LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 11

PHYSICAL SCIENCES

CONTROL TEST 1

18 MARCH 2026

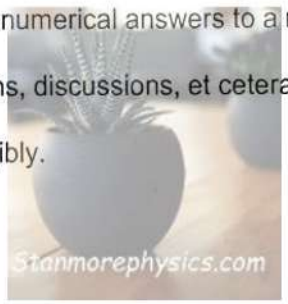
MARKS: 100

TIME: 2 hours

This question paper consists of 13 pages including 2 data sheets.

INSTRUCTIONS AND INFORMATION

1. Write your centre number and examination number in the appropriate spaces on the ANSWER BOOK.
2. This question paper consists of SEVEN questions. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page in the ANSWER BOOK.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Leave ONE line between two sub questions, for example between QUESTION 2.1 and QUESTION 2.2.
6. You may use a non-programmable calculator.
7. You may use appropriate mathematical instruments.
8. You are advised to use the attached DATA SHEETS.
9. Show ALL formulae and substitutions in ALL calculations.
10. Round off your final numerical answers to a minimum of TWO decimal places.
11. Give brief motivations, discussions, et cetera where required.
12. Write neatly and legibly.



QUESTION 1: MULTIPLE-CHOICE QUESTIONS

Four options are provided as possible answers to the following questions. Each question has only ONE correct answer. Write only the letter (A – D) next to the question number (1.1–1.10) in the ANSWER BOOK, for example 1.11 D.

1.1 The statement below refers to the vector and scalar quantities.

(i) A vector has magnitude and direction, while a scalar has magnitude only.
(ii) A scalar quantity can always be added to a vector quantity.
(iii) Force is an example of a vector quantity, while distance is an example of a scalar quantity.

Which of the above statements is /are TRUE?

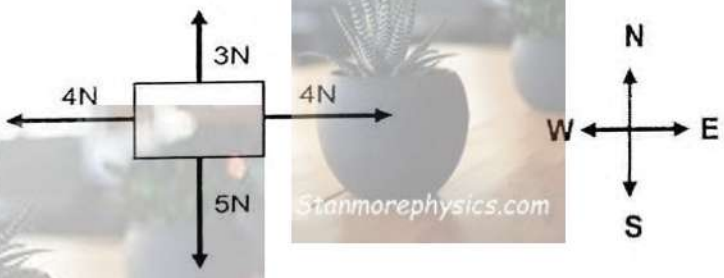
A (i) and (ii) only

B (i) and (iii) only

C (ii) and (iii) only

D (i) only (2)

1.2 Four forces act on a body in the diagram



What is the magnitude and direction of the resultant force?

A 16N south

B 2N south

C 8N east

D 8N south (2)

1.3 A net force **F** is applied on an object of mass **m** kg and causes an acceleration of ***a*** $m \cdot s^{-2}$. When the net force **F** on the same object is doubled, the resulting acceleration, in $m \cdot s^{-2}$, will be ...

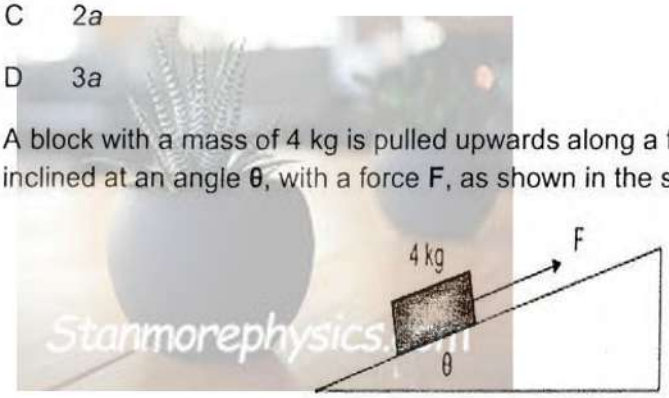
A a

B $\frac{3}{2}a$

C $2a$

D $3a$ (2)

1.4 A block with a mass of 4 kg is pulled upwards along a frictionless slope, inclined at an angle **θ**, with a force **F**, as shown in the sketch below.



Which ONE of the following equations can be used to calculate the magnitude of the normal force (N)?

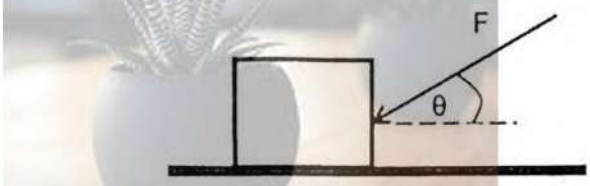
A $N = (4)(9,8)\sin\theta$

B $N = F - (4)(9,8)\cos\theta$

C $N = F + (4)(9,8)\cos\theta$

D $N = (4)(9,8)\cos\theta$ (2)

1.5 A force of magnitude **F** acts on a block at an angle θ to the horizontal, as shown in the diagram below. The block, initially at rest on a flat, frictionless surface, accelerates uniformly.

