Western Cape Government

METRO NORTH EDUCATION DISTRICT

SCHOOL-BASED ASSESSMENT

SEPTEMBER TRIAL COMMON EXAMINATION

PHYSICAL SCIENCES P2 (CHEMISTRY)

TASK NO: 5

SEPTEMBER 2026

MARKS: 150

DURATION: 3 hours

This question paper consists of 15 pages and 4 data sheets

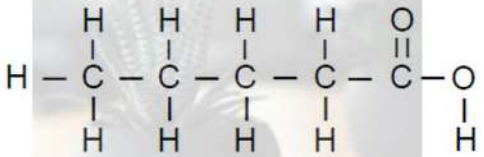
INSTRUCTIONS AND INFORMATION:

1. Write your name, surname and class on your ANSWER BOOK.
2. This question paper consists of TEN questions. Answer ALL questions in your ANSWER BOOK.
3. Start EACH question on a NEW page in your ANSWER BOOK.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Leave ONE line between two sub-questions, for example between QUESTION 2.1 and QUESTION 2.2.
6. You may use a non-programmable calculator.
7. You may use appropriate mathematical instruments.
8. Show ALL formulae and substitutions in ALL calculations.
9. Round off your FINAL numerical answers to a minimum of TWO decimal places.
10. Give brief motivations, discussions, et cetera where required.
11. You are advised to use the attached DATA SHEETS.
12. Write neatly and legibly.

QUESTION 1

Various options are provided as possible answers to the following questions. Choose the correct answer and write only the letter (A - D) next to the question numbers (1.1 - 1.10) in the ANSWER BOOK, for example 1.11 E.

1.1 The structural formula of an organic compound is shown below:



Which one of the following is the correct IUPAC name for the functional isomer of this compound?

A Pentanoic acid.
B Methyl pentanoate.
C Methyl butanoate.
D Pentanone. (2)

1.2 A learner measures the boiling points of four primary bromoalkanes: bromoethane, 1-bromopropane,1-bromobutane and 1-bromopentane.

What is the independent variable in this investigation?

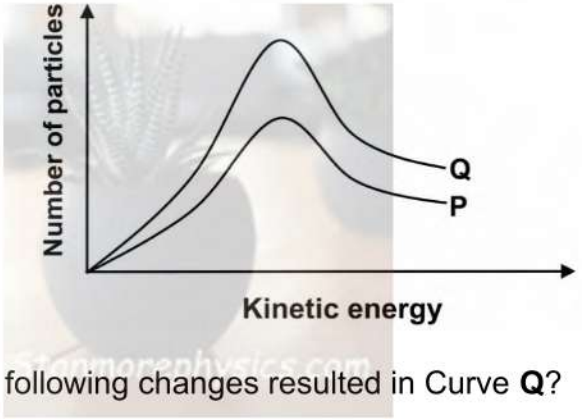
A Boiling point.
B Type of intermolecular force.
C Molecular mass/chain length.
D Type of functional group. (2)

1.3 Consider the reaction of $CH_3(CH_2)_4CH_3$ in the presence of strong heat, high pressures and platinum (Pt) as catalyst.

This reaction is best classified as a/an _____ reaction:

A Addition.
B Cracking.
C Substitution.
D Combustion. (2)

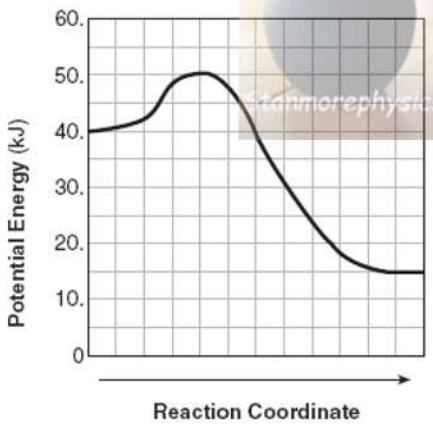
1.4 The graph below shows the Maxwell-Boltzmann distribution curve for carbon dioxide (CO_2) gas in a closed container. Curve **P** represents the distribution under the original conditions, while Curve **Q** was obtained after one reaction condition was changed.



Which ONE of the following changes resulted in Curve **Q**?

A Increasing the temperature of the CO_2 gas.
B Adding a catalyst.
C Increasing the concentration of the CO_2 gas.
D Increasing the surface area of the CO_2 gas. (2)

1.5 The potential energy versus reaction coordinate profile for a reaction at equilibrium is shown below:



Which ONE of the following disturbances will cause in INCREASE in the equilibrium constant?

A A temperature increase.
B A temperature decrease.
C A pressure increase.
D A pressure decrease. (2)

1.6 The hypothetical reaction shown below reaches equilibrium in a sealed container:

$$2\,A\,(g) + B\,(s) \rightleftharpoons 3\,C(g)$$

The chemist decreases the volume of the reaction vessel and makes the following predictions regarding the re-establishment of the new equilibrium following this disturbance:

(i) The forward reaction will be favoured.
(ii) The equilibrium constant will remain the same.
(iii) The number of moles of C present in the vessel will decrease.

Which of the chemist's statements are TRUE?

A i only.
B i and iii.
C ii and iii.
D ii only. (2)

1.7 Which ONE of the following salts will form an aqueous solution with a pH equal to 7 at 25 °C?

A Na_2CO_3.
B CH_3COONa.
C $NH_4C\ell$.
D $NaC\ell$. (2)

1.8 Two acid solutions, **X** and **Y**, of equal concentration are compared. The pH of solution **X** is 1, while the pH of solution **Y** is 4.

Which ONE of the following statements is CORRECT?

