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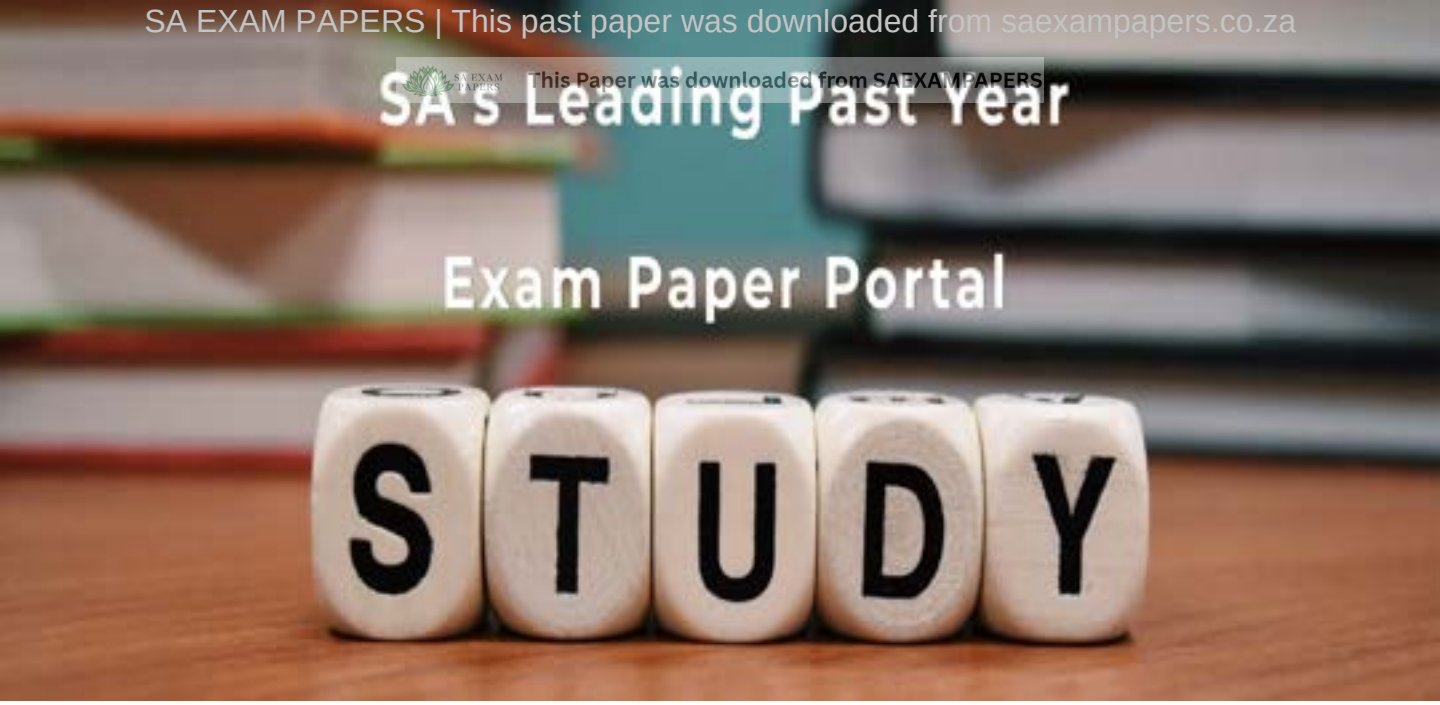

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education

Department of Education
FREE STATE PROVINCE

EXAMINATION/*EKSAMEN*

GRADE/GRAAD 12

PHYSICAL SCIENCES/ *FISIESE WETENSKAPPE*

PHYSICS (PAPER ONE)/ *FISIKA (PAPIER EEN)*

JUNE/*JUNIE* 2026

MARKS/*PUNTE*: 150

UPDATED MARKING GUIDELINE/ *OPGEDATEER MERKRIGLYNE*

Notes/*Aantekeninge*:
Questions/*Vrae* - 2.3.2, 2.4.2, 3.1, 5.1.2(removed/*verwyder*), 5.2.5, 6.3.2, 7.5.2.

