basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE/ *NASIONALE SENIOR SERTIFIKAAT*

GRADE/*GRAAD* 11

PHYSICAL SCIENCES: PHYSICS (P1)
FISIESE WETENSKAPPE: FISIKA (V1)

NOVEMBER 2016

MEMORANDUM

MARKS/*PUNTE*: 150

This memorandum consists of 18 pages.
Hierdie memorandum bestaan uit 18 bladsye.

Approved
7/11

Please turn over/*Blaai om asseblief*

QUESTION 1/*VRAAG 1*

1.1 D ✓✓ (2)

1.2 B ✓✓ (2)

1.3 C ✓✓ (2)

1.4 A ✓✓ (2)

1.5 A ✓✓ (2)

1.6 C ✓✓ (2)

1.7 B ✓✓ (2)

1.8 D ✓✓ (2)

1.9 A ✓✓ (2)

1.10 C ✓✓ (2)
[20]

QUESTION 2/*VRAAG 2*

2.1 The sum of two or more vectors ✓✓ (2 or nothing / *2 of niks*)
Die som van twee of meer vektore
OR/*OF*
The single vector having the same effect as two or more (all) vectors together.
Die enkele vektor wat dieselfde effek as twee of meer (al die) vektore saam het. (2)

2.2 There will be a resultant/net force not equal to zero.✓✓ 2 or nothing/*2 of niks*)
Dit sal 'n resultante/netto krag wees wat nie nul is nie.
OR/*OF*
The (system) is not in equilibrium.
Die (sisteem) is nie in ewewig nie.
OR/OF
The forces are unbalanced.
Die kragte is ongebalanseerd.
NOTE IF : The object is lifted upwards – no marks
NOTA INDIEN : Die voorwerp word opgelig – geen punte (2)

2.3.1 OPTION 1
$F_{Ay} = F_A \sin 70°$
$= 730 \sin 70°$ ✓
$= 685,98$ N✓

OPTION 2
$F_{Ay} = F_A \cos 20°$
$= 730 \cos 20°$ ✓
$= 685,98$ N✓
(2)

2.3.2 OPTION 1
$F_{Ax} = F_A \cos 70°$
$= (730)\cos 70°$ ✓
$= 249,67$ N ✓

OPTION 2
$F_{Ax} = F_A \sin 20°$
$= (730)\sin 20°$ ✓
$= 249,67$ N ✓ (2)

2.4 OPTION 1

$F_{By} = F_B \cos 10^\circ$
$= (1\,440)\cos 10^\circ$ ✓
$= 1418,12$ N ✓

OPTION 2

$F_{By} = F_B \sin 80^\circ$
$= (1\,440)\sin 80^\circ$
$= 1\,418,12$ N

POSITIVE MARKING FROM 2.3.1
POSITIEWE NASIEN VANAF 2.3.1

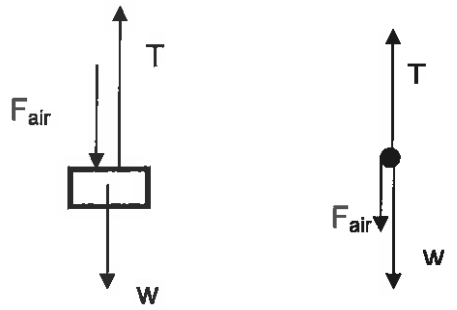
Maximum/*Maksimum* w = $F_{YA} + F_{YB}$
$= 685,98 + 1418,12$ ✓
$= 2\,104,1$ N ✓ (4)

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. ✓
Indien die afstand x vergroot, sal die vertikale komponente van die toegepaste krag verklein en dan sal die stelsel (moontlik) nie die gewig kan optel nie. (2)
[14]

QUESTION 3/*VRAAG 3*

3.1 A body will remain in its state of rest or motion/moving at constant/uniform velocity ✓ unless a non-zero resultant/net force/unbalanced force acts on it. ✓
'n Liggaam sal in sy toestand van rus of beweging teen konstante/uniforme snelheid bly tensy 'n nie-nul resulterende/netto kragongebalanseerde krag daarop inwerk. (2)

3.2



(3)

Notes: Accepted Labels/*Aanvaarbare Byskrifte*		Mark/*Punt*
w	weight/gravitational force/F_G/F_g *gewig/gravitasiekrag/swaartekrag*	✓
T	Tension/F_T/$F_{applied}$/F_A *Spanning/$F_{toegepas}$*	✓
F_{air}	F of the blades/f/Air friction/Downward force of the blades/$F_{air\ on\ container}$ *F van die lemme/f/Lugweerstand/Afwaartse krag van lemme/ $F_{lug\ op\ houer}$*	✓
	Any non-applicable force(s): deduct 1 mark (maximum ⅔) *Enige nie-toepaslike krag(te): trek 1 punt af (maksimum⅔)*	
	Lines must touch object otherwise (maximum ⅔) *Lyne moet voorwerp raak anders (maksimum ⅔)*	
	Accept a free-body diagram *Aanvaar 'n vrye kragtediagram*	