A Solution **X** is a weaker acid than solution **Y**.
B Solution **X** has a higher hydronium ion concentration than solution **Y**.
C Solution **Y** ionises more completely than solution **X**.
D Solution **X** will react more slowly with magnesium ribbon than solution **Y**. (2)

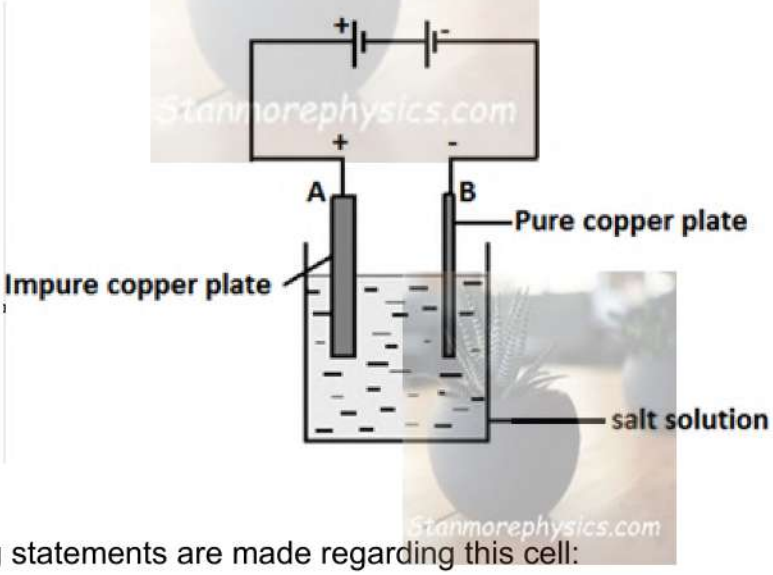
1.9 The E^{θ}-value of the $Cu^{2+}/Cu(s)$ electrode is usually determined using a standard H^+/H_2, Pt-electrode as reference electrode.

The equation for the half-reaction which occurs at the cathode of this cell is:

A	$Cu^{2+} + 2\ e^-$	→	$Cu\ (s)$
B	$H_2\ (g)$	→	$2\ H^+ + 2\ e^-$
C	$2\ H^+ + 2\ e^-$	→	$H_2\ (g)$
D	$Cu\ (s)$	→	$Cu^{2+} + 2\ e^-$

(2)

1.10 To purify an impure copper plate the following setup is used.



The following statements are made regarding this cell:

i) Electrode **A** is the cathode

ii) Electrode **B** is where reduction is taking place

iii) Copper sulphate would be a suitable salt solution to use

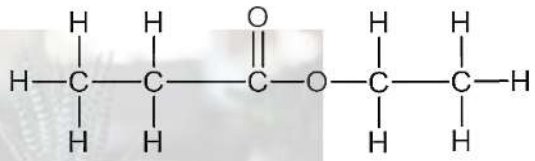
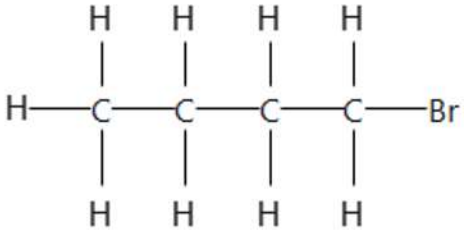
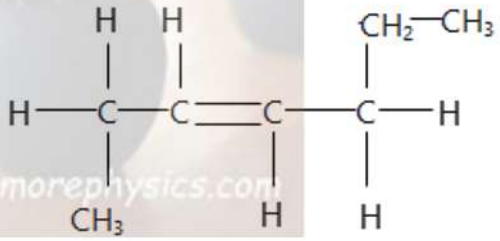
Which of these statements are TRUE?

A (i) only
B (ii) only
C (i) and (iii)
D (ii) and (iii)

(2)
[20]

QUESTION 2 (Start on a new page)

The letters **A** to **F** in the table represent six organic compounds.

A	3,3-difloro-2-methylpentane	**B**	
C		**D**	
E	$CH_3CH_2COCH_2CH_3$	**F**	2-methylpropan-1-ol

2.1 Define the term *homologous series*. (2)

2.2 Write down the GENERAL FORMULA of the homologous series to which compound **C** belongs. (1)

2.3 Write down the IUPAC name of the following compounds:
2.3.1 **B** (2)
2.3.2 **D** (2)

2.4 Write down the STRUCTURAL FORMULA of the following compounds:
2.4.1 **A** (3)
2.4.2 **E** (2)

2.5 For compound **E**, write down the:
2.5.1 NAME of the FUNCTIONAL GROUP. (1)
2.5.2 STRUCTURAL FORMULA of its FUNCTIONAL isomer. (2)

2.6 Compound **F** is an alcohol.
2.6.1 Is compound **F** a PRIMARY, SECONDARY or TERTIARY alcohol? (1)
2.6.2 Give a reason for the answer to Question 2.6.1. (2)

2.7 A 5 g sample of a white powder contains 2,58 g carbon, 0,67 g hydrogen and 1,75 g oxygen.
Determine the empirical formula of this compound by means of a calculation. (4)
[22]

QUESTION 3 (Start on a new page)

Learners use compounds **A**, **B** and **C** to investigate one of the factors that influences the VAPOUR PRESSURE of organic compounds.

