LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL
SENIOR CERTIFICATE



GRADE 10

PHYSICAL SCIENCES: CONTROL TEST 2
FISIESE WETENSKAPPE: KONTROLE TOETS 2

MARKING GUIDELINE/*NASIENRIGLYNE*

13 SEPTEMBER 2024

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MARKS/*PUNTE*: 100

This Marking Guideline consists of 8 pages/

Hierdie nasienriglyne bestaan uit 8 bladsye .

QUESTION 1/*VRAAG 1*

1.1 B ✓✓ (2)

1.2 A ✓✓ (2)

1.3 D ✓✓ (2)

1.4 B ✓✓ (2)

1.5 A ✓✓ (2)

1.6 C ✓✓ (2)

1.7 C ✓✓ (2)

1.8 B ✓✓ (2)

1.9 C ✓✓ (2)

[18]

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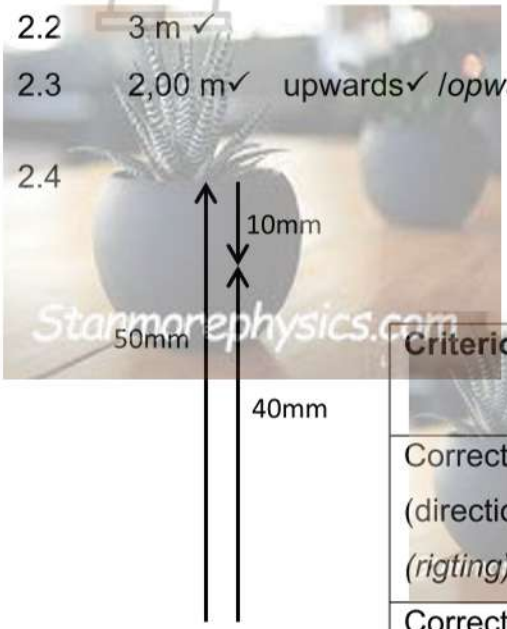
QUESTION 2/*VRAAG 2*

2.1 Resultant is the single vector having the same effect as two or more vectors together.✓✓ / *Resultant is die enkele vektor wat dieselfde effek het as twee of meer vektore saam* (2)

2.2 3 m ✓ (1)

2.3 2,00 m✓ upwards✓ /*opwaarts* (2)

2.4



Criterion/*kriteria*	Mark allocation/ ***puntetoekenning***
Correct arrows (direction)/ *Korrekte pyle (rigting)*	All ✓ /*almal*
Correct values/ *korrekte waardes*	All ✓ /*almal*
Correct measurements / *korrekte afmetings*	At least 2✓ /*ten minste 2*

Displacement/*verplasing* is 40 mm ÷ 2 = 2 m✓ (4)

2.5

$$\textbf{Speed}/\boldsymbol{spoed} = \frac{\Delta x}{\Delta t} \checkmark$$

$$= \frac{3}{8} \checkmark$$

$$= 0{,}375\ m.s^{-1} \checkmark$$

(3)

[12]

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QUESTION 3/*VRAAG 3*

3.1 Distance is the total path length travelled. ✓✓ / *Afstand is die totale padlengte afgelê* (2)

3.2 $\frac{100\ km}{1h} \times \frac{1000\ ✓}{60 \times 60 ✓}$

$= 27{,}78\ m.s^{-1}$ ✓ (3)

3.3

Positive marking from 3.2/*positiewe merk vanaf 3.2* **Option 1/*Opsie 1***	**Positive marking from 3.2/*positiewe merk vanaf 3.2*** **Option 2/*Opsie 2***
$\Delta x = (\frac{v_i + v_f}{2})\Delta t$ ✓ $= \left(\frac{27{,}78 + 27{,}78}{2}\right)(3)$ ✓ $= 83{,}34\ m$ ✓	$\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2$ ✓ $= (27{,}78)(3) + 0$ ✓ $= 83{,}34\ m$ ✓

(3)

3.4 **Positive marking from 3.2 qne 3.3 /*positiewe merk vanaf 3.2 en 3.3***

The motor car will not hit ✓the donkey/

Die motor sal nie die donkie tref nie

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

$= \left(\frac{27{,}78 + 0}{2}✓\right)(10)$ ✓

$= 138{,}90\ m$ ✓

Distance to be travelled in the next 10 seconds/ *afstand beweeg in die volgende 10 sekondes* = 300 – 83,34 = 216,66✓

Distance travelled is less ✓than distance to reach the donkey / *Afstand afgelê is minder as afstand om die donkie te bereik*

(6)

3.5 Increases ✓/*Toeneem*

For the same change in velocity, ✓the stopping time will increase. ✓/ *Vir dieselfde verandering in snelheid sal die stilhou tyd toeneem.* (3)

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QUESTION 4/*VRAAG 4*

4.1 Acceleration is the rate of change of velocity. ✓✓/ *Versnelling is die tempo van verandering van snelheid.* (2)

4.2.1
- The car starts from rest and velocity increases to 10m.s^{-1} in 20 seconds. ✓
- Car moves east at a constant velocity/uniform acceleration ✓ /
- *Die motor begin vanuit rus en snelheid neem toe tot 10m.s^{-1} in 20 sekondes.*
- *Motor beweeg teen konstante snelheid/uniforme versnelling oos.*

(2)

4.2.2
- The car continues to increase velocity from 10m.s^{-1} to 40m.s^{-1} in 10 seconds✓
- The car moves east at a constant/uniform acceleration but greater than that in section AB. ✓ /
- *Die motor verhoog snelheid van 10m.s^{-1} na 40m.s^{-1} in 10 sekondes*
- *Die motor beweeg teen konstante/uniforme versnelling oos, maar groter as dié in afdeling AB.*

