Western Cape Government

METRO NORTH EDUCATION DISTRICT

SCHOOL-BASED ASSESSMENT

SEPTEMBER DISTRICT COMMON EXAMINATION

PHYSICAL SCIENCES P2

MARKING GUIDELINE

SEPTEMBER 2026

This Marking Guideline consists of 11 pages

QUESTION/ VRAAG 1

1.1	C	✓✓	(2)	1.6	C	✓✓	(2)
1.2	C	✓✓	(2)	1.7	D	✓✓	(2)
1.3	B	✓✓	(2)	1.8	B	✓✓	(2)
1.4	C	✓✓	(2)	1.9	A	✓✓	(2)
1.5	B	✓✓	(2)	1.10	D	✓✓	(2) **[20]**

QUESTION/ VRAAG 2

2.1 A series of organic compounds that can be described by the same general formula. ✓✓ **OR**
Series of organic compounds each of which differ from the next member in the series by a $-CH_2$ group. (2 or/of 0) (2)

2.2 $C_nH_{2n+1}X$ ✓ (1)

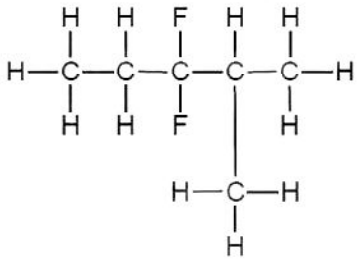
2.3 2.3.1 Ethyl✓ propanoate ✓ (2)

2.3.2 Hept-3-ene ✓✓ / 3-heptene

Marking criteria/*Nasienriglyne:*
- Correct stem i.e. ene./ *Korrekte stam d.i. een.* ✓
- IUPAC name completely correct including numbering, sequence, hyphens and commas./*IUPAC-naam heeltemal korrek insluitende nommering, volgorde, koppeltekens en kommas* ✓

(2)

2.4 2.4.1

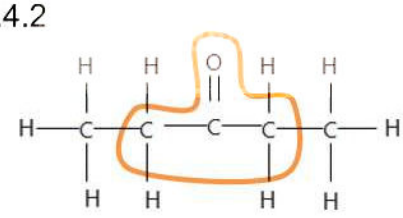


Marking criteria/Nasienkriteria:
- Methyl substituent on second C atom. ✓
- Two fluorine atoms on third C atom. ✓
- Whole structure correct. ✓

- Metielsubstituent op tweede C-atoom.
- Twee fluooratome op derde C-atoom.
- Hele struktuur korrek.

(3)

2.4.2

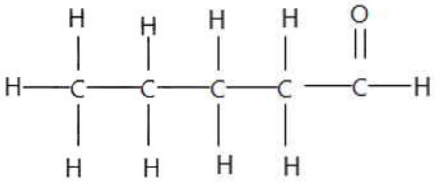


Marking criteria/*Nasienriglyne:*
- Correct functional group./ *Korrekte funksionele groep.* ✓
- Whole structure correct/ Hele struktuur korrek ✓

(2)

2.5 2.5.1 Carbonyl / karboniel ✓ (1)

2.5.2



Marking criteria/*Nasienriglyne:*
- Correct functional group./ *Korrekte funksionele groep.* ✓
- Whole structure correct/ Hele struktuur korrek ✓

(2)

2.6 2.6.1 Primary / primêre ✓ (1)

2.6.2 The carbon atom bonded to the hydroxyl/OH group is bonded to only one other carbon atom. ✓✓
Die koolstofatoom waaraan die hidroksiel/OH groep gebind is, is aan slegs een ander koolstofatoom gebind.

OR/OF

The functional group is bonded to only one other carbon atom.
Die funksionele groep is aan slegs een koolstofatoom gebind. (2 or/of 0) (2)

2.7

	C	H	O	
Mass/massa	2,58	0,67	1,75	
Mole ($n = {}^{m}/_{M}$)	$\frac{2,58}{12}$	$\frac{0,67}{1}$	$\frac{1,75}{16}$	✓ ($\div M_r$)
Ratio	$\frac{0,215}{0,1094}$	$\frac{0,67}{0,1094}$	$\frac{0,1094}{0,1094}$	✓ (÷ smallest/kleinste mol)
	2	6	1	✓ (2 marks for final answer if left out)
	C_2H_6O			✓

(4)

[22]

QUESTION/ VRAAG 3

3.1 The pressure exerted ✓ by a vapour at equilibrium with its liquid in a closed system. ✓
Die druk uitgeoefen deur 'n damp in ewewig met sy vloeistof in 'n geslote sisteem.
(–1 per omitted phrase in context/ -1 per frase uitgelaat in konteks) (2)

