

MEMORANDUM

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 GRADE 11 EXAMINATIONS
 GRAAD 11-EKSAMEN

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**PHYSICAL SCIENCES – SECOND PAPER (CHEMISTRY)
 FISIÊSE WETENSKAPPE – TWEDE VRAESTEL (CHEMIE)**

**QUESTION 1: ONE WORD ITEMS
 VRAAG 1: EENWOORD-ITEMS**

- 1.1 Activation energy ✓ /
 Aktiveringseergie (1)
- 1.2 Endothermic ✓ /
 Endoermies (1)
- 1.3 Carbon dioxide ✓ /
 Koolstofdiksie (1)
- 1.4 Standard solution ✓ /
 Standaardoplossing (1)
- 1.5 Pyramidal ✓ /
 Piramidaal (1)

[5]

**QUESTION 2: MATCHING ITEMS
 VRAAG 2: PAS-ITEMS**

- 2.1 H ✓ (1)
 2.2 A ✓ (1)
 2.3 F ✓ (1)
 2.4 J ✓ (1)
 2.5 C ✓ (1)

[5]

**QUESTION 3: TRUE OR FALSE
 VRAAG 3: WAAR OF ONWAAR**

- 3.1 TRUE ✓ ✓ /
 WAAR (2)
- 3.2 FALSE ✓, no equilibrium in open container ✓ /
 ONWAAR, geen ewewig in oop houer (2)
- 3.3 FALSE ✓, +6 ✓ /
 ONWAAR, +6 (2)
- 3.4 TRUE ✓ ✓ /
 WAAR (2)
- 3.5 TRUE ✓ ✓ /
 WAAR (2)

[10]

This memorandum consists of 9 pages/Hierdie memorandum bestaan uit 9 bladsye.

0 8 3 0 6 6

QUESTION 4: MULTIPLE-CHOICE QUESTIONS
VRAAG 4: MEERVOUDIGEKEUSE-VRAE

- 4.1 A ✓✓✓ (3)
 4.2 A ✓✓✓ (3)
 4.3 D ✓✓✓ (3)
 4.4 C ✓✓✓ (3)
 4.5 D ✓✓✓ (3)

TOTAL SECTION A: [15] / 35

QUESTION 5/VRAAG 5

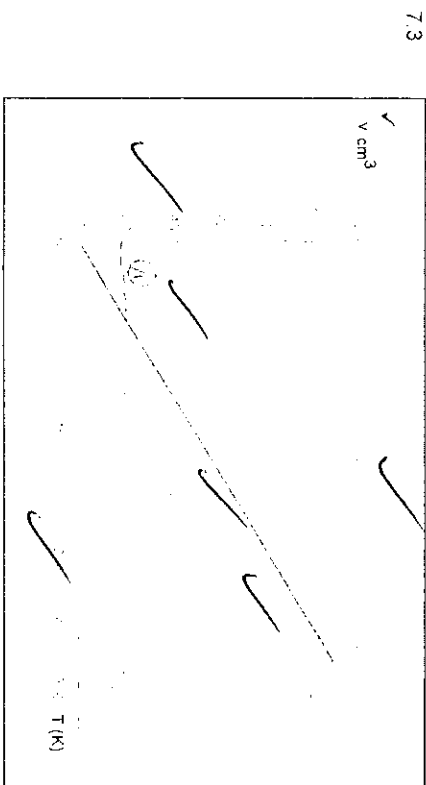
- 5.1 Hydrogen sulphide ✓ /
 Waterstofsulfied ✓ (1)
 5.2 1,0 ✓ (1)
 5.3 Liquid ✓
 Vloeistof ✓ (1)
 5.4 Polar covalent ✓ /
 Polar kovalent ✓ (1)
 5.5 Hydrogen bonds ✓ /
 Waterstofbindings ✓ (1)
 5.6 H : S : O ✓✓✓ (3)
 H ✓
 Ascending order ✓
 Toenemende orde ✓
 CO₂ ✓ H₂S ✓ H₂O ✓ (3)
QUESTION 6/VRAAG 6 [11]

- 6.1 % C = $\frac{92,3}{10} \times 100 = 92,3$ ∴ n(C) = $\frac{92,3}{12} = 7,7$ ✓
 % H = $\frac{0,77}{10} \times 100 = 7,7$ ∴ n(H) = $\frac{7,7}{1} = 7,7$ ✓
 ∴ mole ratio is 1 : 1 ✓
 mol verhouding 1 : 1 (4)