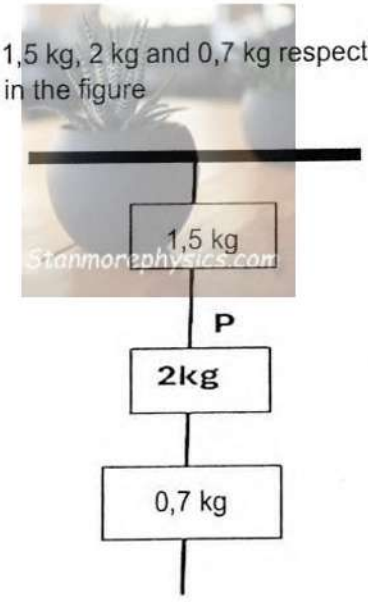


Angle θ is now halved. How will the NORMAL FORCE and the NET HORIZONTAL FORCE acting on the block change?

	NORMAL	NET HORIZONTAL FORCE
A	Increases	Increases
B	Decreases	Increases
C	Increases	Decreases
D	Decreases	Decreases

(2)

1.6 Three objects of mass 1,5 kg, 2 kg and 0,7 kg respectively, are suspended by a light string as shown in the figure



A 15 N

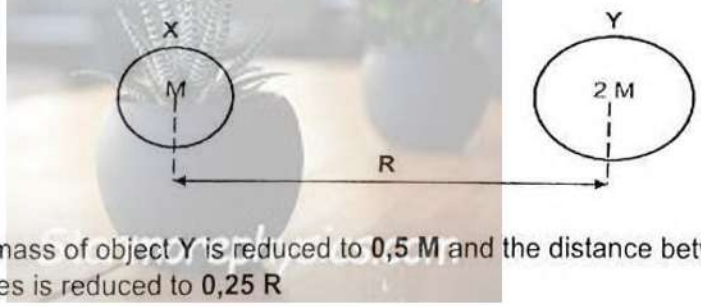
B 42 N

C 27 N

D 35 N

(2)

1.7 Two bodies, **X** and **Y**, of mass **M** and **2M** respectively exert a force **F** on each other when their centres are **R** metres apart.



The mass of object **Y** is reduced to **0,5 M** and the distance between their centres is reduced to **0,25 R**

What is the new force that the bodies exert on each other, in terms of F?

A 8 F

B 16 F

C 4 F

D 2 F (2)

1.8 The distance between two charges, Q_1 and Q_2 is **r**. The force exerted by the spheres on each other is **F**. Both charges are now doubled without changing the distance between them. The magnitude of the electrostatic force on **Q1** will be:

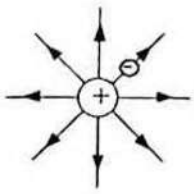
A 4F

B ¼ F

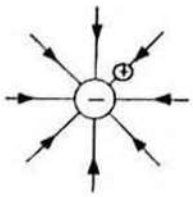
C 2F

D ½ F (2)

1.9 Which one of the following diagrams indicates the direction of magnetic fields and how it is determined with a test charge around charged spheres correctly?

A 

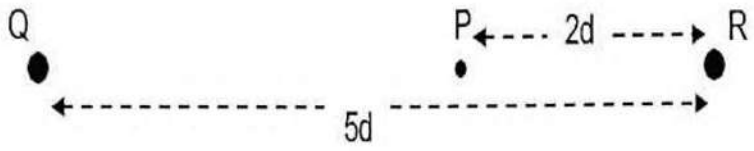
B 

C 

D 

(2)

1.10 A negative charge **Q** is placed at a distance of **5d** from another charge **R.**



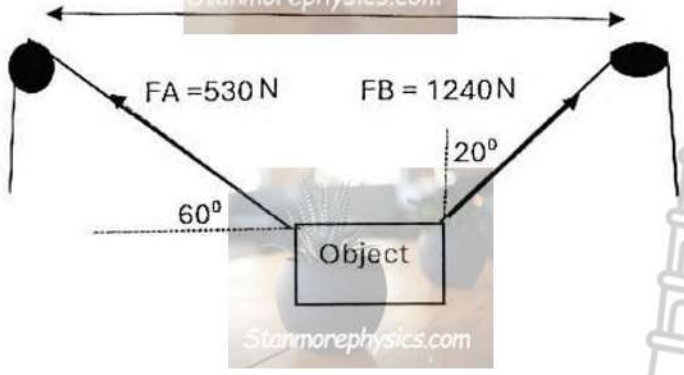
	RATIO OF THE CHARGES Q:R	CHARGE ON R
A	4:9	Positive
B	3:2	Negative
C	5: 2	Positive
D	9: 4	Negative

(2)

[20]

QUESTION 2 (Start on a new page)

A heavy object is lifted using two ropes and two pulleys, as shown in the diagram below. The two pulleys are a distance **x** apart. The force F_A, in rope **A**, is 530 N and the force F_B, in rope **B**, is 1 240 N. Rope **A** makes an angle of 60° with the horizontal and rope **B** makes an angle of 20° with the vertical.