3.3 There is an extra downward force ✓✓(on the container created by the air / blades of the helicopter)
Daar is 'n ekstra afwaartse krag (op die houer as gevolg van die lug / lemme van die helikopter) (2)

3.4 $w = mg$
$1\ 960 = m(9,8)$ ✓
$m = 200\ kg$ ✓ (2)

3.5 **POSITIVE MARKING FROM 3.4**
POSITIEWE NASIEN VAN 3.4

$F_{net} = ma$ ✓
$T + F_g + F_{air} = ma$
$T - F_g - F_{air} = ma$

Any one/Enige

$T - 1\,960 - 140$ ✓ $= (200)(0,13)$ ✓
$T = 2\,126$ N ✓

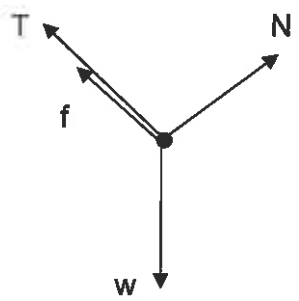
OR/*OF* $T - 2\,100 = ma$
$T - 2\,100 = (200)(0,13)$
$T = 2\,126$ N (4)

3.6 2 100 N ✓ (1)
[14]

QUESTION 4/*VRAAG 4*

4.1 When a net force acts on an object, it will accelerate in the direction of the (net) force. ✓ The acceleration is directly proportional to the (net) force and inversely proportional to the mass of the object. ✓
Wanneer 'n netto krag op 'n voorwerp inwerk, sal dit in die rigting van die (netto) krag versnel. Die versnelling is direk eweredig aan die (netto) krag en omgekeerd eweredig aan die massa van die voorwerp.
Accept Newton's Second Law in terms of momentum: The net force on an object is equal to the rate of change in momentum. ✓✓
Aanvaar Newton se tweede wet in terme van momentum: Die netto krag is gelyk aan die tempo van verandering in momentum. (2)

4.2



Notes: Accepted Labels/*Aanvaarbare byskrifte*		**MARK/ *PUNT***
N	Normal force/ F_N / *Normaalkrag*	✓
w	Weight/F_G/F_g /*Gewig/Gravitasiekrag/Swaartekrag*	✓
T	Tension/F_T /*Spanning*	✓
f	Friction/F_f /*Wrywingskrag*	✓
	Any non-applicable force(s): deduct 1 mark maximum (maximum ¾) *Enige nie-toepaslike krag(te): trek 1 punt af (maksimum ¾)*	
	Is both weight and its components are shown, penalise 1 mark *Indien beide gewig en die komponente van gewig getoon, penaliseer 1 punt*	
	Lines must touch dot otherwise (maximum ¾) *Lyne moet kolletjie raak anders (maksimum ¾)*	
	Do not penalise if angle is shown/not shown *Moenie penaliseer as hoek getoon/nie getoon is nie.*	
	Ignore the comparitive lengths of the arrows *Ignoreer die vergelykende lengtes van die pyle*	

(4)

4.3 $f_k = \mu_k N$ ✓
$f_k = 0,2(4)(9,8)\cos 40°$ ✓ OR/*OF* $0,2(4)(9,8)\sin 50°$
$f_k = 6,01$ N ✓ up the slope/*teen die helling op*✓ (4)

4.4 **POSITIVE MARKING FROM 4.3**
POSITIEWE NASIEN VAN 4.3

$F_{net} = ma$ ✓

For the 8 kg box:
Vir die 8 kg-blok:
$T - f = ma$
$T - 0,2(8)(9,8)$ ✓ $= 8a$
$T = 8a + 15,68$ ....(1)

✓

For the 4 kg box:
Vir die 4 kg-blok:
$F_{g||} - T - f = ma$
$4(9,8)\sin 40° - T - 6,01$ ✓$= 4a$
$25,2 - 6,01 - T = 4a$
$19,19 - 4a = T$ ....(2)

Combining equations (1) and (2):
Kombineer vergelykings (1) en (2)
$4(9,8)\sin 40° - 6,01 - 4a = 0,2(8)(9,8) + 8a$ ✓
$a = 0,29\ m{\cdot}s^{-2}$ ✓

