education

MPUMALANGA PROVINCE

REPUBLIC OF SOUTH AFRICA

FURTHER EDUCATION AND TRAINING

VERDERE ONDERWYS EN OPLEIDING

Stanmorephysics.com

GRADE/GRAAD 11

PHYSICAL SCIENCES/FISIESE WETENSKAPPE

JUNE/JUNIE 2025

MARKING GUIDELINES/NASIENRIGLYNE

Stanmorephysics.com

MARKS / PUNTE 100

This marking guideline consists of 11 pages.

Hierdie nasienriglyn bestaan uit 11 bladsye.

Copyright reserved /Kopiereg voorbehou

QUESTION / VRAAG 1

1.1 B ✓✓ (2)

1.2 C ✓✓ (2)

1.3 B ✓✓ (2)

1.4 D ✓✓ (2)

1.5 A ✓✓ (2)

1.6 B ✓✓ (2)

1.7 D ✓✓ (2)



[14]

Copyright reserved /Kopiereg voorbehou

QUESTION / VRAAG 2

2.1

Take North as positive. / Neem Noord as positief.	**Take South as positive. / Neem Suid as positief.**
$F_{net} = F_{Peter} + F_{Richard}$	$F_{net} = F_{Peter} + F_{Richard}$
$= 20 + (-30)$ ✓	$= -20 + 30$ ✓
$= -10$	$= 10$ N ✓ South / Suid. ✓
$= 10$ N ✓South / Suid. ✓	

(3)

2.2.1 The vector sum of two or more vectors
Die vektorsom van twee of meer vektore. ✓✓
OR/ OF
The single vector having the same effect as two or more vectors together / Die enkele vektor wat dieselfde effek het as twee of meer vektore tesame. ✓✓ (2)

2.2.2 **Take right as positive/ Neem regs as positief**

$F_{x\ net} = F \cos\theta$

$= -8 \cos 48° + 2 \cos 10° - 5$ ✓

$= -8{,}38$ N

$= 8{,}38$ N Left / Links ✓

$F_{y\ net} = F \sin\theta$

$= 8 \sin 48° - 2 \sin 10°$ ✓

$= 5{,}60$ N Up / Op ✓

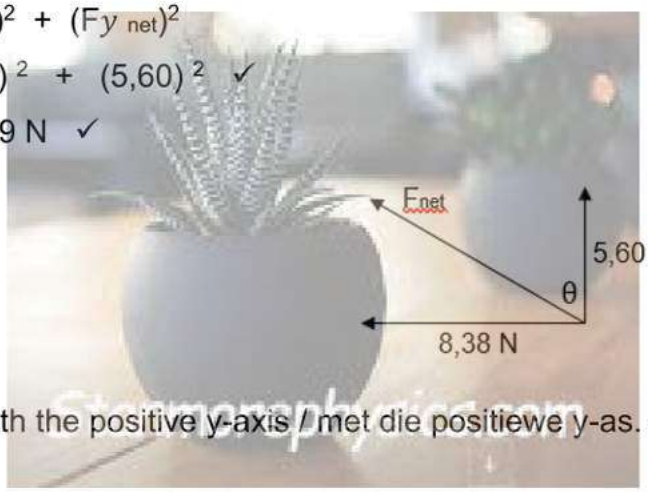
$(F_{net})^2 = (F_{x\ net})^2 + (F_{y\ net})^2$

$= (-8{,}38)^2 + (5{,}60)^2$ ✓

$\therefore F_{net} = 10{,}079$ N ✓

$\text{Tan}\ \theta = \frac{F_{x\ net}}{F_{y\ net}}$

$= \frac{8{,}38}{5{,}60}$

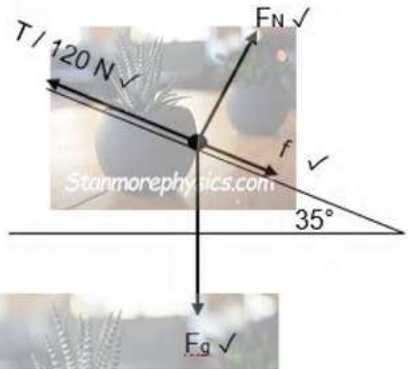


$\therefore \theta = 56{,}25°$ with the positive y-axis / met die positiewe y-as. ✓

(7)
[12]

QUESTION / VRAAG 3

3.1



Acceptable labels / Aanvaarbare benoemings	
F_N	N / Normal / F_{normal} / $F_{normaal}$ / Normaal
f	(kinetic) friction / F_f / f_k / (kinetiese) wrywing / F_w
F_g	w / F_w / weight / gewig / mg / 39,2 N / gravitational force / krag
T	F_T / F_{string} / tension / spanning / F_{tou} / 120 N