A	Butan-1-ol
B	Butan-2-one
C	Propanoic acid

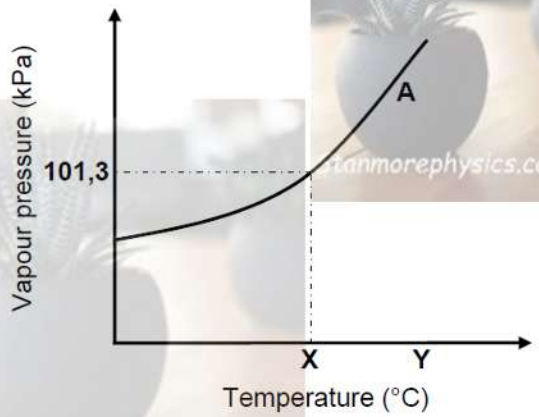
3.1 Define the term vapour pressure. (2)

3.2 Write down the independent variable for this investigation. (1)

3.3 Which compound, **A** or **B**, has the higher vapour pressure? (1)

3.4 Fully explain the answer to QUESTION 3.3.
Include the TYPES OF INTERMOLECULAR FORCES in your explanation. (4)

3.5 The graph below represents the relationship between vapour pressure and temperature for compound **A** at sea level. **X** and **Y** represent different temperatures.



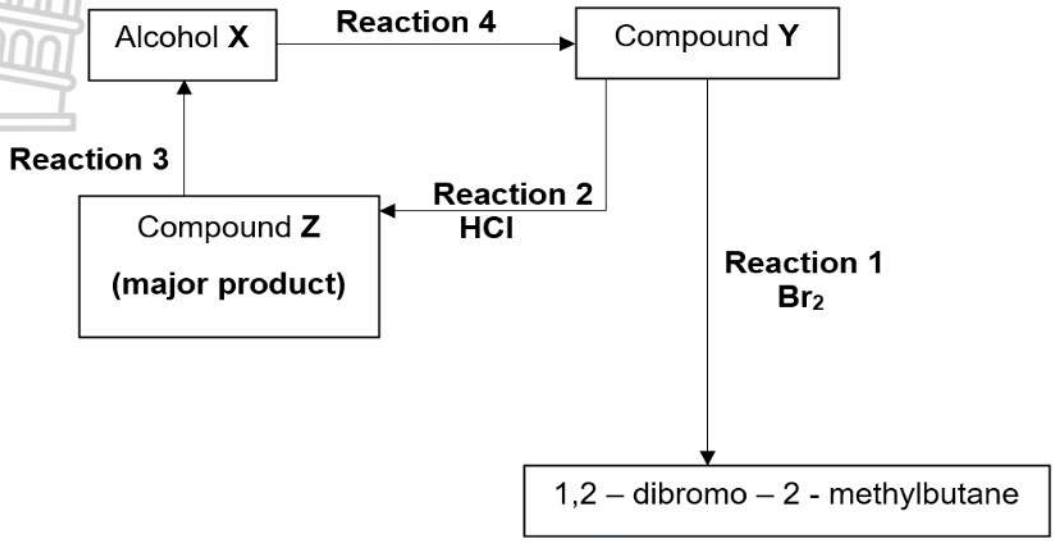
3.5.1 Write down the term for the temperature represented by **X**. (1)

3.5.2 State the phase of compound **A** at temperature **Y**. Choose from GAS, LIQUID or SOLID. (1)

3.5.3 Redraw the graph above in your ANSWER BOOK. On the same set of axes, sketch the curve that will be obtained for compound **C**. Clearly label curve **A** and curve **C**. (2)
[12]

QUESTION 4 (Start on a new page)

4.1 The flow diagram below shows different organic reactions. X, Y and Z are organic compounds.



Reaction 1 is an addition reaction. Write down:

4.1.1 The TYPE of addition reaction. (1)

4.1.2 One observable change which occurs in the container during the reaction. (1)

4.1.3 The STRUCTURAL FORMULA of compound Y. (3)

Consider **reaction 2**.

4.1.4 Write down the IUPAC name of compound **Z**. (2)

For **reaction 3**, write down:

4.1.5 A balanced equation using CONDENSED structural formulae. (4)

4.1.6 The IUPAC name of alcohol **X.** (2)

Reaction 4 is an elimination reaction

4.1.7 Write down the TYPE of elimination reaction. (1)

4.2 Propan–1–ol reacts with butanoic acid in the presence of a catalyst.
Write down the:

4.2.1 TYPE of reaction that takes place. (1)

4.2.2 IUPAC name of the organic product formed. (2)

[17]

QUESTION 5 (Start on a new page)

The reaction between zinc, Zn(s) and an EXCESS of diluted hydrochloric acid, HCℓ(aq) is used to investigate one of the factors that affects reaction rate. The balanced equation for the reaction is below:

$$Zn(s) + 2\,HC\ell(aq) \rightarrow ZnC\ell_2(aq) + H_2(g)$$

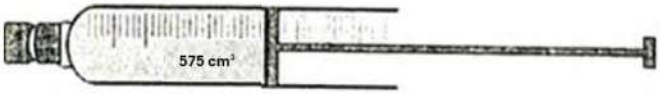
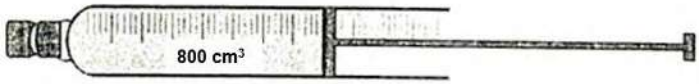
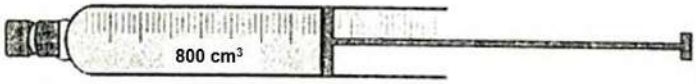
In all experiments, the mass of zinc granules and the volume of hydrochloric acid were kept constant.

The reaction conditions for each experiment are summarised in the table below.

EXPERIMENT	VOLUME OF HCℓ (aq) in cm^3	CONCENTRATION OF HCℓ(aq) in $mol.dm^{-3}$	TEMPERATURE OF HCℓ(aq) in °C
A	750	0,20	25
B	750	0,20	30
C	750	0,20	35
D	750	0,10	40

5.1 Identify the independent variable for experiment **A** to **C** for this investigation. (1)

The hydrogen gas, $H_2(g)$, produced during EXPERIMENT A is collected in a gas syringe. The volume of the gas collected is shown in the table below.