This paper consists of 14 pages/
Hierdie dokument bestaan uit 14 bladsye

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QUESTION/VRAAG 1

1.1 C ✓✓

1.2 D ✓✓

1.3 A ✓✓

1.4 D ✓✓

1.5 B ✓✓

1.6 C ✓✓

1.7 D ✓✓

1.8 B ✓✓

1.9 A ✓✓

1.10 C ✓✓

[20]

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QUESTION/*VRAAG* 2

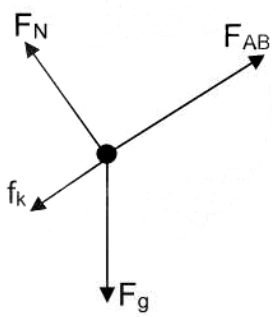
2.1

Marking Criteria / *Merk kriteria*:
-1 mark for each key word/phrase omitted in the correct context.
-1 punt vir elke sleutel woord/frase in die korrekte konteks weggelaat.

The force or the component of a force which a surface exerts on an object with which it is in contact, and which is perpendicular to the surface. ✓✓ (2)

Die krag of komponent van 'n krag wat 'n oppervlak op 'n voorwerp waarmee dit in kontak is, uitoefen en wat loodreg op die oppervlak is.

2.2



(4)

Accept the following symbols./*Aanvaar die volgende simbole*:	
F_N ✓	N / Normal / *Normaal* / Normal force / *Normaalkrag*
f_k ✓	F_f / f / f_r / / F_w / frictional force/*wrywingskrag*/kinetic frictional force / *kinetiese wrywingskrag*
F_g ✓	w / mg / weight / $F_{Earth\ on\ B}$ / 29,4 N / gravitational force / gewig / $F_{aarde\ op\ B}$ / gravitasiekrag
F_{AB} ✓	F / F_A / Applied force / *Toegepaste krag* / F_T

Notes/Aantekeninge:

- Mark awarded for label and arrow./*Punt toegeken vir byskrif en pyltjie.*
- Do not penalise for length of arrows since drawing is not to scale./*Moenie vir die lengte van die pyltjies penaliseer nie aangesien die tekening nie volgens skaal is nie.*
- Any other additional force(s)/*Enige ander addisionele krag(te)*: Max/*Maks* 3/4

2.3.1 $N = F_{g\perp}$
$N = mg\cos\theta$
$N = \underline{6 \times 9{,}8 \times \cos 30°}$ ✓
$N = 50{,}92$ N ✓ (2)

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2.3.2

Option 1/ Opsie 1- Up the incline/Op teen die helling: + ve

For block B/*Vir blok B*

$F_{net} = ma$
$F_{AB} + f_k + F_{g//} = ma$
$F_{AB} \underline{- 3,4 - 3\times9,8\sin30°}$ ✓$= \underline{3\times2}$
$F_{AB} = 24,1$ N

$F_{AB} = - F_{BA}$

✓Any one/*Enige een*

✓Both/ *Albei*

For block A/Vir blok A

$F_{net} = ma$
$F + f_k + F_{g//} + F_{BA} = ma$
$F \underline{- 6,8 - 6\times9,8\sin30° - 24,1}$✓$= \underline{6\times2}$
$F = 72,3$ N ✓

Option 2/ Opsie 2- Up the incline/Op teen die helling: - ve

For block B/*Vir blok B*

$F_{net} = ma$
$F_{AB} + f_k + F_{g//} = ma$
$F_{AB} \underline{+ 3,4 + 3\times9,8\sin30°}$ ✓$= \underline{3\times-2}$
$F_{AB} = - 24,1$ N

$F_{AB} = - F_{BA}$

✓Any one/*Enige een*

✓Both/ Albei

For block A/Vir blok A

$F_{net} = ma$
$F + f_k + F_{g//} + F_{BA} = ma$
$F \underline{+ 6,8 + 6\times9,8\sin30° + 24,1}$✓$= \underline{6\times-2}$
$F = - 72,3$ N
$F = 72,3$ N ✓ (5)

