Whole* structure correct ✓

NOTE: If a bond or hydrogen is missing ½

NASIENKRITERIA:

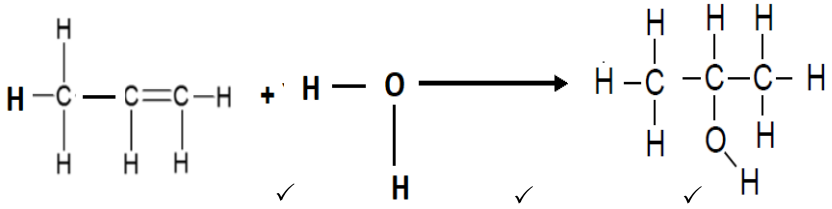
- *Korrekte funksionele groep*
- *Hele struktuur korrek*

LET WEL: Indien 'n binding of waterstof ontbreek ½ (2)

5.4.2 Inorganic/*Anorganies* ✓ (1)

5.4.3 It does not have carbon as the main element. ✓/
Dit het nie koolstof as die hoofelement nie. (1)

5.5 5.5.1



MARKING CRITERIA
- Correct reactants ✓
- Correct products ✓
- Correct balancing ✓

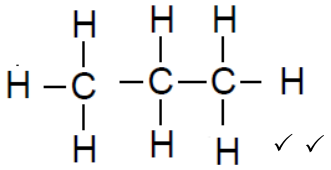
NOTE: Accept molecular structure of H_2O

NASIENKRITERIA
- *Korrekte reaktante*
- *Korrekte produkte*
- *Korrekte balansering*

LET WEL: Aanvaar molekulêre struktuur van H_2O (3)

5.5.2 Excess water /H_2O in concentration H_2SO_4 / Diluted sulphuric acid / H_2SO_4 ✓/
Oortollige water / H_2O in gekonsentreerde. H_2SO_4 / Verdunde swaelsuur / H_2SO_4 (1)

5.6 5.6.1



✓ ✓

MARKING CRITERIA:
- Correct functional group ✓
- Whole structure correct ✓

NOTE: If a bond or hydrogen is missing ½

NASIENKRITERIA:
- Korrekte funksionele groep
- Hele struktuur korrek

LET WEL: Indien 'n binding of waterstof ontbreek ½ (2)

5.6.2 Oxygen (gas) / *Suurstof (gas)* ✓ (1)

5.6.3 CO_2 ✓ (1)

[17]

QUESTION/*VRAAG* 6

6.1 Boron / B ✓ (1)

6.2 Three / *Drie* (3) ✓ (1)

6.3 Free holes that are positively charged/positive holes. ✓/
Vrye holtes wat positief gelaai is/positiewe holtes. (1)

6.4 Semiconductor is a material that has electrical conductivity between that of a conductor and an insulator. ✓✓/
Halfgeleier is 'n materiaal wat elektriese geleidingsvermoë het tussen dié van 'n geleier en 'n isolator. (2)

6.5 If the semiconductor is connected across the terminals of a cell, the electrons in the valence band move from hole to hole. ✓
The absence of an electron creates the effect of a positive charge. ✓

As die halfgeleier oor die terminale van 'n sel verbind is, beweeg die elektrone in die valensieband van holte na holte.
Die afwesigheid van 'n elektron skep die effek van 'n positiewe lading. (2)

6.6 **Improves conductivity** of the semiconductor ✓
Verbeter die geleidingsvermoë *van die halfgeleier* (1)

6.7 P-type */ P-tipe* ✓ (1)
[9]

TOTAL/*TOTAAL*: 75