LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL

SENIOR CERTIFICATE

GRADE/*GRAAD* 10

PHYSICAL SCIENCES/*FISIESE WETENSKAPPE*

CONTROLLED TEST 2/*KONTROLE TOETS 2*

SEPTEMBER 2025

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 100

These marking guidelines consists of 8 pages./Hierdie nasienriglyne bestaan uit 8 bladsye

QUESTION 1/*VRAAG 1*

1.1	B ✓✓	(2)
1.2	B ✓✓	(2)
1.3	A ✓✓	(2)
1.4	A ✓✓	(2)
1.5	C ✓✓	(2)
1.6	C ✓✓	(2)
1.7	B ✓✓	(2)
1.8	C ✓✓	(2)
		[16]

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QUESTION 2/*VRAAG 2*

2.1	90 m ✓	(1)
2.2	$v = \frac{\Delta x}{\Delta t}$ ✓ $2,5 = \frac{90}{\Delta t}$ ✓ $\Delta t = 36$ s ✓	(3)
2.3	Rate of change of position. ✓✓/ *Tempo van verandering van posisie*	(2)
2.4	0 $m.s^{-1}$ ✓✓	(2)
		[8]

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QUESTION 3/*VRAAG 3*

3.1 Rate of change of velocity ✓✓/ *Tempo van verandering van snelheid* (2)

3.2 **C – D**

- The car moves in opposite direction. ✓/ *Die motor beweeg in die teenoorgestelde rigting*
- Increasing velocity/constant acceleration ✓/ *Toenemende snelheid/konstante versnelling*

D – E

- The car moves with a constant velocity south/in opposite direction. ✓/ *Die motor beweeg teen 'n konstante snelheid suid/in teenoorgestelde rigting*. (3)

3.3 3.3.1 Area A – B = l x b

= 10 x 2 ✓

= 20 m

Area B – C = $\frac{1}{2}$ b.h

= $\frac{1}{2}$ (4)(10) ✓

= 20 m

Total distance/*totale afstand* = 20 + 20 ✓

= 40 m ✓ (4)

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3.3.2 a = $\frac{\Delta v}{\Delta t}$ ✓

= $\frac{0 - 10}{6 - 2}$ ✓

= -2,5 m.s^{-2}

= 2,5 m.s^{-2} South ✓/*suid* (4)

3.4 GREATER THAN ✓/*GROTER AS* (1)

3.5 Slope of graph **BC** is steeper than **CD** ✓/ *Die helling van grafiek **BC** is steiler as **CD**.* (1)

3.6 North ✓/*noord* (1)

3.7 **OPTION 1/*OPSIE 1***

$v_f = v_i + a\Delta t$ ✓

= 10✓ + (-2,5)(5 – 2) ✓

= 2,5 m.s^{-1} North ✓/*noord*

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OPTION 2/*OPSIE 2*

$v_f = v_i + a\Delta t$ ✓

$= 5$ ✓$+ (-2,5)(1)$ ✓

$= 2,5$ m.s^{-1} North ✓/*noord* (4)

[20]

QUESTION 4/*VRAAG 4*

4.1 Velocity decreases by 2,5 m.s^{-1} every second. ✓✓/ *Snelheid neem elke sekonde met 2,5 m.s^{-1} af.* (2)

4.2 $\frac{72\ 000 \text{ m}}{3\ 600 \text{ s}}$ ✓

$= 20$ m.s^{-1} ✓

OR/*OF*

$\frac{72}{3,6}$ ✓

$= 20$ m.s^{-1} ✓ (2)

4.3 **OPTION 1/*OPSIE 1***

$\Delta x = v \times \Delta t$ ✓

$= 20 \times 0,4$ ✓

$= 8$ m ✓

OPTION 2/*OPSIE 2*

$\Delta x = v_i\Delta t + \frac{1}{2} a\Delta t^2$ ✓

$= (20)(0,4) + \frac{1}{2}(0)(0,4)^2$ ✓

$= 8$ m ✓

OPTION 3/*OPSIE 3*

$\Delta x = \frac{(v_f + v_i)}{2} \times \Delta t$ ✓

$= \frac{(20 + 20)}{2} \times 0,4$ ✓

$= 8$ m ✓ (3)