NOTE/*LET WEL*
- If one system of blocks (sum of masses and frictions), then give 2/6 max. (correct formula and answer)
- *As een stelsel van blokke (som van massas en wrywings), gee dan 2/6 maks. (korrekte formule en antwoord)*

2.4.1 INCREASES/*TOENEEM*✓ (1)

2.4.2 - If the angle of the inclination decreases, $\underline{F_{g\perp} \text{ increases}}$✓given $F_{g\perp}=mg\cos\theta$.
- Given $N = F_{g\perp}$, $\underline{\text{if } F_{g\perp} \text{ increases then N also increases}}$.✓
- According to $\underline{f_k = \mu_k N \text{ for constant } \mu_k}$, ✓ if N increases then f_k also increases. (3)
- *As die hellingshoek afneem, $\underline{F_{g\perp} \text{ toeneem}}$ gegewe $F_{g\perp}=mg\cos\theta$.*
- *Gegewe $N = F_{g\perp}$, as $F_{g\perp}$ toeneem, neem N ook toe.*
- *Volgens $f_k = \mu_k N$ vir konstante μ_k, as N toeneem, dan neem f_k ook toe.*

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3.1 An object which has been given an initial velocity and then it moves under the influence of the gravitational force only.✓✓
'n voorwerp waaraan 'n beginsnelheid gegee is en wat dan slegs onder die invloed van die gravitasiekrag beweeg. (2/0)

3.2 DOWNWARDS✓, Velocity increases✓✓ (3)
AFWAARTS, Snelheid neem toe

3.3

Option/*Opsie* 1

Gradient/Gradiënt = $\frac{\Delta v}{\Delta t}$

$9,8 = \frac{19,84 - v_i}{1 - 0}$ ✓

$v_i = 10,04\ m \cdot s^{-1}$✓

Option/*Opsie* 2

$v_f = v_i + a\Delta t$

$19,84 = v_i + 9,8 \times 1$✓

$v_i = 10,04\ m \cdot s^{-1}$✓

Option/*Opsie* 3

Extrapolating from the graph/ Ekstrapolasie vanaf die grafie

$v_i = 10,04\ m \cdot s^{-1}$✓✓ **(10,00 to 10,06)**

(2)

3.4.1 **Option 1/ Opsie 1: down/*af* +ve**

Impulse/*Impuls* = $F_{net}\Delta t$
= Δp
= $m(v_f - v_i)$
✓Any one/*Enige een*

= $\underline{0,45(-11,27 - 19,84)}$✓
= - 14 N·s
Impulse/*Impuls*= 14 N·s upwards/*opwaarts*✓

Option 2/ Opsie 2: down/*af* -ve

Impulse/*Impuls* = $F_{net}\Delta t$
= Δp
= $m(v_f - v_i)$
✓Any one/*Enige een*

= $\underline{0,45(11,27 - (-19,84))}$✓
= 14 N·s
Impulse/*Impuls*= 14 N·s upwards/*opwaarts*✓

(3)

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3.4.2

Marking Criteria/*Nasienkriteria*:

- Correct formula for/*Korrekte formule vir* E_{Ki}/ E_{Kf} ✓
- Correct substitution to calculate E_{Ki} ✓
  Korrekte substitusie om E_{Ki} *te bereken*
- Correct substitution to calculate E_{Kf} ✓
  Korrekte substitusie om E_{Kf} *te bereken*
- Correct calculation for/*Korrekte berekening vir* $E_{Klost/verlore}$ ✓
- Correct final answer./*Korrekte finale antwoord.* ✓