READING	TIME (s)	VOLUME OF $H_2(g)$ in cm^3
1	30	
2	45	
3	60	
4	75	

5.2 After how many seconds was the reaction completed? Motivate your answer. (2)

5.3 Which reactant is the limiting reagent? (1)

5.4 Calculate the rate (in $cm^3.s^{-1}$) at which $H_2(g)$ is produced during this experiment. (3)

5.5 How will the volume of the $H_2(g)$ gas produced during EXPERIMENT B compare to that produced during EXPERIMENT A?

Choose from GREATER THAN, SMALLER THAN or EQUAL TO. (1)

5.6 Why is EXPERIMENT **D** considered not valid for comparison with the other experiments in this investigation? (1)

5.7 How will the rate at which $H_2(g)$ is produced during EXPERIMENT **B,** compare to the rate during EXPERIMENT **A**?

Choose from INCREASE, DECREASE or REMAINS THE SAME.
Use the collision theory to fully explain your answer. (4)

5.8 Given that the molar gas volume at 25 °C is 24,7 $dm^3 \cdot mol^{-1}$, calculate the new concentration of HCℓ(aq) upon completion of EXPERIMENT A.

Assume that the volume of the HCℓ(aq) remains constant. (5)
[18]

QUESTION 6 (Start on a new page)

The following reversible reaction takes place when cobalt chloride is dissolved in water:

$$[CoCl_4]^{2-}(aq) + 6\ H_2O(l) \rightleftarrows [Co(H_2O)_6]^{2+}(aq) + 4\ Cl^-(aq)$$

dark blue — light pink

The cobalt chloride ion, $[CoCl_4]^{2-}$, has a dark blue colour whereas the cobalt hexahydrate ion, $[Co(H_2O)_6]^{2+}$, has a light pink colour.

The system reaches equilibrium and the solution has a light pink colour.

6.1 Define chemical equilibrium. (2)

6.2 What will the K_c value be for this reaction? Write GREATER THAN ONE or LESS THAN ONE. Give a reason for your answer. (2)

6.3 State Le Chatelier's principle. (2)

6.4 Predict which reaction will be favoured by the changes stated below. Write only FORWARD or REVERSE or NEITHER.

6.4.1 $[CoCl_4]^{2-}$ is removed. (1)

6.4.2 Silver nitrate is added. (1)

6.5 Use Le Chatelier's principle to explain your answer to question 6.4.2. (3)

6.6 A scientist mixes 0,6 mol nitrogen gas with x mols hydrogen gas in a closed 2 dm^3 container at T °C. The nitrogen and hydrogen react to form ammonia (NH_3) according to the balanced chemical equation:

$$N_2\ (g) + 3\ H_2\ (g) \rightleftarrows 2\ NH_3\ (g)$$

At equilibrium, there are 4,42 g NH_3. Determine the **INITIAL mass** of hydrogen in the container if the equilibrium constant is 3,864 at T °C.

(9)
[20]

QUESTION 7 (Start on a new page)

7.1 Sulphuric acid is a diprotic acid.

7.1.1 Explain what is meant by a *diprotic acid*. (1)

7.1.2 Write a balanced equation for the full ionization of sulphuric acid. (3)

7.1.3 Is sulphuric acid a strong or a weak acid? Explain your answer in terms of sulphuric acids K_a value. (2)

7.2 A concentrated sulphuric acid solution has a concentration of 0,05 $mol.dm^{-3}$.

7.2.1 Define the term *concentrated acid.* (2)

7.2.2 Calculate the pH of this solution. Assume that the acid ionises completely. (4)

7.2.3 1,5 ℓ of the above solution is allowed to react with **X** g of unpure $CaCO_3$ according to the following balanced equation:

$$H_2SO_4 + CaCO_3 \rightarrow CaSO_4 + H_2O + CO_2$$

The $CaCO_3$ is the limiting reagent in the above reaction, and the excess sulphuric acid neutralizes 60 ml of a 0,2 $mol.dm^{-3}$ NaOH-solution, according to the following balanced equation:

$$H_2SO_4 + 2\,NaOH \rightarrow Na_2SO_4 + 2\,H_2O$$

The $CaCO_3$ is 70% pure. Calculate **X**. (7)

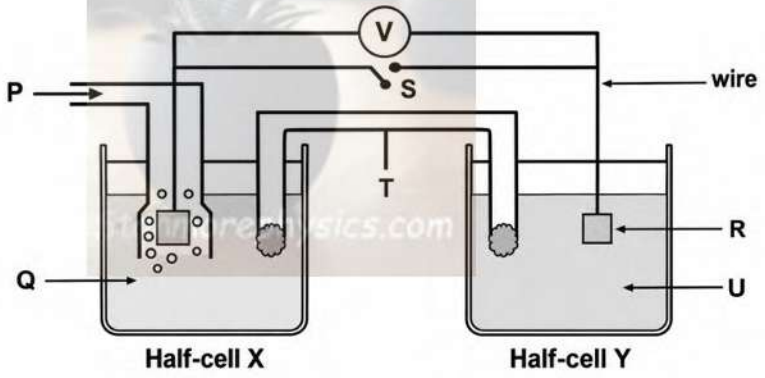
[19]

QUESTION 8 (Start on a new page)

8.1 Chlorine gas and iron (II) ions react in aqueous solution as follows:

$$C\ell_2 + 2\ Fe^{2+} \rightarrow 2\ C\ell^- + 2\ Fe^{3+}$$

A Grade 12 class used the cell shown below to determine the cell potential (E^{θ}_{cell}) for the above reaction under standard conditions.



