education
Department: Education
GAUTENG PROVINCE

NATIONAL SENIOR CERTIFICATE

GRADE 12

PHYSICAL SCIENCES:

MARKING GUIDELINES

Stanmorephysics

This memorandum consists of 6 pages. / Hierdie memorandum bestaan uit 6 bladsye

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QUESTION/ Vraag 1

1.1 B✓✓ (2)
1.2 A✓✓ (2)
1.3 A✓✓ (2)
1.4 C✓✓ (2)
1.5 D✓✓ (2)
1.6 C✓✓ (2)
1.7 C✓✓ (2)
1.8 A✓✓ (2)
1.9 C✓✓ (2)
1.10 B✓✓ (2)

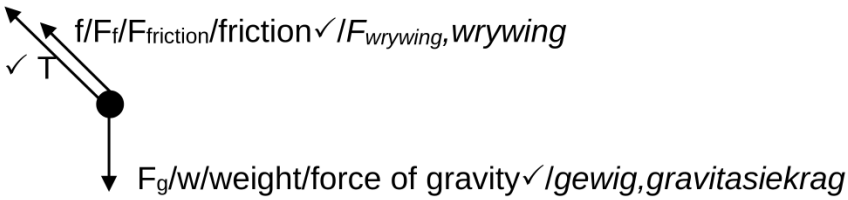


[20]

QUESTION 2/*VRAAG 2*

2.1 The force that opposes the motion✓ of an object and which act parallel to the surface✓
Die krag wat die beweging van 'n voorwerp teenstaan en parallel aan die oppervlak inwerk. (2)

2.2



(3)

2.3.1 $f_{k(max)} = \mu_k F_N$✓
$= \underline{0,15(3)(9,8)}(\cos 30^0)$✓
$= 3,82$ N✓ (3)

2.3.2 **Positive marking from 2.3.1/ *Positiewe merk van 2.3.1***
Right/downwards as positive:/ *Regs/afwaarts as positief*

5 kg block: $F_{net} = ma$ ✓
$T + f = ma$
$\underline{T - (8) = 5a}$✓ 1

3 kg block : $T + f + F_{g//} = ma$
$\underline{-T - 3,82 + (3)(9,8)\sin 30^o}$ ✓$= 3a$✓ 2
$-T + 10,88 = 3a$

Substitute 2 into 1:
$a = 0,36$ m·s^{-2}

Substitute a into 1:
$T - 8 = (5)(0,36)$ ✓
$T = 9,8$ N✓ (6)



[14]

3.1 Downwards/*Afwaarts*✓ (1)

3.2

Upwards positive/*Opwaarts positief:*	**Downwards positive/Af*waarts positief:***
$v_f = v_i + a\Delta t$ ✓ = 30✓ + (-9,8)(2,135) = 9,08 m·s^{-1}, upwards✓	$v_f = v_i + a\Delta t$ ✓ = - 30✓ + (9,8)(2,135) = - 9,078 m·s^{-1} = 9,08 m·s^{-1}, upwards ✓

(3)