4.4 $v_f = v_i + a\Delta t$ ✓

0 ✓ $= 20 + (-2,5)\Delta t$ ✓

$\Delta t = 8$ s

$\Delta t_{total} = 0,4 + 8$

$= 8,4$ s ✓ (4)

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4.5 **OPTION 1/*OPSIE 1***

$v_f^2 = v_i^2 + 2a\Delta x$ ✓

$(0)^2 = (20)^2 + 2(-2,5)\Delta x$ ✓

$\Delta x = 80$ m ✓

The motor car will stop. ✓/ *Die motor sal stop.*

Since it comes to a halt within (80 + 8) m ✓ (which is less than 100 m)/ *Aangesien dit tot stilstand kom binne (80 + 8) m (wat minder as 100 m is)*

POSITIVE MARKING FROM 4.3/ *POSITIEWE PUNTE VANAF 4.3*

OPTION 2/*OPSIE 2*

$\Delta x = v_i\Delta t + \frac{1}{2} a\Delta t^2$ ✓

$= (20)(8) + \frac{1}{2}(-2,5)(8)^2$ ✓

$= 80$ m ✓

The motor car will stop. ✓/ *Die motor sal stop*.

Since it covers (80 + 8) m✓ which is less than 100 m./ *Aangesien dit (80 + 8) m dek, wat minder as 100 m is.*

(5)

[16]

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QUESTION 5/*VRAAG 5*

5.1 5.1.1 n = m/M ✓

= 25/142 ✓

= 0,18 moles ✓/*mol* (3)

5.1.2 n = N/N_A ✓

$0,18 = N/6,02 \times 10^{23}$ ✓

$= 1,08 \times 10^{23} \times 2$ ✓

$= 2,16 \times 10^{23}$ atoms ✓ (4)

5.2 5.2.1 The simplest whole number ratio of atoms in a compound. ✓✓/ *Die eenvoudigste heelgetalverhouding van atome in 'n verbinding.* (2)

5.2.2

Element	Mass/*massa*	n = m/M	Simplest ratio/*eenvoudigste verhouding*
C	40	40/12 = 3,33 ✓	1
H	6,67	6,67/1 = 6,67 ✓	2 ✓
O	53,3	53,33/16 = 3,33 ✓	1

(5)

Empirical formula/*empiriese formule*: **CH_2O** ✓

5.2.3 $M(CH_2)$ 30 $g.mol^{-1}$

n = 60/30 ✓

= 2

molecular formula/*molekulêre formule* **$C_2H_4O_2$** ✓ (2)

[16]

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QUESTION 6/*VRAAG 6*

6.1 6.1.1 $2KClO_3$ ✓ → $2KCl + 3O_2$ ✓ (2)

6.1.2 n(KCl) = m/M

= 160/74.5 ✓

= 2,1476 moles/*Mol*

$KClO_3$: KCl

2,1476 : 2,1476 ✓

m = n x M

= 2,1476 x 122,5 ✓

= 263,08 g ✓ (4)

6.1.3 m = n x M

= 200/74,5 ✓

= 2,6845 moles/*mol*

O_2 : KCl

3 : 2

x : 2,6845

4,0267 ✓

V = n x V_m

= 4,0267 x 22,4 ✓

= 90,20 dm^3 ✓ (4)

6.2 6.2.1 Concentration is the amount of a substance present per volume of solution. ✓✓/ *Konsentrasie is die hoeveelheid van 'n stof wat per volume oplossing teenwoordig is.* (2)

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6.2.2 n = c x V

= 0,25 x 0,25 ✓

= 0,0625 moles/*mol*

KOH : K_2SO_4

2 : 1

0,0625 : 0.03125 ✓

m = nM

= 0.03125 x 174 ✓

= 5,44 g ✓ (4)

6.2.3 % yield = actual yield/theoretical yield x 100 ✓ /

% opbrengs = werklike opbrengs/teoretiese opbrengs x 100

= 0,87/5,44 ✓ x 100 ✓

= 15,99 % ✓ (4)

6.3 $M(CuSO_4.H_2O) = 249,5\ g.mol^{-1}$

$M(CuSO_4) = 159,5\ g.mol^{-1}$ ✓

$M(H_2O) = 249,5 – 159,5$ ✓

= 90 g

n = m/M (4)

= 90/18 ✓

= 5

x = 5 or/*of* $CuSO_4.5H_2O$ ✓

[24]

TOTAL/*TOTAAL* = 100

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