Give the CHEMICAL FORMULAE of the substances represented by the following letters:

8.1.1 P (1)

8.1.2 Q (1)

8.1.3 R (1)

8.2 Consider the component labelled T.

8.2.1 Which of the following salts is suitable to be used in part T? Write only sodium nitrate ($NaNO_3$) OR silver chloride ($AgC\ell$). (1)

8.2.2 Give ONE reason for your choice of the salt in Question 8.2.1. (1)

8.3 Calculate the initial cell potential (E^{θ}_{cell}) for this cell under standard conditions. (4)

8.4 Identify the reducing agent in this cell. (1)

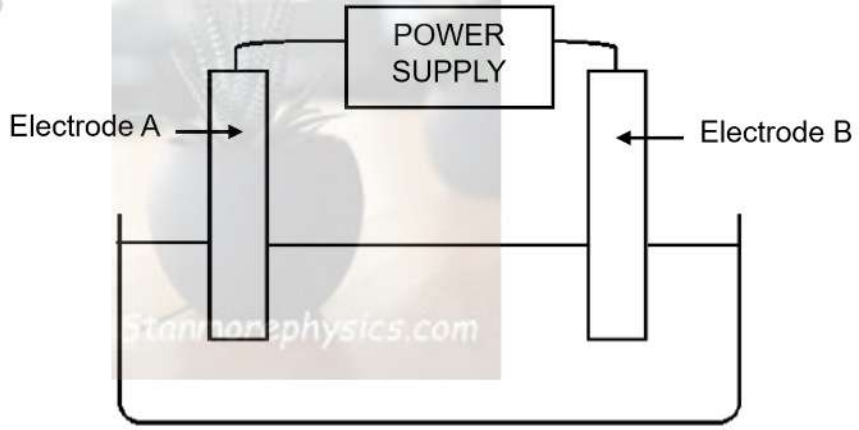
8.5 Write down the correct options between the brackets in the statement below.

When switch S is closed, electrons will flow from half-cell 8.5.1 (**X** to **Y** OR **Y** to **X**) through 8.5.2 (THE EXTERNAL CIRCUIT or T). (2)

[12]

QUESTION 9 (Start on a new page)

The simplified diagram below represents an electrochemical cell used for the electrolysis of a concentrated copper (II) chloride solution, $CuC\ell_2(aq)$.



9.1 Define the term *electrolytic cell*. (2)

9.2 A gas starts to form at electrode **B**. Write down the:

9.2.1 NAME or FORMULA of the gas that is forming. (1)

9.2.2 Electrode at which reduction is taking place. State only **A** or **B**. (1)

9.2.3 Will the mass of electrode **A** INCREASE, DECREASE or STAY THE SAME. (1)

9.2.4 The electrode to which the negative terminal of the power supply is connected. State only **A** or **B**. (1)

9.2.5 Balanced equation for the net (overall) cell reaction that takes place in the cell. (3)

9.2.6 FORMULA of a suitable substance to use for electrode **B**. (1)
[10]

GRAND TOTAL: 150

DATA FOR PHYSICAL SCIENCES
PAPER 2 (CHEMISTRY)

GEGEWENS VIR FISIESE WETENSKAPPE
VRAESTEL 2 (CHEMIE)

TABLE 1: PHYSICAL CONSTANTS/*TABEL 1: FISIESE KONSTANTES*

NAME/*NAAM*	SYMBOL/*SIMBOOL*	VALUE/*WAARDE*
Standard pressure *Standaarddruk*	p^θ	$1{,}013 \times 10^5$ Pa
Molar gas volume at STP *Molêre gasvolume by STD*	V_m	22,4 $dm^3 \cdot mol^{-1}$
Standard temperature *Standaardtemperatuur*	T^θ	273 K
Charge on electron *Lading op elektron*	e	$-1{,}6 \times 10^{-19}$ C
Avogadro's constant *Avogadro-konstante*	N_A	$6{,}02 \times 10^{23}$ mol^{-1}

TABLE 2: FORMULAE/*TABEL 2: FORMULES*

$n = \frac{m}{M}$	$n = \frac{N}{N_A}$
$c = \frac{n}{V}$ or/*of* $c = \frac{m}{MV}$	$n = \frac{V}{V_m}$
$\frac{c_a v_a}{c_b v_b} = \frac{n_a}{n_b}$	pH = -log[H_3O^+]
$K_w = [H_3O^+][OH^-] = 1 \times 10^{-14}$ at/*by* 298 K	
$E^\theta_{cell} = E^\theta_{cathode} - E^\theta_{anode}$ / $E^\theta_{sel} = E^\theta_{katode} - E^\theta_{anode}$ or/*of* $E^\theta_{cell} = E^\theta_{reduction} - E^\theta_{oxidation}$ / $E^\theta_{sel} = E^\theta_{reduksie} - E^\theta_{oksidasie}$ or/*of* $E^\theta_{cell} = E^\theta_{oxidising\ agent} - E^\theta_{reducing\ agent}$ / $E^\theta_{sel} = E^\theta_{oksideermi\ ddel} - E^\theta_{reduseermi\ ddel}$	