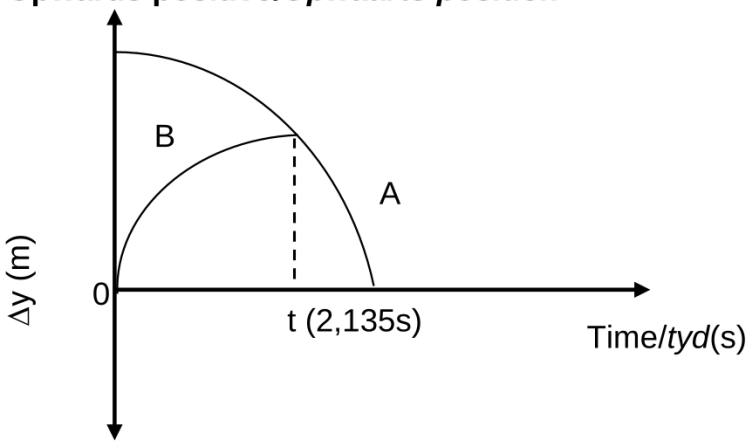
3.3

Upwards positive/*Opwaarts positief:*	**Downwards positive/Af*waarts positief:***
Ball A: $\Delta y = v_i\Delta t + \frac{1}{2}a\Delta t^2$ ✓ = -12(2,5) + ½(-9,8)(2,5)^2✓ = - 60,625 m (Height /Hoogte= 19,375 m) Ball B: $\Delta y = v_i\Delta t + \frac{1}{2}a\Delta t^2$ = 30(2,5) ✓ + ½(-9,8)(2,5)^2✓ = 44,375 m Distance = 44,375 - 19,375✓ = 25 m ✓	$\Delta y = v_i\Delta t + \frac{1}{2}a\Delta t^2$ ✓ = 12(2,5) + ½(9,8)(2,5)^2✓ = 60,625 m (Height /Hoogte= 19,375 m) Ball B: $\Delta y = v_i\Delta t + \frac{1}{2}a\Delta t^2$ = -30(2,5) ✓ + ½(9,8)(2,5)^2✓ = - 44,375 m Distance = 44,375 - 19,375✓ = 25 m✓

(6)

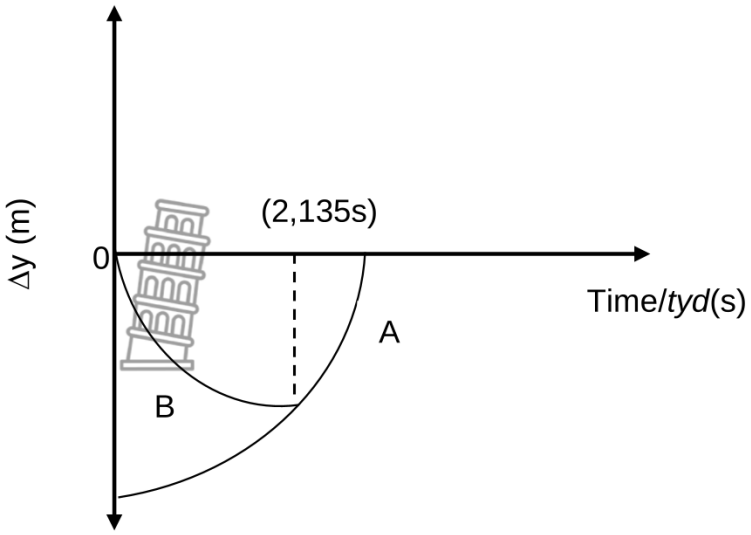
3.4 **OPTION 1/*OPSIE 1***

Upwards positive/*Opwaarts positief:*



Criteria for graph/*Kriteria vir grafiek:*	**Marks/ *Punte***
Shape for ball A up till zero position. *Vorm vir bal A tot zero posisie.*	✓
Shape for ball B up till intersection of lines time. *Vorm vir bal B tot grafieklyne kruis.* 2,135 s.	✓
Indication of time 2,135 s. *Aanduiding van tyd 2,135 s*.	✓
Ground not zero position (provided everything else is correct): $^2/_3$ *Grond nie zero posisie nie (op voorwaarde die res is korrek) :* $^2/_3$	(3)

OPTION 2/*OPSIE 2*



Criteria for graph/*Kriteria vir grafiek:*	**Marks/ *Punte***
Shape for ball A up till zero position. *Vorm vir bal A tot zero posisie.*	✓
Shape for ball B up till intersection of lines time. *Vorm vir bal B tot grafieklyne kruis.* 2,135 s.	✓
Indication of time 2,135 s. *Aanduiding van tyd 2,135 s*.	✓
Ground not zero position (provided everything else is correct): $^2/_3$ *Grond nie zero posisie nie (op voorwaarde die res is korrek) :* $^2/_3$	(3)

[13]

QUESTION 4/*VRAAG 4*

4.1 The total linear momentum of a closed system✓ remains constant ✓

Die totale linieëre momentum in 'n geslote sisteem bly konstant (2)

4.2 The kinetic energy remains constant. ✓ OR
The kinetic energy before the collision equals kinetic energy after the collision.

Die kinetiese energie bly konstant. OF Die kinetiese energie voor botsing is gelyk aan die kinetiese energie na botsing. (1)

4.3 $\Sigma p_{before} = \Sigma p_{after}$ ✓
$(5)(4) = (6,5)v_f$ ✓
$v_f = 3,077\ m\cdot s^{-1}$
$\Delta p = m(v_f - v_i)$
$= 5\ (3,077 - 4)$ ✓
$= -4,62\ kg\cdot m\cdot s^{-1}$
$= 4,62\ kg\cdot m\cdot s^{-1}$✓, left/west/ opposite to direction of motion ✓
Links/wes/teenoorgesteld aan bewegingsrigting (5)