$E_{K(before/voor)} = \frac{1}{2}mv_i^2$ ✓

$= \frac{1}{2}(0,45)(19,84)^2$ ✓

$= 88,56576$ J

$E_{K(after/na)} = \frac{1}{2}mv_f^2$

$= \frac{1}{2}(0,45)(-11,27)^2$ ✓

$= 28,5779025$ J

$E_{K(lost)} = E_{K(before/voor)} - E_{K(after/na)}$

$= 88,56576 \text{ J} - 28,5779025 \text{ J}$ ✓

$= 60$ J

$E_{K(lost)} = 60$ J (lost/verlore) ✓

(5)

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3.5

Marking Criteria / *Nasienriglyn*:
- Correct formula for calculating Δy / *korrekte formule om Δy te bereken* ✓
- Correct substitution in the formula / korrekte vervanging in formule ✓✓
- Final answer with correct SI unit /*Finale antwoord met korrekte SI eenheid* ✓
  RANGE (1,1 m – 1,2 m)

Option/*Opsie* 1: down/*af* +ve

$v_f^2 = v_i^2 + 2a\Delta y$✓
0✓$= (-4,8)^2 + 2\times 9,8\Delta y$✓
$\Delta y = -1,18$ m
∴height/*hoogte* = 1,18 m✓

Option/*Opsie* 2: down/*af* -ve

$v_f^2 = v_i^2 + 2a\Delta y$✓
0✓$= (4,8)^2 + 2\times(-9,8)\Delta y$✓
$\Delta y = 1,18$ m
∴height/*hoogte* = 1,18 m✓

Option/*Opsie* 3: down/*af* +ve

$\Delta y = v_i\Delta t + \frac{1}{2}a\Delta t^2$✓
$\Delta y = -4,8\times(4,3 - 3,8)$✓ $+\frac{1}{2}\times 9,8\times(4,3 - 3,8)^2$✓
$\Delta y = -1,18$m
∴height/*hoogte* = 1,18 m✓

Option/*Opsie* 4: down/*af* -ve

$\Delta y = v_i\Delta t + \frac{1}{2}a\Delta t^2$✓
$\Delta y = 4,8\times(4,3 - 3,8)$✓ $+\frac{1}{2}\times -9,8\times(4,3 - 3,8)^2$✓
$\Delta y = 1,18$m
∴height/*hoogte* = 1,18 m✓

Option/*Opsie* 5: down/*af* +ve

$\Delta y = \frac{(v_i + v_f)}{2}\Delta t$✓
$\Delta y = \frac{(-4,8 + 0)}{2}$✓$\times(4,3 - 3,8)$✓
$\Delta y = -1,2$ m
∴height/*hoogte* = 1,2 m✓

Option/*Opsie* 6: down/*af* -ve

$\Delta y = \frac{(v_i + v_f)}{2}\Delta t$✓
$\Delta y = \frac{(4,8 + 0)}{2}$✓$\times(4,3 - 3,8)$✓
$\Delta y = 1,2$ m
∴height/*hoogte* = 1,2 m✓

(4)

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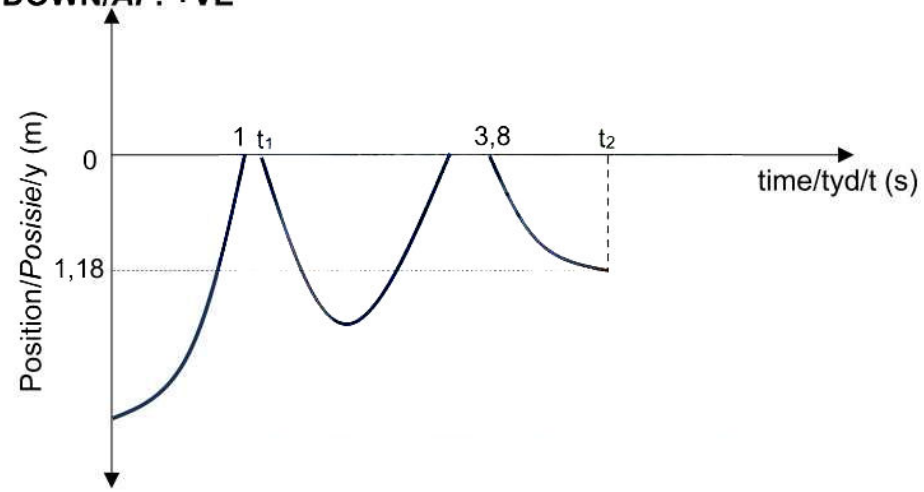
3.6 **POSITIVE MARKING FROM 3.5/*POSITIEF NASIEN VAN 3.5***