TABLE 3: THE PERIODIC TABLE OF ELEMENTS
TABEL 3: DIE PERIODIEKE TABEL VAN ELEMENTE

1 (I)	2 (II)	3	4	5	6	7	8	9	10	11	12	13 (III)	14 (IV)	15 (V)	16 (VI)	17 (VII)	18 (VIII)
2,1 **1** **H** 1																	**2** **He** 4
1,0 **3** **Li** 7	1,5 **4** **Be** 9											2,0 **5** **B** 11	2,5 **6** **C** 12	3,0 **7** **N** 14	3,5 **8** **O** 16	4,0 **9** **F** 19	**10** **Ne** 20
0,9 **11** **Na** 23	1,2 **12** **Mg** 24											1,5 **13** **Aℓ** 27	1,8 **14** **Si** 28	2,1 **15** **P** 31	2,5 **16** **S** 32	3,0 **17** **Cℓ** 35,5	**18** **Ar** 40
0,8 **19** **K** 39	1,0 **20** **Ca** 40	1,3 **21** **Sc** 45	1,5 **22** **Ti** 48	1,6 **23** **V** 51	1,6 **24** **Cr** 52	1,5 **25** **Mn** 55	1,8 **26** **Fe** 56	1,8 **27** **Co** 59	1,8 **28** **Ni** 59	1,9 **29** **Cu** 63,5	1,6 **30** **Zn** 65	1,6 **31** **Ga** 70	1,8 **32** **Ge** 73	2,0 **33** **As** 75	2,4 **34** **Se** 79	2,8 **35** **Br** 80	**36** **Kr** 84
0,8 **37** **Rb** 86	1,0 **38** **Sr** 88	1,2 **39** **Y** 89	1,4 **40** **Zr** 91	**41** **Nb** 92	1,8 **42** **Mo** 96	1,9 **43** **Tc**	2,2 **44** **Ru** 101	2,2 **45** **Rh** 103	2,2 **46** **Pd** 106	1,9 **47** **Ag** 108	1,7 **48** **Cd** 112	1,7 **49** **In** 115	1,8 **50** **Sn** 119	1,9 **51** **Sb** 122	2,1 **52** **Te** 128	2,5 **53** **I** 127	**54** **Xe** 131
0,7 **55** **Cs** 133	0,9 **56** **Ba** 137	**57** **La** 139	1,6 **72** **Hf** 179	**73** **Ta** 181	**74** **W** 184	**75** **Re** 186	**76** **Os** 190	**77** **Ir** 192	**78** **Pt** 195	**79** **Au** 197	**80** **Hg** 201	1,8 **81** **Tℓ** 204	1,8 **82** **Pb** 207	1,9 **83** **Bi** 209	2,0 **84** **Po**	2,5 **85** **At**	**86** **Rn**
0,7 **87** **Fr**	0,9 **88** **Ra** 226	**89** **Ac**															

												58 **Ce** 140	**59** **Pr** 141	**60** **Nd** 144	**61** **Pm**	**62** **Sm** 150	**63** **Eu** 152	**64** **Gd** 157	**65** **Tb** 159	**66** **Dy** 163	**67** **Ho** 165	**68** **Er** 167	**69** **Tm** 169	**70** **Yb** 173	**71** **Lu** 175
												90 **Th** 232	**91** **Pa**	**92** **U** 238	**93** **Np**	**94** **Pu**	**95** **Am**	**96** **Cm**	**97** **Bk**	**98** **Cf**	**99** **Es**	**100** **Fm**	**101** **Md**	**102** **No**	**103** **Lr**