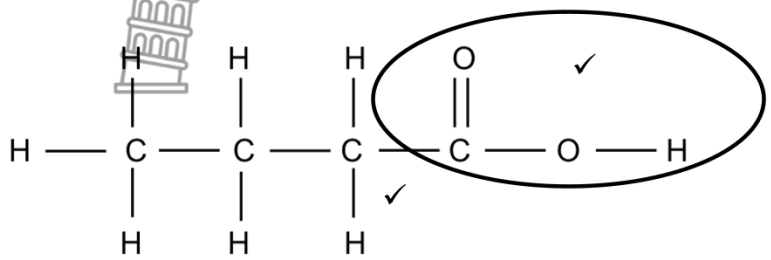
[8]

5.1.1 Compounds with <u>one or more multiple bonds between carbon atoms</u> in their hydrocarbon chains. ✓✓ (2)

5.1.2 2-methylbut-2-ene ✓✓ (2)

5.2.1 Carboxyl group ✓✓ (2)

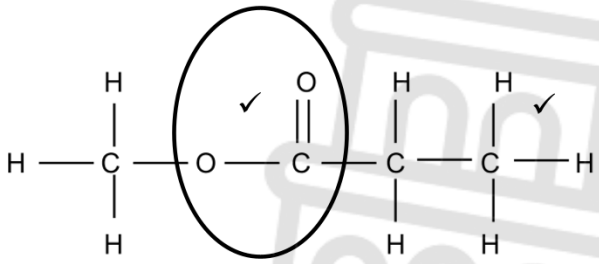
5.2.2



MARKING GUIDELINES:
✓ Functional group
✓ Correct structure
Correct condensed structure ½

(2)

5.2.3



MARKING GUIDELINES:
✓ Functional group
✓ Correct structure
Correct condensed structure ½

(2)

5.2.4 They have the <u>same molecular formula</u>, ✓ but <u>different functional groups</u>. ✓ (2)

5.2.5 Methanol ✓✓ (2)

5.2.6 Propyl methanoate ✓✓ (2)

[18]

QUESTION 3/*VRAAG 6*

6.1. B – Pentanal ✓✓ (2)

6.2 Primary ✓ The hydroxyl group is bonded to one carbon only. ✓ (2)

6.3.1 Yes. ✓
The molar mass of the two compounds is the same/equal. ✓ (2)

6.3.2 Compound D is an alkane and has <u>weaker London forces</u>. ✓
Compound B has <u>stronger dipole-dipole forces</u> (and London forces). ✓
More <u>energy</u> is needed to overcome the intermolecular forces in compound B than compound D. ✓ (3)

6.4.1 The <u>pressure exerted by a vapour</u> ✓at equilibrium with its <u>liquid in a closed system.</u> ✓ (2)

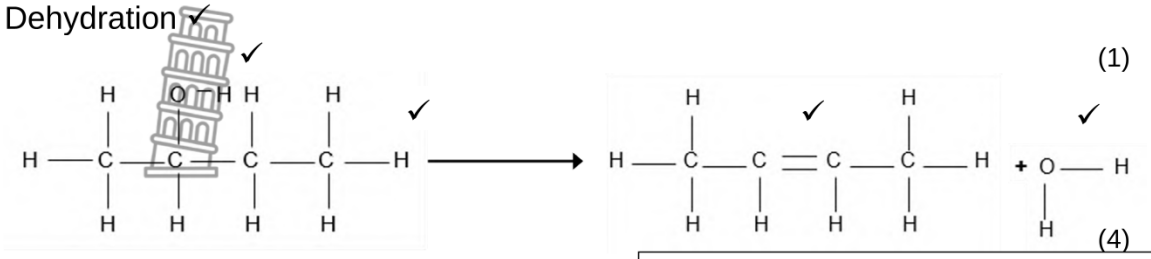
3.4.2 Compound A ✓✓ (2)

[13]

QUESTION 7/*VRAAG7*

7.1.1 Concentrated Sulphuric acid/Hydrogen sulphate ✓
OR
Phosphoric acid/Hydrogen phosphate ✓ (1)

7.1.2 Dehydration ✓ (1)

7.1.3 

(4)

MARKING GUIDELINES:
✓ OH on 2nd C for alcohol
✓ 4 C's
✓ Double bond between 2nd and 3rd C
✓ structure for H_2O

7,2 A low concentration (dilute solution) of a strong base/NaOH/KOH or water✓
Heat (under reflux) ✓ (2)

7.3. Addition ✓✓ (2)

7.4.1 2-bromobutane ✓✓ (2)

7.4.2 No water may be present ✓✓ (2)

[14]

GRAND TOTAL:100