3.2 Functional group/Type of intermolecular forces/Homologous series ✓
Funksionele groep/Tipe intermolekulêre kragte/Homoloë reeks (1)

3.3 B ✓ (1)

3.4

Marking criteria/*Nasienkriteria*

- State hydrogen bonding in **A**./*Noem waterstofbinding in **A***. ✓
- State dipole-dipole forces in **B**./*Noem dipool-dipoolkragte in **B***.✓
- Compare strengths of IMFs./*Vergelyk sterktes van IMKe.* ✓
- Compare energies required./*Vergelyk energieë benodig.* ✓

- Compound **A**/butan-1-ol has hydrogen bonding (dipole-dipole and London forces) between molecules. ✓
- Compound **B**/butan-2-one has dipole-dipole forces (and London forces) between molecules. ✓
- Intermolecular forces in compound **A**/butan-1-ol are stronger than intermolecular forces in compound B/butan-2-one. ✓

OR

Intermolecular forces in compound **B**/butan-2-one is weaker than intermolecular forces in compound **A**/butan-1-ol.

- More energy is needed to overcome/break intermolecular forces in compound **A**/*butan-ol* than in compound **B**/butan-2-one. ✓

- *Verbinding **A**/butan-1-ol het waterstofbindings (dipool-dipoolkragte en Londonkragte) tussen molekule.*
- *Verbinding **B**/butan-2-oon het dipool-dipoolkragte (en London kragte) tussen molekule.*
- *Intermolekulêre kragte in verbinding **A**/butan-1-ol is sterker as intermolekulêre kragte in verbinding **B**/butan-2-oon.*

OF

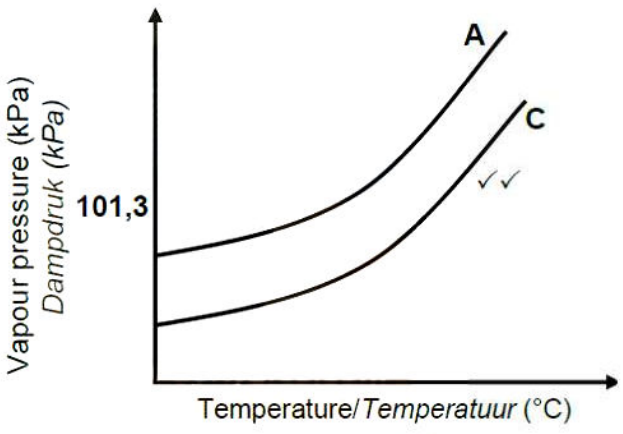
*Intermolekulêre kragte in verbinding **B**/butan-2-oon is swakker as intermolekulêre kragte in verbinding **A**/butan-1-ol.*

- *Meer energie is nodig om intermolekulêre kragte te oorkom/breek in verbinding **A**/butan-1-ol as in verbinding **B**/butan-2-oon.* (4)

3.5.1 Boiling point (of compound **A**/butan-1-ol) ✓
*Kookpunt (van verbinding **A**/butan-1-ol)* (1)

3.5.2 Gas ✓ (1)

3.5.3



Marking criteria/*Nasienkriteria:*

- Curve **C** starts below curve **A**/*Kurwe **C** begin onder kurwe **A***. ✓
- Curve **C** remains below curve **A**/ *Kurwe **C** bly onder kurwe **A***. ✓

Accept/*Aanvaar*

- If **C** is labelled as **B** / *Indien **C** as **B** benoem is*
- If graph below graph **A** is unlabelled /*Indien grafiek onder grafiek **A** nie benoem is nie*

Note/*Let Wel*

If both graphs unlabelled / *Indien beide grafiek nie benoem is nie:* 0 marks / *0 punte*

(2)

[12]

QUESTION/ VRAAG 4

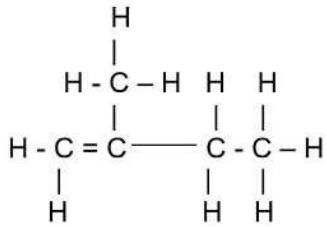
4.1 4.1.1 Halogenation / Bromination ✓
Halogenering / brominering (1)

4.1.2 The bromine water /Br_2 / solution decolourises. The brown colour disappears. ✓
Die broomwater /Br_2 / oplossing ontkleur. Die bruin kleur verdwyn.

