education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT

GRADE 12

GRAAD 12

PHYSICAL SCIENCES/ FISIESE WETENSKAPPE

MARCH 2026/ MAART 2026

MARKING GUIDELINES/ NASIENRIGLYNE

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MARKS/ PUNTE: 100

These marking guidelines consists of 8 pages
Hierdie naasienriglyne bestaan uit 8 bladsye

QUESTION / VRAAG 1

1.1 C ✓✓ (2)

1.2 D ✓✓ (2)

1.3 B ✓✓ (2)

1.4 D ✓✓ (2)

1.5 D ✓✓ (2)

1.6 B ✓✓ (2)

1.7 C ✓✓ (2)

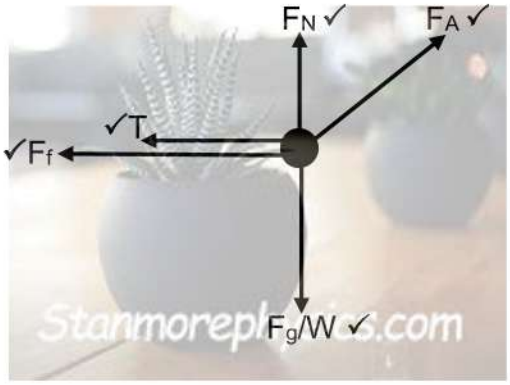
[14]

QUESTION / VRAAG 2

2.1 When a <u>net force</u> ✓ acts on an object, the object will accelerate in the direction of the force and <u>the acceleration is directly proportional to the force and inversely proportional to the mass</u> of the object. ✓

Wanneer 'n <u>netto krag</u> op 'n voorwerp inwerk, sal die voorwerp in die rigting van die <u>krag</u> versnel en die <u>versnelling is direk eweredig aan die krag en omgekeerd eweredig aan die massa</u> van die voorwerp. (2)

2.2



(5)

2.3.1 $N = mg - F_Y$

$= (24 \times 9,8) - 120\sin 64°$✓

$= 127.34$ N✓

(2)

2.3.2 $f_k = u_kN$ ✓

$4,3$ ✓ $= u_k\ (127.34)$ ✓

$u_k = 0.03$ ✓ (4)

2.4 **For block A/ Vir blok A:**

Fnet = ma
$T + f_k = ma$ } ✓ any one

$T - 3,2 = 16a$

$T = 3,2 + 16a$… 1✓

For block B/ Vir blok B:

Fnet = ma

$F\cos\theta + T + f_k = ma$

$120\cos64° - T - 4,3 = 24a$ ✓

$48,305 - 24a = T$… 2

$48,305 - 24a = 16a + 3,2$ ✓

$a = 1,127…\ m•s^{-2}$

$T = 48,305 - 24\ (1,127…)$✓ or $T = 3,2 + 16(1,127…)$ ✓

$= 21,24$ N ✓ $= 21,24$ N ✓ (6)

[19]

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QUESTION / VRAAG 3

3.1 An object which has been given an initial velocity and then moves under the influence of gravitational force only. ✓✓

'n Voorwerp wat 'n aanvanklike snelheid gegee is en dan slegs onder die invloed van swaartekrag beweeg. ✓✓ (2)

3.2 Ball moves downwards ✓ from $0 m.s^{-1}$ and accelerates✓ with uniform acceleration till it hits the ground.

Bal beweeg afwaarts✓vanaf 0 $m.s^{-1}$ en versnel✓met eenvormige versnelling totdat dit die grond tref. (2)

3.3.1 Upwards✓ / *Opwaarts*✓ (1)

3.3.2 Once/ *Een keer* /1 ✓ (1)

3.4.1

Option/ Opsie 1:	**Option/ Opsie 2:**
$v_f^2 = v_i^2 + 2g\Delta y$ ✓ $(+8)^2 = (0)^2 + 2(9,8)\Delta y$✓ $\Delta y = 3,27$ m ✓	$\Delta y = v_i\Delta t + ½ g\Delta t^2$✓ $= \underline{(0)(0,8) + ½ (9.8)(0,8)^2}$✓ = 3.14 m✓
Option/ Opsie 3: $\Delta y = (\frac{vi+vf}{2})\Delta t$ ✓ $=(\frac{0+8}{2})(0.8)$ ✓ = 3.2 m ✓	

(3)

