



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL
SENIOR CERTIFICATE

GRADE 11

PHYSICAL SCIENCES/FISIESE WETENSKAPPE

CONTROL TEST/KONTROLE TOETS

MARKING GUIDELINES/NASIENRIGLYNE

17 SEPTEMBER 2026

MARKS/PUNTE : 100

This marking guideline consists of 09 pages/*Hierdie nasienriglyne bestaan uit 9 bladsye*

QUESTION 1/VRAAG 1

1.1 D ✓✓ (2)

1.2 C ✓✓ (2)

1.3 A ✓✓ (2)

1.4 B ✓✓ (2)

1.5 D ✓✓ (2)

[10]**QUESTION 2/VRAAG 2**

2.1 The mass of one mole of substance measured in $\text{g}\cdot\text{mol}^{-1}$ ✓✓ / *Die massa van een mol van 'n stof gemeet in $\text{g}\cdot\text{mol}^{-1}$* (2)

2.2 $M(\text{C}_{12}\text{H}_{22}\text{O}_{11}) = 342 \text{ g/mol}$

$M(\text{C}) = 12(12)$

$= 144 \text{ g/mol of C}$

$$\% \text{ C} = \frac{144}{342} \times 100$$

$= 42.11\%$

(3)

Marking Guidelines/*Nasieriglyne*

$$2.3 \quad n_{(\text{CO}_2)} = \frac{m}{M} = \frac{6.2}{44} = 0.1409 \text{ mol of CO}_2 \checkmark$$

$$m = nM = (0.1409)(12) \checkmark = 1.69 \text{ g of CO}_2$$

$$\therefore C_xH_y = 1.97 - 1.69 = 0.28 \text{ g of H in } C_xH_y$$

C

$$n = \frac{m}{M} = \frac{1.69}{12} = 0.1409 \text{ mol of C} \checkmark$$

$$= \frac{0.1409}{0.1409} = 1$$

H

$$n = \frac{m}{M} = \frac{0.28}{1} = 0.28 \text{ mol of H} \checkmark$$

$$= \frac{0.28}{0.1409} = 2 \checkmark$$



(6)

$$2.4.1 \quad M_{(\text{MCl}_2)} = M + 2(35.5) = M + 71 \checkmark$$

$$\frac{M}{M + 71} \times 100 = 44.1 \checkmark$$

$$M = 56.0 \text{ g} \cdot \text{mol}^{-1} \checkmark$$

(3)

Postive marking from 2.4.1/Positiewe nasien vanaf 2.4.2

$$2.4.2 \quad M_{(\text{FeCl}_2)} = 56 + x(35.5) \checkmark$$

$$\frac{35.5x}{56 + 35.5x} \times 100 = 65.5 \checkmark$$

$$x = 3 \checkmark$$

(4)

[18]

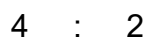
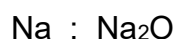
QUESTION 3/VRAAG 3

- 3.1 The substance that is completely used up in a chemical reaction / *Die stof wat heeltemal opgebruik word in 'n chemiese reaksie* (2)

3.2 OPTION 1/OPSIE 1

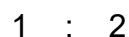
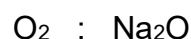
$$n = \frac{m}{M}$$

$$= \frac{483}{23} = 21 \text{ mol of Na} \checkmark$$



$$n = \frac{2}{4}(21) = 10.5 \text{ mol of Na}_2\text{O} \checkmark$$

$$n = 5.8 \text{ mol of O}_2$$



$$n = \frac{2}{1}(5.8)$$

$$= 11.6 \text{ mol of Na}_2\text{O} \checkmark$$

$\therefore$ Na is a limiting reagent $\checkmark$ / *Na is die beperkende reagens*

OPTION 2/OPSIE 2**Na**

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

$$n = \frac{483}{23} \checkmark$$

$$n = 21 \text{ mol}$$

$$= \frac{21}{4}$$

$$= 5.25 \checkmark$$

Na is a limiting reagent $\checkmark$ / *Na is die beperkende reagens*

O

$$n = 5.8 \text{ mol of O}$$

$$= \frac{5.8}{1}$$

$$= 5.8 \checkmark$$

(4)