2.1 Define the term *resultant vector.* (2)

2.2 Explain why the vector diagram of force F_A, force F_B and the weight will NOT be a closed vector diagram. (2)

2.3 Calculate the:

2.3.1 Vertical component of F_A (2)

2.3.2 Horizontal component of F_A (2)

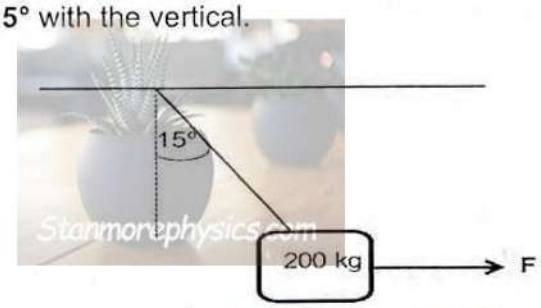
2.4 Calculate the maximum weight that force F_A and force F_B will be able to lift from the ground. Show ALL calculations. (4)

2.5 Explain why the rope and pulley system will be less effective if the distance **x** between the pulleys is increased (2)

[14]

QUESTION 3 (Start on a new page)

A horizontal force, **F**, is applied to a **200 kg** block by means of a massless, inextensible rope, as shown in the sketch below. The block remains stationary when the rope makes an angle of **15°** with the vertical.



3.1 Explain why the block is stationary. (2)

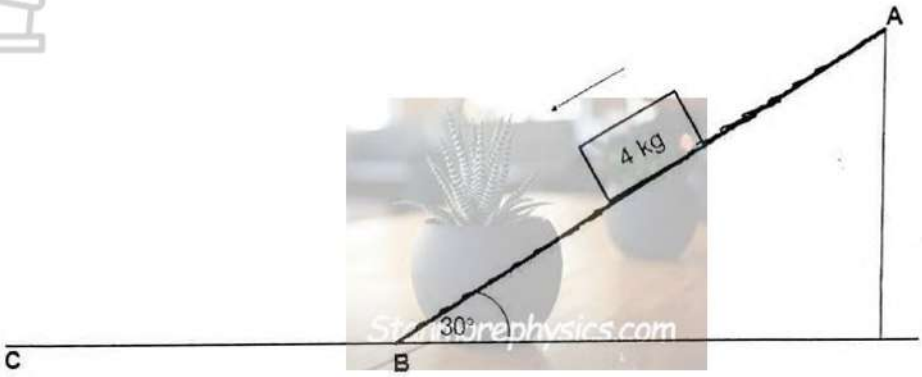
3.2 Determine the magnitude of tension in the rope. (4)

3.3 Determine the magnitude of the applied force, **F**. (3)

[09]

QUESTION 4 (Start on a new page.)

A block of mass **4 kg** is sliding down a rough plane (**AB**) inclined at **30°** to the horizontal, as shown in the diagram below. The coefficient of kinetic friction between the surface and the block is **0.2**.



4.1 Define the term *frictional force.* (2)

4.2 Calculate the magnitude of the:

4.2.1 Kinetic frictional force between the 4 kg block and the surface (3)

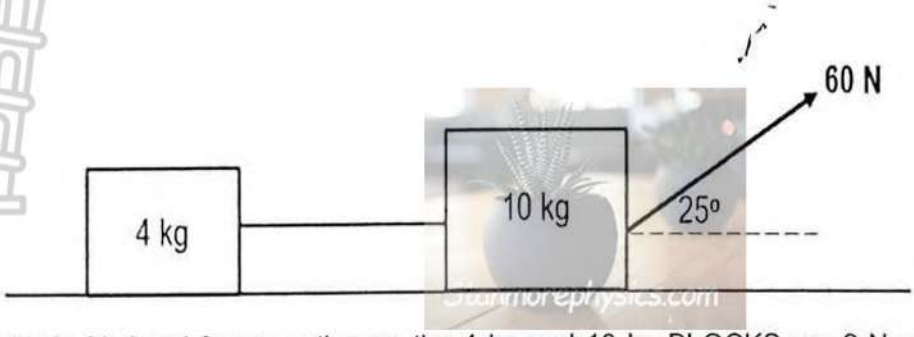
4.2.2 Acceleration of block while is moving on section AB (5)

The block is NOW moving on section **BC** which is frictionless.

4.3 Will the block in section **BC** move at at a LOWER, a HIGHER or a ZERO ACCELERATION? Give the reason for the answer (2)

[14]

QUESTION 5 (Start on a new page.)



The kinetic frictional forces acting on the 4 kg and 10 kg BLOCKS are 2 N and 3,5 N respectively.