3.4.2

Option/ Opsie 1:	**Option/ Opsie 2:**
$\Delta y = v_i\Delta t + ½ g\Delta t$ $= (-4)(0.4)$ ✓ + ½ $(9.8)(0.4)^2$ ✓ = 0,82 m ✓ (upwards)	$V_f^2 = v_i^2 + 2g\Delta y$ $(0)^2$ ✓$= (-4)^2 + 2(9,8)\Delta y$ ✓ Δy = 0,82 m ✓ (upwards)
Option 3: $\Delta y = (\frac{vi+vf}{2})\Delta t$ $= (\frac{-4+0}{2})$ ✓ (0,4) ✓ = 0.8 m ✓ (upwards)	

(3)
[10]

QUESTION / VRAAG 4

4.1 The product of the net/resultant force acting on an object and the time the net force acts on the object ✓✓

Die produk van die netto/resulterende krag wat op 'n voorwerp inwerk en die tyd wat die netto krag op die voorwerp inwerk✓✓ (2)

4.2 $\Delta p = mv_f - mv_i$ ✓
$= (70)(0) - (70)(8)$ ✓
$= 560$ kg.m.s^{-1} upwards✓ (3)

4.3 **Positive marking from question 4.2/ Positiewe merk vanaf vraag 4.2**

$F_{net}\Delta t = \Delta p$ ✓
$F_{net}(0.6) = -560$ ✓ (3)

F_{net} = 933.33 N upward/ opwaarts ✓

4.4 Increases. ✓ According to Newton's second law in terms of momentum, $F_{net} \propto 1/\Delta t$ ✓. Shorter contact time with the ground will increase the force experienced by the foot. ✓

Neem toe.✓ Volgens Newton se tweede wet in terme van momentum, $F_{net} \propto 1/\Delta t$. ✓ Korter kontaktyd met die grond sal die krag wat die voet ervaar, verhoog.✓ (3)

[11]

QUESTION / VRAAG 5

5.1.1 D ✓ (1)

5.1.2 E ✓ (1)

5.1.3 B ✓ (1)

5.2.1 Tertiary✓ the carbon atom bonded to the -OH/hydroxyl group is attached to three other carbon atoms. ✓

Tersiêre✓ Die koolstofatoom wat aan die -OH/hidroksielgroep gebind is, is aan drie ander koolstofatome geheg.✓ (2)

5.2.2 3-methylheptan-3-ol/ 3-methyl-3-heptanol ✓✓✓

3-metielheptan-3-ol/ 3-metiel-3-heptanol✓✓✓ (3)

5.2.3 Hydroxyl ✓

Hidroksiel✓ (1)

5.3.1 Organic molecules with the same molecular formula but different functional groups. ✓✓

Organiese molekules met dieselfde molekulêre formule maar verskillende funksionele groepe.✓✓ (2)

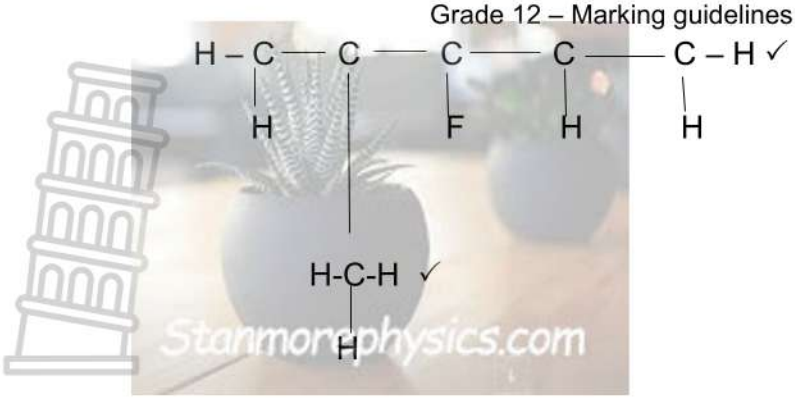
5.3.2 Pentanoic acid ✓✓

Pentanoësuur✓✓ (2)

5.4



(3)



5.5 $n = \frac{m}{M}$ ✓

$= \frac{1800}{44}$ ✓

= 40.909 mol of CO_2

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

40.909 ✓ $= \frac{m}{16}$

= 654.54 g ✓

Accept/*Aanvaar*: 654,54 – 654,56 g (4)

[20]