KEY/*SLEUTEL*

Atomic number
Atoomgetal

Electronegativity
Elektronegatiwiteit

1,9 **29** **Cu** 63,5

Symbol
Simbool

Approximate relative atomic mass
Benaderde relatiewe atoommassa

TABLE 4A: STANDARD REDUCTION POTENTIALS
TABEL 4A: STANDAARDREDUKSIEPOTENSIALE

Half-reactions/*Halfreaksies*			E^{θ} (V)
$F_2(g) + 2e^-$	$\rightleftharpoons$	$2F^-$	+ 2,87
$Co^{3+} + e^-$	$\rightleftharpoons$	Co^{2+}	+ 1,81
$H_2O_2 + 2H^+ + 2e^-$	$\rightleftharpoons$	$2H_2O$	+1,77
$MnO_4^- + 8H^+ + 5e^-$	$\rightleftharpoons$	$Mn^{2+} + 4H_2O$	+ 1,51
$Cl_2(g) + 2e^-$	$\rightleftharpoons$	$2Cl^-$	+ 1,36
$Cr_2O_7^{2-} + 14H^+ + 6e^-$	$\rightleftharpoons$	$2Cr^{3+} + 7H_2O$	+ 1,33
$O_2(g) + 4H^+ + 4e^-$	$\rightleftharpoons$	$2H_2O$	+ 1,23
$MnO_2 + 4H^+ + 2e^-$	$\rightleftharpoons$	$Mn^{2+} + 2H_2O$	+ 1,23
$Pt^{2+} + 2e^-$	$\rightleftharpoons$	Pt	+ 1,20
$Br_2(\ell) + 2e^-$	$\rightleftharpoons$	$2Br^-$	+ 1,07
$NO_3^- + 4H^+ + 3e^-$	$\rightleftharpoons$	$NO(g) + 2H_2O$	+ 0,96
$Hg^{2+} + 2e^-$	$\rightleftharpoons$	$Hg(\ell)$	+ 0,85
$Ag^+ + e^-$	$\rightleftharpoons$	Ag	+ 0,80
$NO_3^- + 2H^+ + e^-$	$\rightleftharpoons$	$NO_2(g) + H_2O$	+ 0,80
$Fe^{3+} + e^-$	$\rightleftharpoons$	Fe^{2+}	+ 0,77
$O_2(g) + 2H^+ + 2e^-$	$\rightleftharpoons$	H_2O_2	+ 0,68
$I_2 + 2e^-$	$\rightleftharpoons$	$2I^-$	+ 0,54
$Cu^+ + e^-$	$\rightleftharpoons$	Cu	+ 0,52
$SO_2 + 4H^+ + 4e^-$	$\rightleftharpoons$	$S + 2H_2O$	+ 0,45
$2H_2O + O_2 + 4e^-$	$\rightleftharpoons$	$4OH^-$	+ 0,40
$Cu^{2+} + 2e^-$	$\rightleftharpoons$	Cu	+ 0,34
$SO_4^{2-} + 4H^+ + 2e^-$	$\rightleftharpoons$	$SO_2(g) + 2H_2O$	+ 0,17
$Cu^{2+} + e^-$	$\rightleftharpoons$	Cu^+	+ 0,16
$Sn^{4+} + 2e^-$	$\rightleftharpoons$	Sn^{2+}	+ 0,15
$S + 2H^+ + 2e^-$	$\rightleftharpoons$	$H_2S(g)$	+ 0,14
$2H^+ + 2e^-$	**$\rightleftharpoons$**	**$H_2(g)$**	**0,00**
$Fe^{3+} + 3e^-$	$\rightleftharpoons$	Fe	– 0,06
$Pb^{2+} + 2e^-$	$\rightleftharpoons$	Pb	– 0,13
$Sn^{2+} + 2e^-$	$\rightleftharpoons$	Sn	– 0,14
$Ni^{2+} + 2e^-$	$\rightleftharpoons$	Ni	– 0,27
$Co^{2+} + 2e^-$	$\rightleftharpoons$	Co	– 0,28
$Cd^{2+} + 2e^-$	$\rightleftharpoons$	Cd	– 0,40
$Cr^{3+} + e^-$	$\rightleftharpoons$	Cr^{2+}	– 0,41
$Fe^{2+} + 2e^-$	$\rightleftharpoons$	Fe	– 0,44
$Cr^{3+} + 3e^-$	$\rightleftharpoons$	Cr	– 0,74
$Zn^{2+} + 2e^-$	$\rightleftharpoons$	Zn	– 0,76
$2H_2O + 2e^-$	$\rightleftharpoons$	$H_2(g) + 2OH^-$	– 0,83
$Cr^{2+} + 2e^-$	$\rightleftharpoons$	Cr	– 0,91
$Mn^{2+} + 2e^-$	$\rightleftharpoons$	Mn	– 1,18
$A\ell^{3+} + 3e^-$	$\rightleftharpoons$	$A\ell$	– 1,66
$Mg^{2+} + 2e^-$	$\rightleftharpoons$	Mg	– 2,36
$Na^+ + e^-$	$\rightleftharpoons$	Na	– 2,71
$Ca^{2+} + 2e^-$	$\rightleftharpoons$	Ca	– 2,87
$Sr^{2+} + 2e^-$	$\rightleftharpoons$	Sr	– 2,89
$Ba^{2+} + 2e^-$	$\rightleftharpoons$	Ba	– 2,90
$Cs^+ + e^-$	$\rightleftharpoons$	Cs	- 2,92
$K^+ + e^-$	$\rightleftharpoons$	K	– 2,93
$Li^+ + e^-$	$\rightleftharpoons$	Li	– 3,05

Increasing oxidising ability/*Toenemende oksiderende vermoë* ↑

Increasing reducing ability/*Toenemende reduserende vermoë* ↓

TABLE 4B: STANDARD REDUCTION POTENTIALS
TABEL 4B: STANDAARDREDUKSIEPOTENSIALE

Increasing oxidising ability/*Toenemende oksiderende vermoë* ↓

Increasing reducing ability/*Toenemende reduserende vermoë* ↑

Half-reactions/*Halfreaksies*			E^{θ} (V)
$Li^+ + e^-$	⇌	Li	−3,05
$K^+ + e^-$	⇌	K	−2,93
$Cs^+ + e^-$	⇌	Cs	−2,92
$Ba^{2+} + 2e^-$	⇌	Ba	−2,90
$Sr^{2+} + 2e^-$	⇌	Sr	−2,89
$Ca^{2+} + 2e^-$	⇌	Ca	−2,87
$Na^+ + e^-$	⇌	Na	−2,71
$Mg^{2+} + 2e^-$	⇌	Mg	−2,36
$Al^{3+} + 3e^-$	⇌	Al	−1,66
$Mn^{2+} + 2e^-$	⇌	Mn	−1,18
$Cr^{2+} + 2e^-$	⇌	Cr	−0,91
$2H_2O + 2e^-$	⇌	$H_2(g) + 2OH^-$	−0,83
$Zn^{2+} + 2e^-$	⇌	Zn	−0,76
$Cr^{3+} + 3e^-$	⇌	Cr	−0,74
$Fe^{2+} + 2e^-$	⇌	Fe	−0,44
$Cr^{3+} + e^-$	⇌	Cr^{2+}	−0,41
$Cd^{2+} + 2e^-$	⇌	Cd	−0,40
$Co^{2+} + 2e^-$	⇌	Co	−0,28
$Ni^{2+} + 2e^-$	⇌	Ni	−0,27
$Sn^{2+} + 2e^-$	⇌	Sn	−0,14
$Pb^{2+} + 2e^-$	⇌	Pb	−0,13
$Fe^{3+} + 3e^-$	⇌	Fe	−0,06
$2H^+ + 2e^-$	**⇌**	**$H_2(g)$**	0,00
$S + 2H^+ + 2e^-$	⇌	$H_2S(g)$	+0,14
$Sn^{4+} + 2e^-$	⇌	Sn^{2+}	+0,15
$Cu^{2+} + e^-$	⇌	Cu^+	+0,16
$SO_4^{2-} + 4H^+ + 2e^-$	⇌	$SO_2(g) + 2H_2O$	+0,17
$Cu^{2+} + 2e^-$	⇌	Cu	+0,34
$2H_2O + O_2 + 4e^-$	⇌	$4OH^-$	+0,40
$SO_2 + 4H^+ + 4e^-$	⇌	$S + 2H_2O$	+0,45
$Cu^+ + e^-$	⇌	Cu	+0,52
$I_2 + 2e^-$	⇌	$2I^-$	+0,54
$O_2(g) + 2H^+ + 2e^-$	⇌	H_2O_2	+0,68
$Fe^{3+} + e^-$	⇌	Fe^{2+}	+0,77
$NO_3^- + 2H^+ + e^-$	⇌	$NO_2(g) + H_2O$	+0,80
$Ag^+ + e^-$	⇌	Ag	+0,80
$Hg^{2+} + 2e^-$	⇌	$Hg(\ell)$	+0,85
$NO_3^- + 4H^+ + 3e^-$	⇌	$NO(g) + 2H_2O$	+0,96
$Br_2(\ell) + 2e^-$	⇌	$2Br^-$	+1,07
$Pt^{2+} + 2e^-$	⇌	Pt	+1,20
$MnO_2 + 4H^+ + 2e^-$	⇌	$Mn^{2+} + 2H_2O$	+1,23
$O_2(g) + 4H^+ + 4e^-$	⇌	$2H_2O$	+1,23
$Cr_2O_7^{2-} + 14H^+ + 6e^-$	⇌	$2Cr^{3+} + 7H_2O$	+1,33
$Cl_2(g) + 2e^-$	⇌	$2Cl^-$	+1,36
$MnO_4^- + 8H^+ + 5e^-$	⇌	$Mn^{2+} + 4H_2O$	+1,51
$H_2O_2 + 2H^+ + 2e^-$	⇌	$2H_2O$	+1,77
$Co^{3+} + e^-$	⇌	Co^{2+}	+1,81
$F_2(g) + 2e^-$	⇌	$2F^-$	+2,87