DOWN/*AF*: +VE



(4)

Marking Criteria/*Nasienkriteria*:	
• Correct labels and units for both position and time axes. *Korrekte byskrifte en eenhede vir beide posisie- en tyd asse.*	✓
• Correct shape from 0 to t_1 s. *Korrekte vorm vanaf 0 tot t_1 s.*	✓
• Two maximum heights from t_1 s to t_2 with decreasing magnitudes. *Twee maksimum hoogtes van t_1 s tot t_2 met afnemende groote.*	✓
• Correct second maximum 1,18 m indicated. (POSITIVE MARKING FROM 4.5). *Korrek sekonde maksimum 1,18 m aangedui.* *(POSITIEWE NASIEN VANAF 4.5).*	✓
NOTES/ NOTAS: • Up taken as positive: (maximum marks $^3/_4$). *Op as positief geneem: (maksimum punte $^3/_4$).* • Ground NOT taken as reference (maximum marks $^3/_4$). *Grond NIE as verwysing geneem nie (maksimum punte $^3/_4$).* If both notes are applicable (maximum marks $^2/_4$). *Indien beide notas van toepassing is (maksimum punte $^2/_4$).*	

[23]

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QUESTION/*VRAAG* 4

4.1. The total linear momentum ofan isolated system remains constant (is conserved).✓✓ (2/0)
Die totale lineêre momentum in 'n geïsoleerde sisteem bly konstant (behoue).

4.2 Inelastic ✓, <u>energy is lost</u> in the form of sound.✓ (2)
Onelastiese, <u>energie gaan verlore</u> in die vorm van klank.

4.3.1

<u>Option 1/*Opsie 1*: east/*oos* +ve</u>

$\Sigma p_i = \Sigma p_f$✓
$(0,05 + 0,02)\times 2$✓ $= 0,05 \times v_{fA} + 0,02\times 10$✓
$v_{fA} = -1,2\ m\cdot s^{-1}$
$v_{fA} = 1,2\ m\cdot s^{-1}$ west/*wes*✓

<u>Option 2/*Opsie 2*: east/*oos* -ve</u>

$\Sigma p_i = \Sigma p_f$✓
$(0,05 + 0,02)\times -2$✓ $= 0,05 \times v_{fA} + 0,02\times -10$✓
$v_{fA} = 1,2\ m\cdot s^{-1}$
$v_{fA} = 1,2\ m\cdot s^{-1}$ west/*wes*✓ (4)

4.3.2 **POSITIVE MARKING FROM 4.3.1/*POSITIEF NASIEN VAN 4.3.1***

<u>Option 1/*Opsie 1*: east/*oos* +ve</u>	**<u>Option 2/*Opsie 2*: east/*oos* -ve</u>**
$\Delta p = m(v_f - v_i)$✓ $= 0,05\times(-1,2 - 2)$✓ $= -0,16\ kgm\cdot s^{-1}$ $\Delta p = 0,16\ kgm\cdot s^{-1}$ west/*wes*✓	$\Delta p = m(v_f - v_i)$✓ $= 0,05\times(-1,2 - (-2))$✓ $= 0,16\ kgm\cdot s^{-1}$ $\Delta p = 0,16\ kgm\cdot s^{-1}$ west/*wes*✓

(3)

4.4 **POSITIVE MARKING FROM 4.3.2/*POSITIEF NASIEN VAN 4.3.2***
East/*Oos*.✓ (1)