OR/OF

Bromine water/ Br_2 solution changes from brown / reddish to colourless.
Broomwater/ Br_2 oplossing verander van bruin / rooibruin na kleurloos. (1)

4.1.3



Marking criteria/*Nasienriglyne:*
- Correct functional group./ *Korrekte funksionele groep.* ✓
- Methyl group on 2nd C / Metielgroep op 2de C ✓
- Whole structure correct/ Hele struktuur korrek, ✓

(3)

4.1.4 2-chloro ✓ -2-methylbutane ✓
2-chloro-2-metielbutaan

Marking criteria/*Nasienriglyne:*
- 2-chloro. ✓
- IUPAC name completely correct including numbering, sequence, hyphens and commas./*IUPAC-naam heeltemal korrek insluitende nommering, volgorde, koppeltekens en kommas* ✓

(2)

4.1.5 $CH_3CH_2C(CH_3)ClCH_3$ ✓ + NaOH ⟶ $CH_3CH_2C(CH_3)OHCH_3$ ✓✓+ NaCl ✓

ACCEPT:



Marking criteria:
- Haloalkane correct. ✓
- Functional group of alcohol correct ✓
- Whole condensed structural formula of alcohol correct. ✓
- *NaOH + NaCl **OR** KOH + KCl **OR** H_2O + HCl* ✓

Nasienkriteria:
- *Haloalkaan korrek*
- *Funksionele groep van alkohol korrek.* ✓
- *Hele gekondenseerde struktuurformule van alkohol korrek.* ✓
- *NaOH + NaCl **OF** KOH + KCl **OF** H_2O + HCl* ✓

NOTE/*AANTEKENING:*
- Structural formulae used/*Struktuurformule gebruik.* Max./*Maks.* 2/4
- Molecular formulae used/*Molekulêre formule gebruik.* Max./*Maks.* 1/4
- Accept bonds on functional groups in condensed structure/*Aanvaar bindings in funksionele groepe.*

(4)

4.1.6 2–methylbutan–2–ol/ 2-metielbutan-2-ol

Marking criteria/*Nasienriglyne:*
- Methylbutanol./ Metielbutanol✓
- IUPAC name completely correct including numbering, sequence, hyphens and commas./*IUPAC-naam heeltemal korrek insluitende nommering, volgorde, koppeltekens en kommas* ✓

(2)

4.1.7 Dehydration/ Dehidrasie ✓ (1)

4.2 4.2.1 Esterification / Condensation ✓
Esterifikasie / Kondensasie (1)

4.2.2 Propyl ✓ butanoate ✓ /Propiel butanoaat (2)
[17]

QUESTION/ VRAAG 5

5.1 Temperature/ Temperatuur ✓ (1)

5.2 60 s. ✓
No more $H_2(g)$ is produced / The volume of $H_2(g)$ remains constant.✓
Geen H_2 gas word gevorm / Die volume H_2 gas bly konstant. (2)

5.3 Zinc/Zn/Sink ✓ (1)

5.4 Ave rate/Gem. tempo = $\frac{V}{\Delta t} = \frac{800(-0)\ \checkmark}{60(-0)\ \checkmark}$

$= 13{,}33\ (cm^3 \cdot s^{-1})$ ✓ (3)

5.5 REMAINS THE SAME / BLY DIESELFDE ✓ (1)

5.6 Two (more than one) independent variable. ✓
Twee (meer as een) onafhanklike veranderlike. (1)

5.7 INCREASE/ NEEM TOE ✓
- (At a higher temperature), particles move faster / have more kinetic energy. ✓
- More particles have sufficient kinetic energy (E_K) (for effective collisions) / More particles have E_K equal to or higher than activation energy. ✓
- More effective collisions per unit time / second ✓
  OR the frequency of effective collisions increases.

- By 'n hoër temperatuur beweeg deeltjies vinniger / het hulle meer kinetiese energie.
- Meer deeltjies het voldoende kinetiese energie (Ek) (vir effektiewe botsings) / Meer deeltjies het Ek gelyk aan of hoër as die aktiveringsenergie.
- Meer effektiewe botsings per eenheidstyd / sekonde
  OF die frekwensie van effektiewe botsings neem toe. (4)

5.8

- Divide the volume by 24,7 / *Deel die volume deur 24,7 in* $\frac{V}{V_M}$ = 0,0324 mol

  If substitution is not shown, award the mark for the answer.
  Indien substitusie nie getoon word nie. ken die punt toe vir die antwoord.
- Ratio / *verhouding* $n(HCl) = 2n(H_2) = 0,0648$ mol
- Calculate / *Bereken* $n(HCl)_{remains/oorbly} = n_{start/begin} - n_{used/verbruik}$
- Substitute / *vervang* in $c = \frac{n}{V}$
- Final answer / *Finale antwoord*