Notes

- Mark is awarded for label and arrow. / Punt word toegeken vir byskrif en pyltjie.
- Do not penalise for length of arrows. /Moonie vir die lengte van die pyltjies penaliseer nie.
- If arrows do not touch the dot / Indien pyle nie die kolletjie raak nie: Max/Maks $\frac{3}{4}$
- Any other additional force(s) / Enige ander addisionele krag(te): Max/Maks $\frac{3}{4}$
- If everything is correct, but no arrows. / Indien alles korrek, maar geen pyltjies word getoon: Max/Maks $\frac{3}{4}$

(4)

Copyright reserved /Kopiereg voorbehou

3.2 $F_{g\parallel} = F \sin \theta$

$= 4\ (9,8) \sin 35°$ ✓

$= 22,48$ N parallel down the incline ✓ / langs die skuinsvlak af. (2)

3.3 A body will remain in its state of rest or motion at constant velocity unless a resultant / net force acts on it. ✓✓

'n Liggaam sal in rus bly of teen 'n konstante snelheid bly voortbeweeg, tensy 'n resultante / netto krag daarop inwerk. (2)

3.4 $F_{net} = ma$ } Any one ✓

$T + F_{g\parallel} + f = ma$

$120 - 22,48 - f = 4\ (0)$ ✓

$\therefore f = 97,52$ N ✓ (3)

Stanmorephysics.com

3.5 $f_k = \mu_k F_N$ ✓

$97,52 = \mu_k F_{g\perp}$ ✓

$97,52 = \mu_k\ 4(9,8) \cos 35°$ ✓

$\mu_k = 3,037$ ✓ (4)

[15]

QUESTION / VRAAG 4

4.1 The force that opposes the motion of a moving object relative to a surface. ✓✓

'n Krag wat die beweging van 'n voorwerp teenwerk, relatief tot die oppervlak.

(2)

4.2

Horizontally / Horisontaal		Vertically / Vertikaal
$F_{net} = ma$	✓	$F_{net} = ma$
$T - f = 2a$		$F_g - T = 6a$
$\underline{T - 3 = 2a}$	✓	$6(9{,}8) - T = 6a$
		$\underline{58{,}8 - T = 6a}$ ✓

$\therefore 55{,}8 = 8a$

$a = 6{,}975\ m.s^{-2}$ ✓

$\therefore T - 3 = 2(6{,}975)$ ✓

$\therefore T = 16{,}95\ N$ ✓

(6)

4.3 No. ✓ According to Newton's 3rd Law - the force that M exerts on the string must be equal to the force that the string exerts on M. ✓

Nee. Volgens Newton se 3de Wet – die krag wat M op die tou uitoefen moet gelyk wees aan die krag wat die tou op M uitoefen.

OR String on N, and N on string. OF Tou op N, en N op die tou.

OR Involves 2 objects. OF 2 Voorwerpe betrokke.

OR/OF The force that N exerts on the string is not in the same plane as the force that M exerts on the string. OF Die krag wat N op die tou uitoefen is nie in dieselfde vlak as die krag wat M op die tou uitoefen nie.

(2)

4.4 EQUAL TO. ✓ Both (blocks) experience gravitational acceleration. ✓

GELYK AAN. Beide (blokke) ervaar gravitasie versnelling.

(2)

[12]

Stanmorephysics.com

QUESTION / VRAAG 5

5.1 Each particle in the universe attracts every other particle with a gravitational force ✓ that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres. ✓

Elke deeltjie in die heelal trek 'n ander deeltjie aan met 'n gravitasiekrag wat direk eweredig is aan die produk van hul massas en omgekeerd eweredig aan die kwadraat van die afstand tussen hul middelpunte. (2)

Stanmorephysics.com

5.2 $F_g = \frac{G m_1 m_2}{r^2}$ ✓

$= \frac{6{,}67 \times 10^{-11}\left(9{,}11 \times 10^{-31}\right)\left(9{,}11 \times 10^{-31}\right)}{\left(0{,}3 \times 10^{-6}\right)^2}$ ✓ ✓

$= 6 \times 10^{-58}$ N ✓ (4)

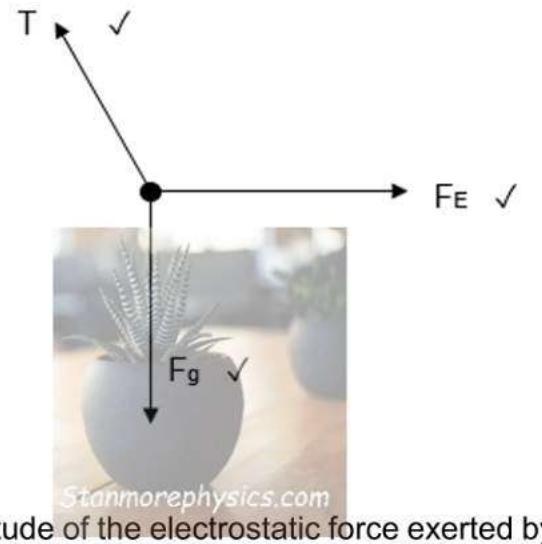
5.3 4 times more / $2{,}4 \times 10^{-57}$ N ✓

4 keer meer / $2{,}4 \times 10^{-57}$ N (1)

[7]

QUESTION / VRAAG 6

6.1



(3)

6.2 The magnitude of the electrostatic force exerted by two point charges on each other ✓ is directly proportional to the product of the magnitudes of the charges and inversely proportional to the square of the distance between them. ✓

Die grootte van die elektrostatiese krag wat twee puntladings op mekaar uitoefen is direk eweredig aan die produk van die grootte van die ladings en omgekeerd eweredig aan die kwadraat van die afstand tussen hulle.