Marking Guidelines/*Nasieriglyne*

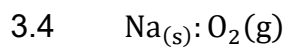
$$n(\text{Na}_2\text{O}) = 10.5 \text{ mol } \checkmark$$

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

$$m = (10.5)(62) \quad \checkmark$$

$$m = 651 \text{ g of Na}_2\text{O} \quad \checkmark$$

(4)



$$x = 5.25 \text{ mol } \checkmark$$

$$n = \frac{V}{V_m} \quad \checkmark$$

$$= (5.25) (22.4) \quad \checkmark$$

$$= 117.6 \text{ dm}^3 \text{ of O}_2 \quad \checkmark$$

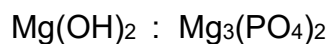
(4)

Marking Guidelines/*Nasieriglyne*

$$\begin{aligned} 3.5.1 \quad M_{\text{Mg(OH)}_2} &= 15 \times \frac{92.5}{100} \\ &= 13.875 \text{ g of Mg(OH)}_2 \checkmark \end{aligned}$$

$$M = 58 \text{ g} \cdot \text{mol}^{-1}$$

$$\begin{aligned} n_{\text{Mg(OH)}_2} &= \frac{m}{M} \checkmark \\ &= \frac{13,875}{58} \checkmark \\ &= 0.23922 \text{ mol} \checkmark \end{aligned}$$



$$3 : 1$$

$$\begin{aligned} n &= \frac{1}{3} (0,23922) \checkmark \\ &= 0.07973 \text{ mol of Mg}_3(\text{PO}_4)_2 \checkmark \end{aligned}$$

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

$$m = nM$$

$$\begin{aligned} &= (0,07973)(262) \checkmark \\ &= 20.889 \text{ g of Mg}_3(\text{PO}_4)_2 \checkmark \end{aligned}$$

(8)

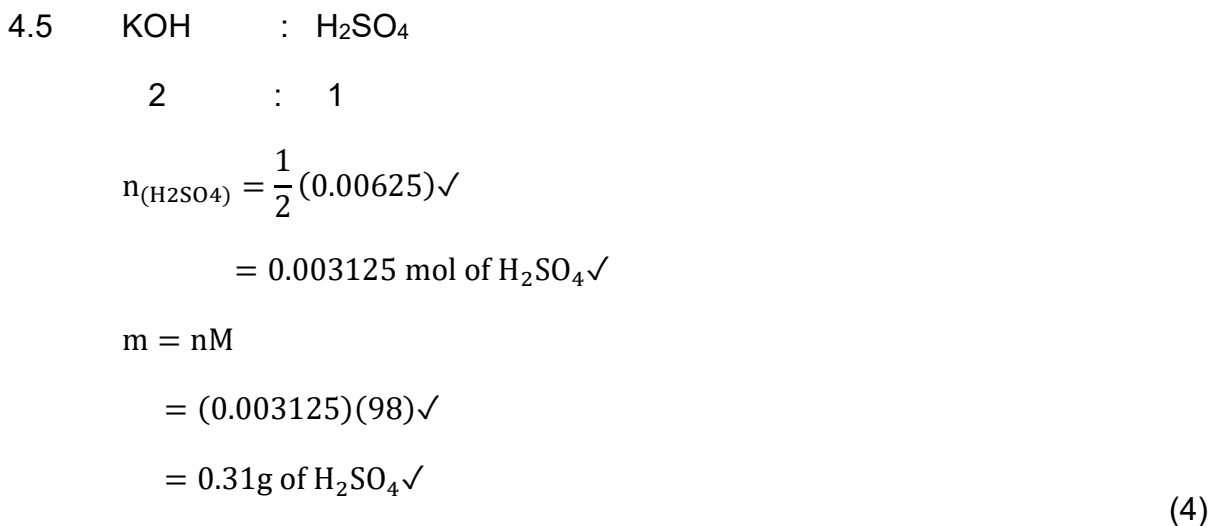
[22]

QUESTION 4/VRAAG 4

4.1 The amount of solute per litre of solution / *Die hoeveelheid opgeloste stof per liter oplossing* (2)

4.2
$$C = \frac{m}{MV} \checkmark$$
$$= \frac{3.36 \checkmark}{(56)(0.25) \checkmark}$$
$$= 0.24 \text{ mol. dm}^{-3} \checkmark$$
 (4)