5.1 State *Newton's second law of motion* in words. (2)

5.2 Draw a labeled free-body diagram showing all the forces acting on the 4 kg block (4)

5.3 Calculate the magnitude of the:

5.3.1 Acceleration of the system. (4)

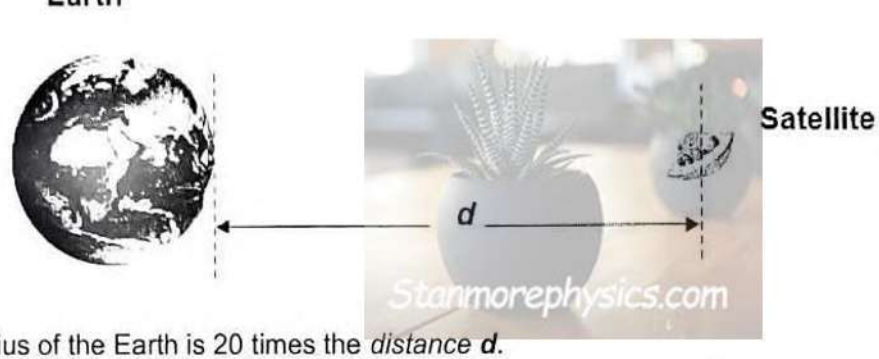
5.3.2 Tension in the string connecting the two blocks. (2)

5.4 The angle at which the force is applied is decreased to 20°. How will the frictional force experienced by 10 kg block change? Write down only INCREASES, DECREASES or REMAINS THE SAME. (1)

[13]

QUESTION 6 (Start on a new page.)

A satellite of mass 1 200 kg is orbiting the Earth at a distance ***d*** from the surface of the Earth as shown on the diagram below.



The radius of the Earth is 20 times the *distance* ***d***.

6.1 State *Newton's Law of Universal Gravitation* in words (2)

6.2 Calculate the:

6.2.1 Distance between the surface of the Earth and the centre of satellite (*Distance* ***d***). (2)

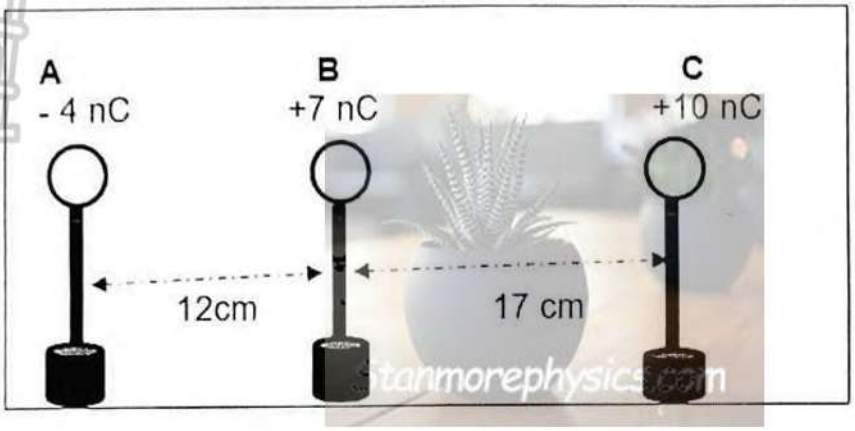
6.2.2 Magnitude of the force that the Earth exerts on the satellite to keep it in orbit (4)

6.3 Calculate the weight of the satellite on the earth surface. (2)

[10]

QUESTION 7 (Start on a new page.)

Three charged spheres, **A**, **B** and **C**, with charges of -4 nC, +7 nC and +10 nC respectively, are placed on rubber stands as shown below



7.1 Can metal stands be used instead of rubber stands? Write down only YES or NO. Give a reason for the answer. (2)

7.2 State *Coulomb's law* in words. (2)

7.3 Calculate the net force acting on charge **C**. (4)

7.4 **A** and **B** are brought into contact and then separated.

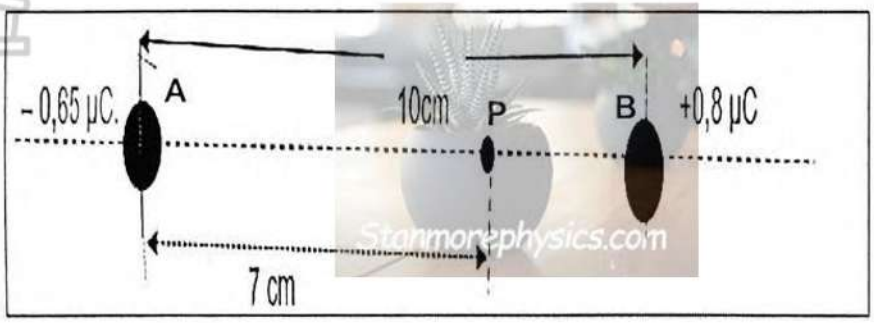
Charge **A** is returned to its original position, while charge **B** is removed.