(2)

4.2.3
- Velocity of the car decreases from 40m.s^{-1} to 0m.s^{-1} in 10 seconds. ✓
- The car decelerates constantly/uniformly east, until it stops. ✓/
- *Snelheid van die motor neem af van 40m.s^{-1} tot 0m.s^{-1} in 10 sekondes.*
- *Die motor vertraag konstant/uniform oos totdat dit stop in 10 sekondes.*

(2)

4.3

Option 1/*Opsie 1*	**Option 2/*Opsie 2***
$v_f = v_i + a\Delta t$✓	$a = \frac{\Delta v}{\Delta t}$✓
10✓ $= 0 + a(20)$✓	$= \frac{10 - 0}{20 - 0}$✓
$a = 0{,}50\ m.s^{-2}$ East✓/*oos*	$a = 0{,}50\ m.s^{-2}$ East✓/*oos*

(4)

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4.4 **Option 1/*Opsie 1***

$$\text{Distance} = \text{area of bottom trapezium} + \text{area of top trapezium} /$$

Afstand = opv van onderste trapesium + opv van boonste trapesium

$$\text{Distance}/afstand = \frac{1}{2}(60 + 38\ ✓)(10)\ ✓ + \frac{1}{2}(38 + 20\ ✓)(30)\ ✓ + 0✓$$

$$= 1360\ m\ ✓$$

Option 2/*Opsie 2*

$$\text{Distance} = \text{area of bottom triangle} + \text{area of bottom rectangle}$$
$$+ \text{area of bottom triangle} + \text{area of top trapezium}$$

Afstand = opv van onderkant van driehoek + opv van onderkant van reghoek + opv van onderste driehoek + opv van boonste trapesium

$$= \frac{1}{2} \times 20 \times 10\ ✓ + 38 \times 10\ ✓ + \frac{1}{2} \times 2 \times 10\ ✓ + \frac{1}{2}(38 + 20\ ✓) \times 30\ ✓$$

$$= 1360\ m\ ✓$$

(6)

[18]

QUESTION 5/*VRAAG 5*

5.1 H_2 ✓ (1)

5.2 Concentration as the number of moles of solute per cubic decimetre of solution. ✓✓ / *Konsentrasie as die aantal mol opgeloste stof per kubieke desimeter oplossing*

OR/*OF*

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

5.3.1 $n = \frac{m}{M}$ ✓

$$= \frac{8}{40}$$ ✓

$$= 0{,}20\ mol\ ✓$$

(3)

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5.3.2 $n_{ca}: n_{HNO_3}$

$1 : 2$

$n_{HNO_3} = \frac{0,2}{1} \times 2$ ✓

$= 0,4\ mol$

$c = \frac{n}{V}$ ✓

$= \frac{0,4}{0,5}$ ✓

$= 0,80\ \text{mol.dm}^{-3}$ ✓ (4)

5.3.3 $n_{ca}: n_{H_2}$

$1 : 1$

$n_{H_2} = \frac{0,2}{1} \times 1$ ✓

$= 0,2\ \text{mol}$

$n = \frac{V}{V_m}$ ✓

$0,2 = \frac{V}{22,4}$ ✓

$V = 4,48\ dm^3$ ✓ (4)

5.3.4 $\text{m} = \text{Mn}$ ✓

$= 2 \times 0,2$ ✓

$= 0,40\ \text{g}$ ✓ (3)

5.3.5 $\text{Percentage yield} = \frac{\text{Actual mass}}{\text{Theoretical mass}} \times 100\%$ ✓ / $\%\ opbrengs = \frac{Ware\ massa}{teoretiese\ massa} \times 100\%$

$= \frac{0,35}{0,4} \times 100\%$ ✓

$= 87,50\ \%$ ✓ (3)

[20]

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QUESTION 6/*VRAAG 6*

6.1.1 Empirical formula is the simplest whole-number ratio of atoms in a compound. ✓✓ / *Empiriese formule is die eenvoudigste heelgetalverhouding van atome in 'n verbinding.* (2)

6.1.2

Formula/*Formule*	C	H	O
$n = \frac{m}{M}$ ✓	$\frac{54,56}{12}$ $= 4,55$ ✓	$\frac{9,09}{1}$ $= 9,09$ ✓	$\frac{36,35}{16}$ $= 2,27$ ✓
Divide by the smallest number✓ / *deel deur kleinste getal*	$\frac{4,55}{2,27}$ $= 2$	$\frac{4,55}{2,27}$ $= 4$	$\frac{2,77}{2,27}$ $= 1$
Empirical formula/ *empiriese formule*	C_2H_4O ✓		

(6)

6.2.1 Water of crystallisation is water that is stoichiometrically bound into a crystal. ✓✓/ *Kristallisasiewater is water wat stoïgiometries in 'n kristal gebind is.* (2)

6.2.2 $m_{AlCl_3} = 150 - 89,595$✓

$= 60,405$

Formula/*formule*	nH_2O	AℓCℓ3
$n = \frac{m}{M}$	$\frac{89,595}{18}$ ✓ $= 4,9775$	$\frac{60,405}{133,5}$ ✓ $= 0,45247$
Divide by the smallest number✓/*deel deur kleinste getal*	$\frac{4,9775}{0,45247}$ $= 11$	$\frac{0,45247}{0,45247}$ $= 1$
Value of n/*waarde van n*	$n = 11$✓	

(5)

[15]

TOTAL/*TOTAAL*: 100

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