OPTION 1 / *OPSIE 1*

$n(H_2) = \frac{V}{V_M} = \frac{0,8}{24,7}$ ✓

$= 0,0324$ mol

$n(HCl) = 2n(H_2) = 2(0,324)$ ✓

$= 0,0648$ mol

$n(HCl)_{remains/oorbly}$

$= (0,2)(0,75) - 0,0648$ ✓

$= 0,0852$ mol

$c(HCl) = \frac{n}{V}$

$c = \frac{0,0852}{0,75}$ ✓

$= 0,11$ mol.dm^{-3} ✓ (0,11 – 0,12)

OPTION 2 / OPSIE 2

24,7 dm^3 (H_2) = 1 Mole / *mol*

0,8 dm^3 (H_2) = 0,0324 mole / *mol*

$n(HCl) = 2n(H_2) = 2(0,324)$

$= 0,0648$ mol

$n(HCl)_{remains/oorbly}$

$= (0,2)(0,75) - 0,0648$

$= 0,0852$ mol

$c(HCl) = \frac{n}{V}$

$c = \frac{0,0852}{0,75}$

$= 0,11$ mol.dm^{-3} (0,11 – 0,12)

(5)

[18]

QUESTION/ VRAAG 6

6.1 The stage in a chemical reaction when the rate of forward reaction equals the rate of reverse reaction. ✓✓
OR The stage in a chemical reaction when the concentrations of reactants and products remain constant.

Die tydstip in 'n chemiese reaksie wanneer die tempo van die voorwaartse reaksie gelyk is aan die tempo van die terugwaartse reaksie.
OF Die tydstip in 'n chemiese reaksie wanneer die konsentrasies van reaktanse en produkte konstant bly. (2 or/of 0) (2)

6.2 GREATER THAN ONE/ GROTER AS EEN ✓
Forward reaction is favoured/ the solution is pink. ✓
Voorwaartse reaksie is bevoordeel/ die oplossing is pienk. (2)

6.3 When the equilibrium in a closed system is disturbed, the system will re-instate a new equilibrium by favouring the reaction that will oppose the disturbance. ✓✓
Wanneer die ewewig in 'n geslote sisteem versteur word, sal die sisteem 'n nuwe ewewig instel deur die reaksie te bevoordeel wat die versteuring teenwerk.

(–1 per omitted phrase in context/ -1 per frase uitgelaat in konteks) (2)

6.4 6.4.1 Reverse/ terugwaartse ✓ (1)

6.4.2 Forward/ voorwaartse ✓ (1)

6.5 Silver ions reacts with chloride ions ✓in the solution which causes a reduction in the concentration of $C\ell^-$ ions ✓. The system will favour the forward reaction ✓.

Silwerione reageer met chloriedione ✓ in die oplossing, wat 'n afname in die konsentrasie van Cl^--ione ✓ veroorsaak. Die sisteem sal die voorwaartse reaksie bevoordeel. ✓ (3)

6.6

$n = \frac{m}{M}$

$= \frac{4,42}{17}$ ✓

= 0,26 mol

	N_2	H_2	NH_3
R	1	3	2
I	0,6 (mol)	X	0
C	0,13	0,39	0,26
E	0,47	x – 0,39	0,26
C = $\frac{n}{V}$	0,235	$\frac{x-0,39}{2}$	0,13

ratio ✓

subtract ✓

divide by 2 ✓

$K_C = \frac{[NH_3]^2}{[N_2][H_2]^3}$ ✓ 3,864 ✓ $= \frac{(0,13)^2}{(0,235)\times\left(\frac{x-0,39}{2}\right)^3}$ ✓ ∴x = 0,92 mol (initial)

Mass/a (m) = nM = 0,92 x 2 ✓ = 1,84 g ✓

AFRIKAANS ONLY:

$K_C = \frac{[NH_3]^2}{[N_2][H_2]^3}$ ✓ 3 864 ✓ $= \frac{(0,13)^2}{(0,235)\times\left(\frac{x-0,39}{2}\right)^3}$ ✓ ∴x = 0,443 mol (initial)

Mass/a (m) = nM = 0,443 x 2 ✓ = 0,89 g ✓

(9)
[20]

QUESTION/ VRAAG 7

7.1 7.1.1 An acid that donates two protons/hydrogen ions per molecule/unit. ✓
'n Suur wat twee protone/waterstof ione skenk per molekuul/eenheid. (1)

7.1.2 $H_2SO_4 + 2\ H_2O \rightarrow SO_4^{-2}$ ✓ + $2\ H_3O^+$ ✓ Balancing ✓ (3)