7.4.1 In which direction did electrons flow?

Choose from **A** to **B** or **B** to **A**. (1)

7.4.2 Calculate the number of electrons transferred to or from charge **A to B**. (5)

7.5 A charged sphere **A** carries a charge of –0.65 µC. It is placed 10 cm away from another charged sphere **B**, which carries a charge of +0.8 µC, along a straight line in a vacuum. Point **P** is located 7 cm to the right of sphere **A.**



7.5.1 Define *electric field at a point.* (2)

7.5.2 Draw electric field lines on sphere A. (2)

7.5.3 Calculate the magnitude of the net electric field at point **P**. (5)

[23]

TOTAL: [100]

DATA FOR PHYSICAL SCIENCES GRADE 12
PAPER 1 (PHYSICS)

GEGEWENS VIR FISIESE WETENSKAPPE GRAAD 12
VRAESTEL 1 (FISIKA)

TABLE 1: PHYSICAL CONSTANTS/*TABEL 1: FISIESE KONSTANTES*

NAME/*NAAM*	SYMBOL/*SIMBOOL*	VALUE/*WAARDE*
Acceleration due to gravity *Swaartekragversnelling*	g	$9,8\ m{\cdot}s^{-2}$
Universal gravitational constant *Universele gravitasiekonstant*	G	$6,67 \times 10^{-11}\ N{\cdot}m^2{\cdot}kg^{-2}$
Speed of light in a vacuum *Spoed van lig in 'n vakuum*	c	$3,0 \times 10^{8}\ m{\cdot}s^{-1}$
Planck's constant *Planck se konstante*	h	$6,63 \times 10^{-34}\ J{\cdot}s$
Coulomb's constant *Coulomb se konstante*	k	$9,0 \times 10^{9}\ N{\cdot}m^2{\cdot}C^{-2}$
Charge on electron *Lading op elektron*	e^-	$-1,6 \times 10^{-19}\ C$
Electron mass *Elektronmassa*	m_e	$9,11 \times 10^{-31}\ kg$
Mass of Earth *Massa van Aarde*	M	$5,98 \times 10^{24}\ kg$
Radius of Earth *Straal van Aarde*	R_E	$6,38 \times 10^{3}\ km$

TABLE 2: FORMULAE/*TABEL 2: FORMULES*

MOTION/*BEWEGING*

$v_f = v_i + a\,\Delta t$	$\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2$ or/*of* $\Delta y = v_i\Delta t + \frac{1}{2}a\Delta t^2$
$v_f^{\,2} = v_i^{\,2} + 2a\Delta x$ or/*of* $v_f^{\,2} = v_i^{\,2} + 2a\Delta y$	$\Delta x = \left(\frac{v_i + v_f}{2}\right)\Delta t$ or/*of* $\Delta y = \left(\frac{v_i + v_f}{2}\right)\Delta t$

FORCE/*KRAG*

$F_{net} = ma$	$p = mv$
$f_s^{max} = \mu_s N$	$f_k = \mu_k N$
$F_{net}\Delta t = \Delta p$ $\Delta p = mv_f - mv_i$	$w = mg$
$F = G\frac{m_1 m_2}{d^2}$ or/*of* $F = G\frac{m_1 m_2}{r^2}$	$g = G\frac{M}{d^2}$ or/*of* $g = G\frac{M}{r^2}$

ELECTROSTATICS/*ELEKTROSTATIKA*

$F = \frac{kQ_1Q_2}{r^2}$	$E = \frac{kQ}{r^2}$
$V = \frac{W}{q}$	$E = \frac{F}{q}$
$n = \frac{Q}{e}$ or / *of* $n = \frac{Q}{q_e}$	

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GRADE/*GRAAD* 11

PHYSICAL SCIENCES/*FISIESE WETENSKAPPE*

CONTROLLED TEST 1/*KONTROLE TOETS 1*

MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/PUNTE: 100

This marking guideline consists of 11 pages/ Hierdie nasienriglyn bestaan uit 11 bladsye

QUESTION 1/*VRAAG 1*

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

[20]

QUESTION 2/*VRAAG 2*

2.1 The sum of two or more vectors acting together on the object. ✓✓/
Die som van twee of meer vektore wat saam op die voorwerp inwerk

OR/*OF*

A single vector having the same effect as two or more vectors together.✓✓/
'n Enkele vektor met dieselfde effek as twee of meer vektore saam (2)

2.2. The object is lifted/moved upwards. ✓ There will be a resultant/net force not equal to zero. ✓/ *Die voorwerp word opwaarts gelig/beweeg.*
Daar sal 'n resulterende/netto krag wees wat nie gelyk is aan nul nie. (2)

2.3.1

$F_y = F_A \sin 60^0$

$= 530(\sin 60^o)$ ✓

$= 458,99$ N✓

(2)