- 6.2 % of C in 78 g/mol is $\frac{92,3}{100} \times 78 = 72$ OR $\frac{\text{molecular formula}}{\text{empirical formula}} = 6$
 % of H in 78 g/mol is $\frac{7,7}{100} \times 78 = 6$
 Number of mole carbon = $\frac{72}{12} = 6$
 Aantal mol koolstof = $\frac{72}{12} = 6$
 Number of mole hydrogen = $\frac{6}{1} = 6$ ✓
 Aantal mol waterstof = $\frac{6}{1} = 6$ ✓
 Mole ratio for C : H = 6 : 6
 Mol verhouding van C : H = 6 : 6
 ∴ The true formula is C₆H₆ ✓ (3)
 Die ware formule is C₆H₆ ✓ (3)

QUESTION 7/VRAAG 7

- 7.1 What is the relation between volume and temperature? ✓✓
 Wat is die verwantskap tussen volume en temperatuur? (2)
 7.2 Volume is directly proportional to temperature OR
 Volume is inversely proportional to temperature ✓
 Volume is direk eweredig aan die temperatuur OF
 Volume is omgekeerd eweredig aan die temperatuur ✓ (2)



Criteria for graph/ Kriteria vir grafiek	1	0
Suitable heading/ Gesikte opschrift		
Axes correctly labelled with units/ Asse korrek benoem met eenhede		
Correct scales on both axes/ Korrekte skaal op beide asse		
Points correctly plotted / Punte korrek geplot		
Straight line graph drawn through points/ Reguitlyngrafiek getrek deur punte.		
Total out of 5 / Totaal uit 5		

- 7.4 $V \propto T$ OR *directly*
Volume is proportional to temperature ✓✓✓
 $V \propto T$ OF
Volume is eweredig aan temperatuur (3)
- 7.5 Helium has properties closer to those of an ideal gas than oxygen. ✓✓
Helium het eienskappe nader aan 'n ideale gas as suurstof. (2)
- 7.6 See line marked as A on the graph above. ✓✓
Sien lyn gemerk as A op die grafiek hierbo. [16] (2)

QUESTION 8/VRAAG 8

- 8.1 ✓ ✓
H single bond and O double bond OR covalent
H enkel binding en O dubbinding (2)
- 8.2 ✓ ✓
H: $2 \times 436 = 872 \text{ kJ mol}^{-1}$
O: $1 \times 499 = 499 \text{ kJ mol}^{-1}$
Total /Totaal = 1371 kJ mol^{-1} ✓ (5)

- 8.3 ΔH is heat of reaction or enthalpy change
 ΔH is reaksie warmte of entalpie verandering
 $\Delta H = E_{\text{products}} - E_{\text{reactants}}$ ✓
 $= 30 \text{ kJ} - 80 \text{ kJ}$
 $= -50 \text{ kJ}$ ✓ (4)

QUESTION 9/VRAAG 9

- 9.1 It is used as a household gas. ✓✓
Word gebruik as huishoudelike gas. (2)
- 9.2 ✓ ✓
 $2\text{C}_4\text{H}_{10} + 13\text{O}_2 \rightarrow 8\text{CO}_2 + 10\text{H}_2\text{O}$ (bal) ✓ (3)
- 9.3 Reducing agent ✓✓
Reduseermiddel (2)
- 9.4 Lead emissions from car engines are toxic and cause lead poisoning if inhaled by humans. ✓✓
Lood-uitlatings van motors is giftig en veroorsaak loodvergiftiging indien deur die mens ingesem word. (2)
- 9.5 Lead replacement fuel/LRP ✓✓
Lood vervangingsbrandstof/LLRP (2)

QUESTION 10 /VRAAG 10

- 10.1 10.1.1 Margarine ✓✓
Margarin (2)
- 10.1.2 Addition ✓✓
Addisie (2)
- 10.2.1

$$\begin{array}{c} \text{H} & \text{H} \\ | & | \\ \text{H}-\text{C}-\text{C}-\text{H} \\ | & | \\ \text{H} & \text{H} \end{array} \rightarrow \begin{array}{c} \text{H} & \text{H} \\ | & | \\ \text{C} & =\text{C} \\ || & | \\ \text{H} & \text{H} \end{array} + \text{H}_2$$
 (3)