(2)

6.3 $$F_E = \frac{kQ_1Q_2}{r^2} \quad \checkmark$$

$$62{,}208 \ \checkmark = \frac{9 \times 10^9 \ (4{,}8 \times 10^{-6})(3{,}6 \times 10^{-6})}{(r)^2} \ \checkmark$$

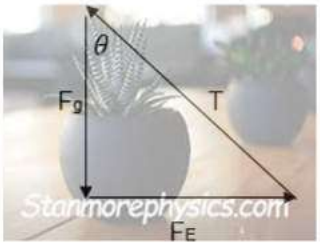
$$\therefore r = 0{,}05 \text{ m} \quad \checkmark$$

(4)

6.4 $$\text{Tan } \theta = \frac{F_E}{F_g}$$

$$= \frac{62{,}208}{(2)(9{,}8)} \quad \checkmark$$

$$\therefore \theta = 72{,}51° \quad \checkmark$$



sketch indicating θ

skets moet θ insluit

(2)

[11]

QUESTION / VRAAG 7

7.1 The electrostatic force experienced per unit positive charge placed at that point. ✓✓

Die elektrostatiese krag ondervind per eenheids positiewe lading wat by daardie punt geplaas word. (2)

7.2 Take right as positive / Neem regs as positief

$E_{net} = EQ_1 + EQ_2$

$E_{net} = \frac{k\,Q}{r^2} + \frac{k\,Q}{r^2}$ ✓

8500 ✓ $= \frac{9 \times 10^{9}\ (25 \times 10^{-9})}{(6 \times 10^{-2})^2}$ ✓ $- \frac{9 \times 10^{9}\ Q}{(8 \times 10^{-2})^2}$ ✓

$\therefore Q =$ + ✓ $3{,}84 \times 10^{-8}$ C ✓ (6)

[8]

QUESTION / VRAAG 8

8.1 The magnitude of the induced emf across the ends of a conductor is directly proportional to the rate of change in the magnetic flux linkage with the conductor. ✓✓

Die grootte van die geïnduseerde emk oor die ente van 'n geleier is direk eweredig aan die tempo van verandering in magnetiese vloed met die geleier. (2)

8.2 The right-hand solenoid rule. ✓ / Die regterhand solenoïde reël. (1)

Stanmorephysics.com

8.3 Move the magnet faster. ✓ / Beweeg die magnet vinniger.
Use a stronger magnet. ✓ / Gebruik 'n sterker magneet.
Increase the number of windings on the solenoid.
Vermeerder die aantal windings op die solenoïde (any two/enige twee) (2)

8.4 $\varepsilon = \frac{-N\,\Delta\emptyset}{\Delta t}$ ✓

$= \frac{-200(1 \times 10^{-4} - 5 \times 10^{-4})}{0,2}$ ✓

$= 0,4$ V ✓ (3)

[8]

QUESTION / VRAAG 9

9.1 EMF is the maximum amount of energy that a battery can supply to move 1 coulomb of charge. ✓✓

EMK is die maksimum hoeveelheid energie wat 'n battery kan verskaf om 1 coulomb lading te beweeg. (2)

9.2 $R_p = \frac{R_1 \times R_2}{R_1 + R_2}$

$= \frac{12 \times 6}{12+6}$ ✓

$= 4\ \Omega$ ✓ (2)

Stanmorephysics.com

9.3

9.3.1 $R_{total} = \frac{V}{I}$ ✓

$R_{total} = \frac{12}{2,57}$ ✓

$= 4,67\ \Omega$ ✓

$R = 4,67 - 4 = 0,67\ \Omega$ ✓ (4)

9.3.2 Use ratio of resistors 1 : 2 (6 Ω :12 Ω)

$I_{\text{bottom branch}} = \frac{2}{3}\ x\ 2,57$ ✓

$\therefore I = 1,71$ A ✓ (2)

9.4 INCREASE. ✓ / TOENEEM

If R_{total} decrease, I_{total} will increase. ✓

As R_{totaal} afneem, sal I_{totaal} toeneem.

According to $P = I^2 R$ ✓ Power will increase, when R remains constant.

Volgens $P = I^2 R$ Drywing sal toeneem, mits R konstant bly. (3)

Stanmorephysics.com

[13]

GRAND TOTAL /GROOTTOTAAL 100

Copyright reserved /Kopiereg voorbehou