2.3.2 **POSITIVE MARKING FROM 2.2/POSITIEWE NASIEN VANAF 2.2**

$F_x = F_A (\cos 60^o)$

$= 530(\cos 60^o)$ ✓

$= 265$N✓

(2)

2.4

$F_y = F_B \cos 20^\circ$

$= (1\,240)\cos 20^\circ$ ✓

$= 1165{,}21\text{N}$ ✓

OR/*OF*

$F_y = F_B \sin 70^\circ$

$= (1\,240)\sin 70^\circ$

$= 1165{,}21\text{N}$

Maximum $w = F_{YA} + F_{YB}$

$= 265 + 1165{,}21$ ✓

$= 1430{,}21\text{N}$ ✓

(4)

2.5 If the distance *x* increases, the vertical components of the applied forces will decrease ✓ and then the system will possibly not be able to pick up the weight. ✓/*As die afstand x toeneem, sal die vertikale komponente van die toegepaste kragte afneem en dan sal die stelsel moontlik nie die gewig kan optel nie.* **(2)**

[14]

QUESTION 3/*VRAAG 3*

3.1 The forces acting on the block are balanced/in equilibrium. ✓/
Die kragte wat op die blok inwerk, is gebalanseerd/in ewewig

OR/OF

The resultant/net force is equal to zero. /*Die resulterende/netto krag is gelyk aan nul.*

OR/*OF*

There is no resultant force acting on the box ✓ / *Daar is geen resulterende krag wat op die boks inwerk nie* (2)

3.2

$F_{net(y)} = 0$ ✓
$T_y = w = mg$
$= (200)(9.8)$ ✓
$= 1960$ N

OPTION 1/*OPSIE 1*	**OPTION 2/*OPSIE 2***
$T_y = T \sin\theta$ $1960 = T\sin 75^\circ$ ✓ $\therefore T = 2029{,}14$ N ✓	$T_y = T \cos\theta$ $1960 = T\cos 15^\circ$ ✓ $\therefore T = 2029{,}14$ N ✓

(4)

3.3 **POSITIVE MARKING FROM 3.2/POSTIEWE NASIEN VANAF 3.2**

Fnet(y) = 0 ✓
$T_x = F$
$2029{,}14\sin 15^\circ$ ✓ = F **OR/*OF*** $2029{,}14\cos 75^\circ = F$
$\therefore F = 525{,}18$ N✓ $\therefore F = 525{,}18$ N

OR/*OF*

$Tan\ 15° = \frac{F}{F_g}$
$F = 1960 Tan 15°$
$= 528{,}18\ N$

OR/*OF*

$T^2 = F^2 + F_g^2$ (Pythagoras)

$F = \sqrt{T^2 - F_g^{\ 2}}$

$F^2 = \sqrt{2029,14^2 - 1960^2}$

$F^2 = 257728.18$

$F = 525,18\ N$

(3)

[09]

QUESTION 4/*VRAAG 4*

4.1 Frictional force: the force that opposes the motion of an object and acts parallel to the surface the object is in contact with✓✓*I*

Wrywingskrag: die krag wat die beweging van 'n voorwerp teenwerk en parallel met die oppervlak waarmee die voorwerp in kontak is, werk. **(2)**

Marking criteria/*Nasien kriteria*
If any of the underlined key words/phrases in the **correct context** is omitted deduct/ *Indien enige van die onderstreepte sleutelwoorde/frases in die **korrekte konteks** weggelaat word, trek af*
(2 or/of 0)

4.2

4.2.1

$F_{net(y)} = 0$ ✓
$f = \mu_k N$
$= \mu_k mg \cos \theta$ } Any one/*enige een*
$f = 0,2(4)(9,8)\cos 30$ ✓
$= 6,79$ N ✓

(3)

4.2.2

$F_{net} = ma$
$F_{g//} - f_k = ma$ } ✓ Any one/ *enige een*
$mg \sin \theta - \mu_k mg \sin \theta = ma$

$(4)(9,8)\sin 30°$ ✓ $- (4)(9,8)\sin 30°$ ✓ $= (4)a$ ✓

$a = 3,20$ m·s^{-2} ✓

(5)

4.3 ZERO ACCELERATION✓/ *NUL VERSNELLING*

The block continues at constant velocity/no frictional force/ the net force is equals to zero. ✓/*Die blok beweeg voort teen konstante snelheid/geen wrywingskrag nie/die netto krag is gelyk aan nul.* (2)

[14]

QUESTION 5/*VRAAG 5*:

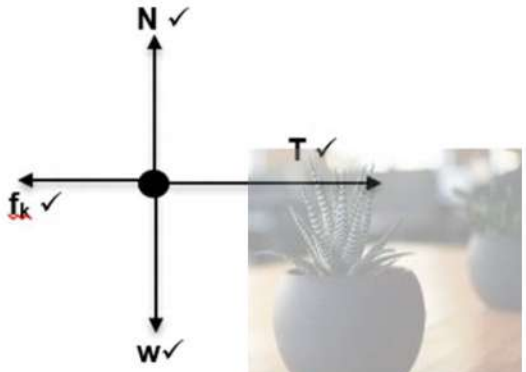
5.1 **Marking criteria/*Nasien kriteria***

If any of the underlined key words/phrases in the **correct context** is omitted deduct/ *Indien enige van die onderstreepte sleutelwoorde/frases in die korrekte konteks weggelaat word, trek af*

When a resultant/net force acts on an object, the object will accelerate in the direction of the force at an acceleration is directly proportional to the resultant/net force and inversely proportional to the mass of the object. ✓✓/ *Wanneer 'n resulterende/netto krag op 'n voorwerp inwerk, sal die voorwerp in die rigting van die krag versnel teen 'n versnelling wat direk eweredig is aan die resulterende/netto krag en omgekeerd eweredig aan die massa van die voorwerp.*

(2 or 0) (2)

5.2



	Accepted labels/*Aanvaarde byskrifte*	
N	F_N / Normal force / *Normaal krag* / Fnormal / $F_{normaal}$ / 212,18 N	✓
fk	(kinetic) friction / *(kinetiese) wrywing* / F_f/ f / 40 N	✓
F	Applied force / *Toegepaste krag* / $F_{applied}$ / $F_{toegepas}$ / F_a	✓
w	F_g / F_w / mg / 245 N / weight / *gewig* / gravitational force / *gravitasie krag*	✓

Notes/*Notas*: Mark is awarded for label and arrow./ *Punte word toegeken vir byskrif en pyl*

- Do not penalize for length of arrows/ *Moenie penaliseer vir die lengte van pyle nie*
- If arrows do not touch the dot: Max 3/4/ *Indien pyle nie die punt raak nie: Maks 3/4/*
- Any other additional force(s): *Max/ ¾ / Enige ander bykomende krag(e): Maks/ 3/4*

- If everything is correct, but no arrows: Max ¾ / *Indien alles korrek is, maar geen pyle nie: Maks. 3/4*
- If components are drawn: Max ¾ / *Indien komponente geteken word: Maks 3/4*

(4)

5.3.1

For the 4 kg block/ *Vir die 4 kg-blok*

$F_{net} = ma$
$T + (-f_k) = ma$ ✓
$T - 2 = 4a$ ✓
$T = 4a + 2$……(1)

For the 10 kg block/ *Vir die 10 kg-blok*

$F_{net} = ma$
$F_x - T - f_k = ma$
$60\cos 25^o$ ✓ $- T - 3,5 = 10a$
$54,378 - T - 3,5 = 10a$ ……✓……(2)
$a = 3,49\ m{\cdot}s^{-2}$ ✓

Any one/*enige een*

(4)

5.3.2 POSITIVE MARKING FROM 5.3.1/*POSITIEWE NASIEN VANAF 5.3.1*

$T = 4(3,491) + 2$✓

$T = 15,97$ N ✓ (2)

5.4 Increases. ✓ /*Neem toe* (1)

[13]

QUESTION 6/*VRAAG 6:*

6.1 Any two objects attract each other with a force that is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centres✓✓/ *Enige twee voorwerpe trek mekaar aan met 'n krag wat direk eweredig is aan die produk van hul massas en omgekeerd eweredig aan die kwadraat van die afstand tussen hul middelpunte.* (2)

6.2.1 R = 20d

6,38 x 106 = 20d✓

d = 3,19 x 105 m✓ (2)

6.2.2 r = R + d

r = 6,38 x 106 + 3,19 x 105 m✓

F = $\frac{GMm}{r^2}$✓

F = $\frac{(6{,}67\ x\ 10^{-11})(5{,}98\ x\ 10^{24})(1200)}{(6{,}69\ x\ 10^{6})^2}$✓✓

F = 1,06×104 N✓ (4)

6.3 W = mg✓

= 1200 x 9,8✓

= 1,18 x 104 N✓ (2)

[10]

QUESTION 7/*VRAAG 7*:

7.1 NO ✓/*NEE*

The spheres will lose their charge✓/ *Die sfere sal hul lading verloor*

OR/*OF*

The metal stands are electrical conductors / *Die metaalstaanders is elektriese geleiers* (2)

7.2 The magnitude of 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. ✓ / *Die grootte van die elektrostatiese krag wat deur een puntlading op 'n ander puntlading uitgeoefen word, is direk eweredig aan die produk van die groottes van die ladings en omgekeerd eweredig aan die kwadraat van die afstand tussen hulle.*

(2)

7.3

OPTION 1/*OPSIE 1*

$F = \frac{kQ_1Q_2}{r^2}$ ✓

$F_{CA} = \frac{(9 \times 10^9)(4 \times 10^{-9})(10 \times 10^{-9})}{(0,29)^2}$ ✓