QUESTION / VRAAG 6

6.1 The temperature at which vapour pressure of a substance is equal to the atmospheric pressure. ✓✓

Die temperatuur waarby die dampdruk van 'n stof gelyk is aan die atmosferiese druk.✓✓ (**2 or 0)**

6.2.1 Chain length/surface area/molecular mass ✓

Kettinglengte/oppervlak area/molekulêre massa✓ (1)

6.2.2 Boiling point. ✓

Kookpunt. ✓ (1)

6.3 C ✓ (1)

6.4 • Chain length/surface area increases from compound A to C/ CH_3CH_2CHO to $CH_3CH_2CH_2CH_2CHO$. ✓ (3)

- Strength of intermolecular/London forces increase with an increase in chain length/surface area. ✓
- Amount of energy needed to overcome intermolecular/London forces increases as the chain length/surface area increase. ✓
- Therefore, the compound with the longest chain length/ largest surface area has the highest boiling point.

- *Kettinglengte/oppervlakarea neem toe van verbinding A na C/ CH_3CH_2CHO na $CH_3CH_2CH_2CH_2CHO$.* ✓
- *Die sterkte van intermolekulêre/Londen kragte neem toe met 'n toename in kettinglengte/oppervlakarea.* ✓
- *Die hoeveelheid energie wat benodig word om intermolekulêre/Londen kragte te oorkom, neem toe soos die kettinglengte/oppervlakarea toeneem.* ✓
- *Daarom het die verbinding met die langste kettinglengte/grootste oppervlakarea die hoogste kookpunt.*

6.5

- HIGHER THAN ✓, Boiling point of 2-methylpropanal is lower than that of B. ✓

ANY ONE

- 2-methylpropanal has shorter chain length/surface area than B. ✓

OR

- 2-methylpropanal has weaker intermolecular/London forces than B.

- *HOËR AS ✓Die kookpunt van 2-metielpropanal is laer as dié van B.* ✓

ENIGE EEN

- *2-metielpropanaal het 'n korter kettinglengte/oppervlakarea as B.* ✓

OF

2-metielpropanaal het swakker intermolekulêre/Londen kragte as B.

(2)
[10]

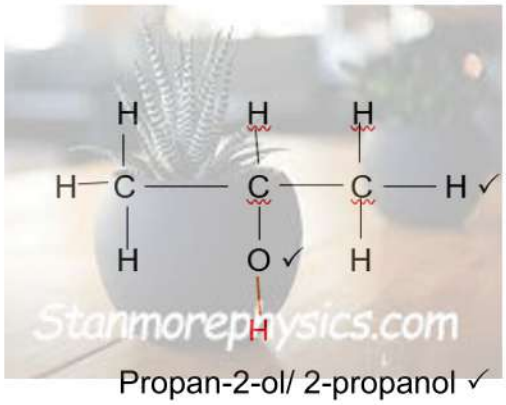
QUESTION / VRAAG 7

7.1 Alkene/ *Alkeen* ✓ (1)

7.2.1 Hydrohalogenation/hydrochlorination ✓

Hidrohalogenering/hidrochlorenasie✓ (1)

7.2.2



Propan-2-ol/ 2-propanol ✓

(3)

7.2.3 Elimination/dehydration ✓

Eliminasie/dehidrasie✓ (1)

7.3.1 Water/sodium chloride ✓

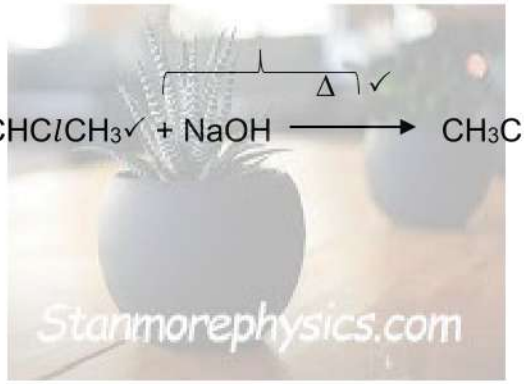
Water/natriumchloried✓ (1)

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7.3.2 • Concentrated strong base (NaOH/KOH) ✓
• More heat✓

• *Gekonsentreerde sterk basis (NaOH/KOH)*✓
• *Meer hitte*✓ (2)

7.3.3



(5)
[14]

TOTAL/TOTAAL: 100