4.3 Solution of known concentration / *Oplossing met 'n bekende konsentrasie* (2)

**[16]**

QUESTION 5/VRAAG 5

5.1 Unstable transition state from reactants to products✓✓ / *Onstabiele oorgangstoestand van reaktante na produkte* (2)

5.2 Exothermic reaction✓✓ / *Eksotermiese reaksie* (2)

5.3.1 2670 kJ.mol⁻¹ ✓✓ (2)

5.3.2 2270 kJ.mol⁻¹ ✓✓ (2)

5.3.3 $\Delta H = H_{\text{product}} - H_{\text{reactants}}$

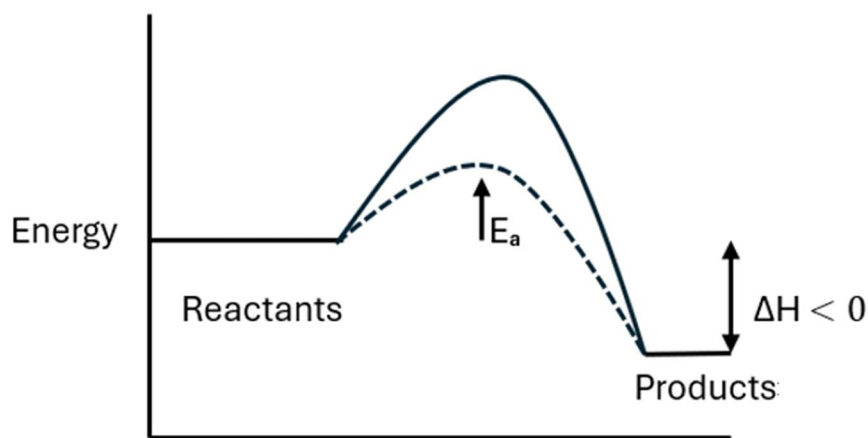
$$\Delta H = 183.3 - 400 \checkmark$$

$$\Delta H = -216.7 \text{ kJ.mol}^{-1} \checkmark \quad (2)$$

5.3.4 $E_A = 2670 - 183.3 \checkmark$

$$E_A = 2486,7 \text{ kJ.mol}^{-1} \checkmark \quad (2)$$

5.3.5



Marking Criteria/Nasien kriteria	Mark/Punt
Second graph with a lower peak than the original graph/ <i>Tweede grafiek met 'n laer piek as die oorspronklike grafiek</i>	1
Same starting and ending energy levels/ <i>Dieselfde begin- en eindenergievlakke</i>	1

(2)
[14]

QUESTION 6/VRAAG 6

- 6.1 The pressure of an enclosed gas is inversely proportional to the volume it occupies at constant temperature. ✓✓ / *Die druk van 'n ingeslote gas is omgekeerd eweredig aan die volume wat dit by konstante temperatuur inneem.* (2)
- 6.2 What is the effect of volume on pressure at constant temperature? ✓✓ / *Wat is die effek van volume op druk by konstante temperatuur?* (2)
- 6.3
- 6.3.1 Pressure / *Druk.* (2)
- 6.3.2 Temperature / *Temperatuur* (2)
- 6.4 Boyles law / *Boyle se wet* (1)
- 6.5 $p_1 v_1 = p_2 v_2$ ✓
- $110 \checkmark \times V_1 = 200 \times 16.5 \checkmark$
- $V_1 = 30 \text{cm}^3 \checkmark$ (4)
- 6.6 At very low temperature Ek of particles is very low✓, intermolecular forces becomes significant and hold particles together. ✓ / *By baie lae temperatuur is die Ek van deeltjies baie laag, intermolekulêre kragte word beduidend en hou deeltjies bymekaar.* (2)
- 6.7 Measure of average kinetic energy of particles in a system✓✓ / *Maatstaf van die gemiddelde kinetiese energie van deeltjies in 'n sisteem* (2)
- 6.8 Heating increases Ek of particles✓, resulting in more effective collisions per second✓ p increases✓ / *Verhitting verhoog die Ek van deeltjies, wat meer effektiewe botsings per sekonde tot gevolg het; p neem toe* (3)

[20]**TOTAL/TOTAAL: 100**