4.5.1 FALSE/*VALS*✓ (1)

4.5.2

<u>Option 1/ Opsie 1: down/*af* +ve</u>

$v_f^2 = v_i^2 + 2a\Delta y$
$v_f^2 = (0)^2 + 2\times 9,8\times 3$✓
$v_f = 7,668\ m\cdot s^{-1}$
$F_{net}\Delta t = \Delta p$✓
$F_{net}\times 0,3$ ✓$= 2,5\ (0 - 7,668)$✓
$F_{net} = -63,9\ N$
$F_{net} = 63,9\ N$✓ upwards/*opwaarts*✓

<u>Option 2/ Opsie 2: down/*af* -ve</u>

$v_f^2 = v_i^2 + 2a\Delta y$
$v_f^2 = (0)^2 + 2\times -9,8\times -3$✓
$v_f = -7,668\ m\cdot s^{-1}$
$F_{net}\Delta t = \Delta p$✓
$F_{net}\times 0,3$ ✓$= 2,5\ (0 - (-7,668))$✓
$F_{net} = 63,9\ N$✓ upwards/*opwaarts*✓

(6)
[19]

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QUESTION/*VRAAG* 5

5.1.1 The total mechanical energy (sum of gravitational potential energy and kinetic energy) in an isolated system remains constant. (2/0)
Die totale meganiese energie (som van gravitasie potensiële energie en kinetiese energie) in 'n geslote sisteem bly konstant.

5.1.2

REMOVED/*VERWYDER*

5.1.3 - Bending the knees increase the (contact) time/ time/Δt to come to rest.✓
- According to $F_{net} = \frac{\Delta p}{\Delta t}$, for constant Δp✓, if Δt increases then F_{net} decreases. ✓
- The chances of serious injuries are then reduced. (3)
- *Deur die knieë te buig, verhoog die (kontak) tyd/tyd/Δt om tot rus te kom.*
- *Volgens $F_{net} = \frac{\Delta p}{\Delta t}$ vir konstante Δp, as Δt toeneem, neem F_{net} af.*
- *Die kanse op ernstige beserings word dan verminder.*

5.2.1

Marking Criteria / *Merk kriteria*:
-1 mark for each key word/phrase omitted in the correct context.
-1 punt vir elke sleutel woord/frase in die korrekte konteks weggelaat.

The net work done on an object is equal to the change in object's change in kinetic energy OR the work done on an object by a net force is equal to the change in the object's kinetic energy.✓✓ (2)
Die netto arbeid verrig op 'n voorwerp is gelyk aan die verandering in kinetiese energie van die voorwerp OF die arbeid verrig op die voorwerp deur 'n netto krag is gelyk aan die verandering in kinetiese energie van die voorwerp.

5.2.2

F_g/w/3920 N (1)

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5.2.3 **OPTION/*OPSIE* 1**

$W_{net} = \Delta K$ ✓

$W_T + W_f + W_{Fg//} = \frac{1}{2}m(v_B^2 - v_A^2)$

$200\times3\cos0° + 848,71\times3\cos180° + 400\times9,8\times\frac{1,5}{3}\times3\cos0° = \frac{1}{2}\times400(v_B^2 - 0)$ ✓

$v_B = 4,44\ m\cdot s^{-1}$ ✓

OPTION/*OPSIE* 2

$W_{nc} = \Delta K + \Delta U$ ✓

$W_T + W_f = \frac{1}{2}m(v_B^2 - v_A^2) + mg(h_B + h_A)$

$200\times3\cos0° + 848,71\times3\cos180° = \frac{1}{2}\times400(v_B^2 - 0) + 400\times9,8(0 - 1,5)$ ✓

$v_B = 4,44\ m\cdot s^{-1}$ ✓ (6)