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)

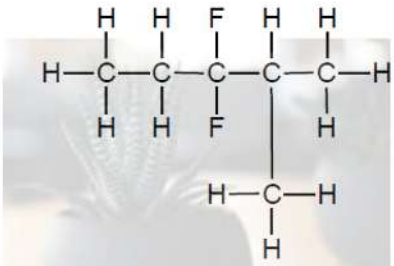
2.3 2.3.1 Ethyl✓ propanoate ✓ (2)

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

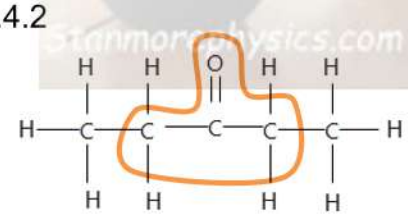


Marking criteria/Nasienkriteria:
- Methyl substituent on second C atom. ✓
- Two fluorine atoms on third C atom. ✓
- Whole structure correct. ✓

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

(3)

2.4.2

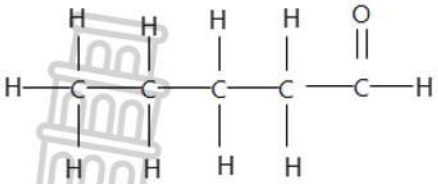


Marking criteria/*Nasienriglyne:*
- Correct functional group./ *Korrekte funksionele groep.* ✓
- Whole structure correct/ Hele struktuur korrek ✓

(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 ($n = {}^{m}/_{M}$)	$\frac{2,58}{12}$	$\frac{0,67}{1}$	$\frac{1,75}{16}$	✓ (÷ 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.*

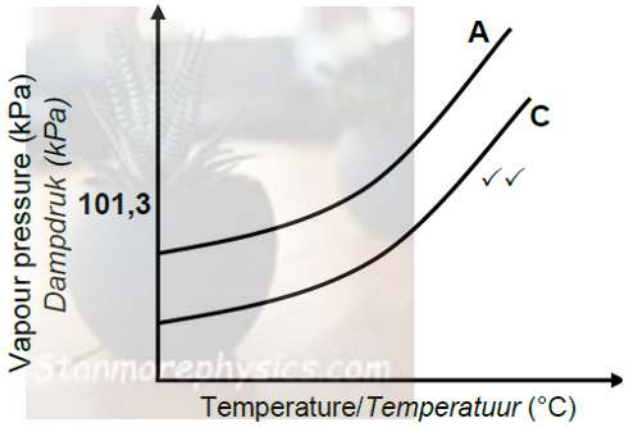
OF

*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)

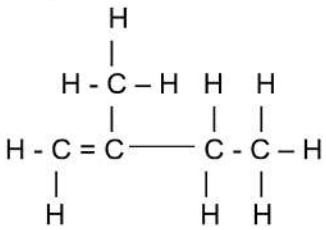
[12]

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)

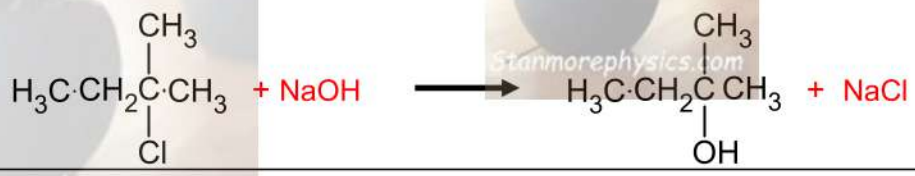
4.1.4 2-chloro ✓ -2-methylbutane ✓
2-chloro-2-metielbutaan

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) $nHCl = n_{ini} - n_{excess}$ ✓	(d) $nHCl = n_{aanv} - n_{oormaat}$ ✓
(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 $CaCO_3 = 6,9 \times 100/70$

X = 9,86 g ✓ (7)

[19]

QUESTION/ VRAAG 8

8.1 8.1.1 $C\ell_2$ ✓ (1)

8.1.2 $C\ell^-$ / HCℓ/ NaCℓ (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