$= 4,28 \times 10^{-6}$N

$F_{CB} = \frac{(9 \times 10^9)(7 \times 10^{-9})(10 \times 10^{-9})}{(0,17)^2}$ ✓

$= 2.18 \times 10^{-5}$N

$F_{net} = F_{CB} - F_{CA}$

$= 2,18 \times 10^{-5} - ✓ (4,28 \times 10^{-6})$

= 1,75 x 10^{-5} N to the right✓/*na regs*

OPTION 2/*OPSIE 2*

$E = \frac{kQ}{r^2}$ ✓

$F_{CA} = \frac{(9 \times 10^9)(4 \times 10^{-9})}{(0,29)^2}$ ✓

$= 428,06\ N.C^{-1}$

$F_{CB} = \frac{(9 \times 10^9)(7 \times 10^{-9})}{(0,17)^2}$ ✓

$= 2179,93\ N.C^{-1}$

$F_{net} = F_{CB} - F_{CA}$

$= 2179,93 - 428,06$ ✓

$= 2\,736\ N.C^{-1}$ due East ✓/ *reg oos*

$F = EQ$

$= (2\,736 \times 12 \times 10^{-9})$

$= 3,28 \times 10^{-5}$ N due East ✓/ *reg oos*

(4)

7.4.1 A to/*na* B ✓ (1)

7.4.2 $Q = \frac{Q_1 + Q_2}{2}$

$= \frac{(-4 \times 10^{-9}) + (7 \times 10^{-9})}{2}$ ✓

$Q = 1,5 \times 10^{-9} C$

Charge transferred/*lading oorgedra* = $1,5 \times 10^{-9} -$ ✓ (-4×10^{-9})

$= 5,5 \times 10^{-9}$ C

OR/*OF*

$= 1,5 \times 10^{-9} - 7 \times 10^{-9})$

$= -5,5 \times 10^{-9} C$

$n = \frac{Q}{q_e}$ ✓

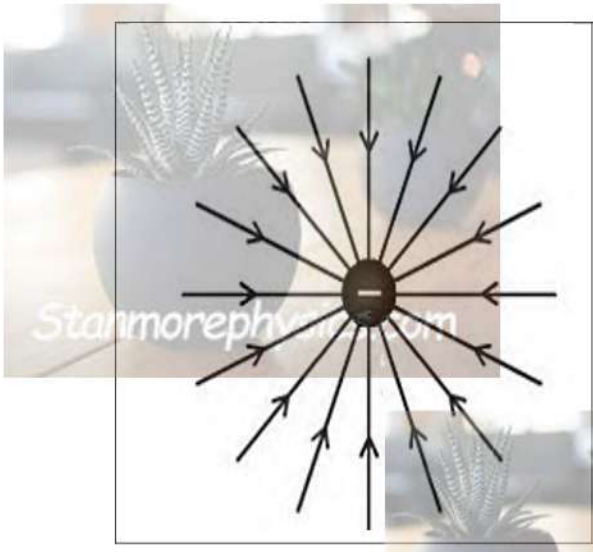
$n = \frac{5,5 \times 10^{-9}}{1,6 \times 10^{-19}}$ ✓

$n = 3,44 \times 10^{10}$ (electrons/*elektrone*) ✓ (5)

7.5.1 The electric field at a point is the electrostatic force experienced per unit positive charge placed at that point. ✓✓ */ Die elektriese veld by 'n punt is die elektrostatiese krag wat per eenheid positiewe lading wat by daardie punt geplaas word, ervaar word*

(2 or/*of* 0) (2)

7.5.2



Notes/*Notas*: more than one charge or combined field drawn 0/2 */ meer as een lading of gekombineerde veld geteken 0/2*

Criteria for sketch/*Kriteria vir skets:*
Correct shape✓ / *korrekte vorm*
Correct direction towards the charge✓ / *Korrekte rigting na die lading*

Note/*Nota*: If electric field lines cross or touch 1/2 / *As elektriese veldlyne kruis of raak 1/2*

(2)

7.5.3

$$E = \frac{kQ}{r^2} \checkmark$$

$$E_A = \frac{(9 \times 10^9)(0{,}65 \times 10^{-6})}{(0{,}07)^2} \checkmark$$

$= 1{,}19 \times 10^{6} N.C^{-1}$

$$E_B = \frac{(9 \times 10^9)(0{,}8 \times 10^{-6})}{(0{,}03)^2} \checkmark$$

$= 8{,}0 \times 10^{6} N.C^{-1}$

$E_{Net} = E_A + E_B$

$= (1{,}19 \times 10^{6}) + (8{,}0 \times 10^{6})$ ✓

$E_{Net} = 9{,}19 \times 10^{6} N.C^{-1}$ ✓ (5)

TOTAL/*TOTAAL*: [100]