5.2.4 **POSITIVE MARKING FROM 5.2.3 /*POSITIEF NASIEN VAN 5.2.3.***

$P_{ave} = F\cdot v_{ave}$ ✓

$P_{ave} = 200\times\left(\frac{0 + 4,44}{2}\right)$ ✓

$P_{ave} = 444\ W$ ✓

Accept/*Aanvaar*

$P = \frac{W_T}{\Delta t}$ ✓

$P = \frac{200\times3\cos0°}{1,351351351}$ ✓

$P = 444\ W$ ✓

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

$3 = \left(\frac{0+4,44}{2}\right)\times\Delta t$

$\Delta t = 1,351351351\ s$ (4)

5.2.5 EQUAL TO/*GELYK AAN* ✓✓ (2)
[20]

QUESTION/*VRAAG* 6

6.1

Marking Criteria / *Merk kriteria*: -1 mark for each key word/phrase omitted in the correct context. -1 punt vir elke sleutel woord/frase in die korrekte konteks weggelaat.

The change in frequency of the sound detected by a listener, because the sound source and the listener have different velocities relative to the medium of sound propagation. ✓✓ (2)

Die verandering in frekwensie (of toonhoogte) van die klank waargeneem deur 'n luisteraar omdat die klankbron en die luisteraar verskillende snelhede relatief tot die medium waarin die klank voortgeplant word het.

Accept: The change in frequency/pitch of the sound detected by a listener due to relative motion between the (sound) source and the listener.

Aanvaar: *Die verandering in frekwensie/toonhoogte van die klank waargeneem deur 'n luisteraar as gevolg van relatiewe beweging tussen klankbron en luisteraar.*

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6.2 AWAY✓
Observed wavelength is longer than actual wavelength OR
Observed frequency is smaller than the actual frequency.✓ (2)
WEG
Waargenome golflengte is langer as die werklike golflengte OF
Waargenome frekwensie is kleiner as die werklike frekwensie.

6.3.1 $v = f\lambda$ ✓
$340 = f \times 0,5$ ✓
$f = 680$ Hz ✓ (3)

6.3.2 **POSITIVE MARKING FROM 6.3.1/*POSITIEF NASIEN VAN 6.3.1***

$\lambda_L = 0,5 + 0,1 \times 0,5$ ✓
$= 0,55$ m
$v = f\lambda$
$340 = f \times 0,55$ ✓
$f_L = 618,1818182$ Hz

$f_L = \frac{v \pm v_L}{v \pm v_S} f_S$ ✓ OR/*OF* $f_L = \frac{v}{v + v_S} f_S$

$618,1818182$ ✓ $= \frac{340}{340 + v_S}$ ✓ $\times 680$ ✓

$v_S = 34\ m \cdot s^{-1}$ ✓ (7)

6.4.1 YES/*JA*✓ (1)

6.4.2 - Spectral lines are red-shifted/shifted towards the red-end of the spectrum.✓
- Spectral lines shifted towards the end of longer wavelength or smaller frequency.✓
- According to Doppler's effect, if observed frequency decreases, the distant star is moving away.✓
∴ The universe is expanding. (3)
- *Spektrale lyne is na rooi verskuif/verskuif na die rooi einde van die spektrum.*
- *Spektrale lyne verskuif na die einde van langer golflengte of kleiner frekwensie.*
- *Volgens die Doppler-effek, as die waargenome frekwensie afneem, beweeg die veraf ster weg.*
∴*Die heelal is besig om uit te brei.* **[18]**

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QUESTION/*VRAAG 7*

7.1 ATTRACTION✓ -ve
Newton's Law of Universal Gravitation✓ (2)
AANTREKKING
Newton se Universele Gravitasiewet

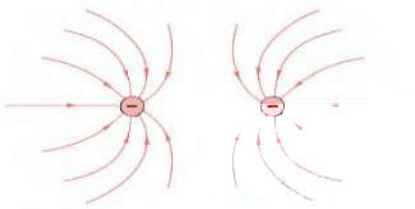
7.2

Marking Criteria / *Merk kriteria*:
-1 mark for each key word/phrase omitted in the correct context.
-1 punt vir elke sleutel woord/frase in die korrekte konteks weggelaat.