0 8 3 0 6 6

- 10.2.2 Elimination ✓✓
 Eliminasi
 10.2.3 Bromine decolourise ✓✓
 Broom ontkleur

QUESTION 11/VRAAG 11

- 11.1 What is the concentration of vinegar in the sample? ✓✓
 Wat is die konsentrasie van asyn in die monster? (2)

11.2 $\frac{C_a V_a}{C_b V_b} = \frac{n_a}{n_b}$ ✓
 $\frac{0,1 \times 10,2}{C_a \times 5} = \frac{1}{1}$ OR
 $C_a = 0,204 \text{ mol. dm}^{-3}$

No of moles of NaOH = n = cV	✓
= 0,1 x 0,0102	✓
= 0,00102 mol	✓
OR	
$C = \frac{n}{V}$	✓
= $\frac{0,00102}{0,005}$	✓
= 0,204 mol. dm ⁻³	

- 11.3 The concentration of the sample of vinegar complies with SABS regulation. ✓✓
 Die konsentrasie van die monster van asyn voldoen aan die SABS regulasie. *does not*

QUESTION 12/VRAAG 12

- 12.1 Loss of electrons ✓ ✓
 Verlies aan elektrone (2)
 12.2 $4 \text{ Fe} + 3 \text{ O}_2 \rightarrow 2 \text{ Fe}_2\text{O}_3$ ✓✓ (2)
 12.3 Oxygen (O₂) ✓✓
 Suurstof (O₂) (2)
 12.4 12.4.1 Zero (0) ✓ (1)
 12.4.2 -2 ✓ (1)
 12.5 Galvanising ✓✓ / Cover with a coat of Zn-metal ✓✓ / painting/Stronger reducing agent (4)
 Galvanisering ✓✓ / Bedek met 'n laag Zn-metaal/deur te verf/Sterker reduseermiddel [12]

QUESTION 13/VRAAG 13

- 13.1 Nitrous oxide ✓, methane ✓, chlorofluorocarbons ✓ or water vapour
 Stikstofoksied, metaan, chloorfluorkoolstowwe *ozone* (3)

- 13.2 Any Two ✓✓ Enige twee
 Burning of fossil fuels Brand van fossiel brandstowwe
 Deforestation Afbreek van plantasies
 Modern Agriculture and Moderne Landbou-metodes
 Industries Industrieë (2)

- 13.3 Green house effect is the trapping of heat near earth's surface by gases in the atmosphere, particularly carbon dioxide. ✓

- 13.4 Any ONE ✓✓ Enige EEN
 Increase in temperature on earth.
 Rise of sea level OR flooding.
 Toename in temperatuur op aarde
 Styging van seevlak OF vloed (2)

- 13.5 Reflects harmful radiation
 Allows energy to radiate into space ✓✓
 Reflekteer skadelike bestraling
 Laat energie toe om in die ruimte te bestraal (2)

- 13.6 Any TWO / Enige TWEE ✓✓
 Use cleaner fuels in motor vehicles
 Reduce emission of harmful gases
 Encourage motorists to make less use of cars
 Plant more trees
 Scale down on industrialisation
 Gebruik skoner brandstowwe in motors
 Verminder die uitlaat van skadelike gasse
 Moedig motoriste aan om minder motors te gebruik
 Plant meer bome
 Verminder industrialisasie (2)

- 13.7 Most nations have signed the Kyoto Protocol agreeing to reduce greenhouse gases
 Meeste nasies het die Kyoto Protokol onderteken en stem saam dat hulle kweekhuis gasse wil verminder. (2)
 [15]

QUESTION 14 /VRAAG 14

- 14.1 Fe_2O_3 ✓✓ (2)
- 14.2 Reducing agent ✓✓
Reduseermiddel (2)
- 14.3 ✓ ✓
 $\text{Fe}_2\text{O}_3 + 3\text{CO} \rightarrow 2\text{Fe} + 3\text{CO}_2$ (balancing) ✓ (balansering) (3)
- 14.4 ~~Making of steel~~ ✓ ~~Deforestation~~ ✓ ~~soil erosion~~ ✓
~~Used to manufacture machinery tools~~ ✓ ~~pollution~~ ✓
~~Used in building materials and cement making~~ ✓
Maak van staal
Vervaardiging van masjinerie, gereedskap
Gebruik in bou-materiaal en maak van sement

AFDELING/SECTION B: (3)
110

GROOTTOTAAL/GRAND TOTAL: 115
150

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