7.1.3 Strong acid ✓, large K_a value/ $K_a > 1$ ✓
Sterk suur, hoë K_a waarde/ $K_a > 1$. (2)

7.2 7.2.1 Contain a large amount (number of moles) of acid/base in proportion to the volume of water ✓✓
Bevat 'n groot hoevelheid (aantal mol) suur / basis in verhouding tot die volume water. (2 or 0) (2)

7.2.2 $[H_3O^+] = 0,05 \times 2 = 0,1\ mol.dm^{-3}$ ✓

pH $= -\log[H_3O^+]$ ✓

$= -\log(0,1)$ ✓

$= 1$ ✓ (4)

7.2.3

Marking criteria	***Nasienkriteria:***
(a) Substitute: 0,2 mol·dm^{-3} & 0,06 dm^3 in n = cV ✓	(a) Vervang: 0,2 mol·dm^{-3} & 0,06 dm^3 in n = cV ✓
(b) USE ratio: $n(H_2SO_4) = ½\ n(NaOH)$✓	(b) GEBRUIK ratio: $n(H_2SO_4) = ½\ n(NaOH)$✓
(c) Substitute: 0,05 mol·dm^{-3} & 1,5 dm^3 in n = cV ✓	(c) Vervang: 0,05 mol·dm^{-3} & 1,5 dm^3 in n = cV ✓
(d) $nHC\ell = n_{ini} - n_{excess}$ ✓	(d) $nHC\ell = n_{aanv} - n_{oormaat}$ ✓
(e) USE ratio: $n(H_2SO_4) = n(CaCO_3)$✓	(e) GEBRUIK ratio: $n(H_2SO_4) = n(CaCO_3)$✓
(f) Substitute Mr into n=m/M ✓	(f) Vervang Mr into n=m/M ✓
(g)Final answer: 2,14 g ✓	(g)Finale antwoord: 2,14 g ✓
Range:	*Gebied:*

Excess/oormaat: $n_{NaOH} = cV = (0,2)(0,06)$ ✓ = 0,012 mol

0,012 / 2✓ = 0,006 mol H_2SO_4 was in excess/oormaat

Initial/begin: $n_{H2SO4} = c.V = (0,05)(1,5)$ ✓ = 0,075 mol

H_2SO_4 reacted/reageer: 0,075 – 0,006 = 0,069 mol ✓

Ratio 1:1 therefore/dus 0,069 mol $CaCO_3$ ✓

m = n.M = 0,069.100✓ = 6,9 g

Impure/onsuiwer $CaCO_3$ = 6,9 x 100/70

X = 9,86 g ✓ (7)

[19]

QUESTION/ VRAAG 8

8.1 8.1.1 $C\ell_2$ ✓ (1)

8.1.2 $C\ell^-$ / $HC\ell$/ $NaC\ell$ (any soluble metal chloride salt/ enige oplosbare metaal chloride sout)✓ (1)

8.1.3 Pt / C ✓ (1)

8.2 8.2.1 Sodium nitrate/ natriumnitraat/ $NaNO_3$ ✓ (1)

8.2.2 $NaNO_3$ will not react with the electrolyte/Cl^- ✓

$NaNO_3$ sal nie met die elektroliet/ Cl^- reageer nie. (1)

8.3 $E^{\theta}_{cell/sel} = E_{cathode/katode} - E_{anode/anode}$ ✓ (any other correct formula/ enige ander korrekte formule)

= 1,36V ✓– 0,77V ✓

= 0,59 V ✓ (4)

8.4 Fe^{2+} / iron (II) ion / yster (II) ioon ✓ (1)

8.5.1 Y to/na X ✓ (1)

8.5.2 THE EXTERNAL CIRCUIT/ DIE EKSTERNE STROOMBAAN ✓ (1)

[12]

QUESTION/ VRAAG 9

9.1 A cell in which electrical energy is converted into chemical energy. ✓✓
'n Sel waarin elektriese energie omgeskakel word na chemiese energie. (2 or/of 0) (2)

9.2 9.2.1 Chlorine/ Cl_2 / chloor (gas) ✓ (1)

9.2.2 A ✓ (1)

9.2.3 Increase/ toeneem ✓ (1)

9.2.4 A ✓ (1)

9.2.5 $2C\ell^- + Cu^{2+}$ ✓ $\rightarrow C\ell_2 + Cu$ ✓ ✓bal. (3)

9.2.6 C or/of Pt ✓ (1)

[10]

TOTAL/ TOTAAL: 150