The magnitude the electrostatic force exerted by one point charge on another point charge is directly proportional to the product of the magnitudes of the charges and inversely proportional to the square of the distance between them.✓✓ (2)
Die grootte van die elektrostatiese krag wat een puntlading op 'n ander puntlading uitoefen, is direk eweredig aan die produk van die groottes van die ladings en omgekeerd eweredig aan die kwadraat van die afstand tussen hulle.

7.3 LEFT/ *LINKS*✓ (1)

7.4



(3)

Marking Criteria / *Merk kriteria*	
Correct direction of the field lines/ *Korrek rigting van die veldlyne*	✓
Field lines do not cross each other and touch the charges/ *Veldlyne kruis mekaar nie en raak nie aan die ladings nie*	✓
Correct shape/ *Korrek vorm*	✓

7.5.1
$$F_e = \frac{kQ_1Q_2}{r^2}\checkmark$$
$$= \frac{9\times10^{9} \times 3\times10^{-9} \times 3\times10^{-9}}{(1\times10^{-9})^2}\checkmark$$
$$= 8{,}1\times10^{10}\text{N}\checkmark$$
(3)

7.5.2
$$E_P = \frac{kQ_P}{r^2}\checkmark$$
$$= \frac{9\times10^{9} \times 3\times10^{-9}}{(1\times10^{-9}+ 5\times10^{-10})^2}\checkmark$$
$$= 1{,}2\times10^{19}\text{N}\cdot\text{C}^{-1}\ \text{left/}\textit{links}\checkmark$$
(4)
[15]

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8.1 The potential difference across a conductor is directly proportional to the current in the conductor at constant temperature. (2/0)
Die potensiaalverskil oor 'n geleier is direk eweredig aan die stroom in die geleier by konstante temperatuur.

8.2 Yes✓, there is a complete closed circuit with the battery allowing current to pass through A_1.✓ (2)
Ja, daar is 'n volledig geslote stroombaan met die battery wat stroom deur A_1 laat vloei.

8.3.1 HOTTER/*WARMTER*✓ (1)

8.3.2 a)

$$\frac{1}{R_{p/ext}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} \checkmark$$

$$\frac{1}{2,222} \checkmark = \frac{1}{10} + \frac{1}{10} + \frac{1}{2X} \checkmark$$

$$\frac{1}{2X} = \frac{1}{4}$$

$$\therefore X/R_4 = 2\ \Omega \checkmark$$

(4)

b)

$\varepsilon = I(R+r)$✓

$12 = I(2,2222+1)$✓

$I_T = 3,724$ A

OPTION/*OPSIE* 1

Calculate /*Bereken* $V_{ext/ekt}$

$R = \frac{V}{I}$

$2,2222 = \frac{V}{3,724}$✓

$V = 8,275$ V

Current through R_1/R_2

Stroom deur R_1/R_2

$R = \frac{V}{I}$

$10 = \frac{8,275}{I}$ ✓

$I = 0,8275$ A

Calculate A_1 reading

Bereken A_1 lesing

$A_1 = 0,8275A \times 2$✓

= 1,66 A✓

Range/*Reeks* (1,64A - 1,67A)

OPTION/*OPSIE* 2

Calculate /*Bereken* $V_{ext/ekt}$

$R = \frac{V}{I}$

$2,2222 = \frac{V}{3,724}$✓

$V = 8,275$ V

Current through 2X

(Positive marking from 8.3.2a)

Stroom deur 2X

(Positiewe merk van 8.3.2a)

$R = \frac{V}{I}$

$4 = \frac{8,275}{I}$ ✓

$I_{2X} = 2,07$ A

Calculate A_1 reading

Bereken A_1 lesing

$A_1 = 3,724 - 2,07$✓

= 1,66 A✓

Range/*Reeks* (1,64A - 1,67A)

(6)

8.4 Cost = kWh × tariff
Cost = 2×(3×30)✓ × R4,45✓
Cost = R801✓ (3)

[18]

GRAND TOTAL/*GROOTTOTAAL*: 150

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