Mark allocation / Puntetoekenning:
Formula/Formule ✓
Left side sub for 8 kg/Links sub vir 8kg ✓
Left side sub for 4 kg/Links sub vir 4kg ✓
Sub of both 8a and 4a/ Sub vir beide 8a and 4a✓
Combining of eq/ Kombineer vergelykings ✓
Answer/Antwoord ✓

OR/*OF*
$8a + 15,68 = 19,19 - 4a$
$a = 0,29\ m{\cdot}s^{-2}$

System approach: one mark for formula and one mark for answer, max $^2/_6$
Sisteembenadering: een punt vir formule en een punt vir antwoord, maks $^2/_6$ (6)

4.5 Greater than ✓
Groter as

Explanation:/*Verduideliking:*
The total mass remains the same ✓
Component of weight parallel to the slope increases ✓
The force of friction increases ✓

Die totale massa bly dieselfde
Komponent van gewig parallel aan die helling vermeerder
Die wrywingskrag vergroot
OR/*OF*
The total mass remains the same ✓
The net force increases ✓✓

Die totale massa bly dieselfde
Die netto krag vergroot

OR/*OF*
For the 8 kg box:
Vir die 8 kg-blok:
$8(9,8)\sin 40° - (0,2)(8)(9,8)\cos 40° - T = 8a$ ✓
$50,39 - 12,01 - T = 8a$ ...(1)
$50,39 - 12,01 - 8a = 4a + 7,84$
$a = 2,545\ m{\cdot}s^{-2}$ ✓

For the 4 kg box:
Vir die 4 kg-blok:
$T - 0,2(4)(9,8) = 4a$ ✓
$T - 7,84 = 4a$ ...(2)

(4)
[20]

QUESTION 5/*VRAAG 5*

5.1 Every body in the universe attracts every other body 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. ✓
Elke liggaam in die heelal trek elke ander liggaam aan met 'n krag wat direk eweredig is aan die produk van hul massas en omgekeerd eweredig is aan die kwadraat van die afstand tussen hul middelpunte.
NOTE: if charges are mentioned, no marks
NOTA: indien ladings genoem word, geen punte (2)

5.2 Weightlessness is the sensation experienced when all contact forces are removed. ✓✓
Gewigloosheid is die sensasie wat ervaar word wanneer alle kontakkragte verwyder word. (2)

5.3 $F = G\frac{m_1 m_2}{r^2}$ **OR/*OF*** $F = G\frac{M_E m}{R_E^2}$ ✓

$= \frac{(6{,}67\times10^{-11})(5{,}98\times10^{24})(3800)}{[6{,}38\times10^{6}+25\times10^{6}]^2}$ ✓ ✓ = 1 539,23 N✓ (4)

5.4 **OPTION 1/*OPSIE 1***
Greater than ✓✓
the mass is greater ✓
and for the same force ✓ the distance must also be greater
(because the product of the masses is directly proportional to the square of the distance between the centres.)
Groter as
Die massa is groter
en vir dieselfde krag moet die afstand ook groter wees
(omdat die produk van die massas direk eweredig is aan die kwadraat van die afstand tussen die middelpunte)

OPTION 2/*OPSIE 2*
POSITIVE MARKING FROM 5.3
POSITIEWE NASIEN VAN 5.3
Greater than ✓✓
Groter as
$F = G\frac{m_1 m_2}{R^2}$

✓1539,23 $= 6{,}67\,10^{-11} \times \frac{(5{,}98\times10^{24})(4500)}{R^2}$ ✓
R = 3,41 x 10^7 m

Distance above the surface of the Earth
Afstand bo oppervlak van Aarde
D = 3,41 x 10^7 – 6,38 x 10^6
D = 2,78 x 10^7 m (or 27 768 214,93 m)

OPTION 3/*OPSIE 3*
Greater than ✓✓
Groter as
$G\frac{mm_1}{R_1^2} = G\frac{mm_2}{R_2^2}$
$\frac{3800}{R_1^2} = \frac{4500}{R_2^2}$ ✓✓
$R_2^2 = \frac{4500}{3800}R_1^2$
$R_2^2 = 1{,}0882...(25\times10^6 + 6{,}38\times10^6)$
R_2 = 3,41 x 10^7
D = 3,41 x 10^7 – 6,38 x 10^6
D = 2,78 x 10^7 m
OR/OF
D = 1,0882...(25 x 10^6)
D = 2,78 x 10^7 m

(4)
[12]

QUESTION 6/*VRAAG 6*

6.1 The refractive index is the ratio between the speed of light in a vacuum ✓ and the speed of light in a medium. ✓
Die brekingsindeks is die verhouding tussen die spoed van lig in 'n vakuum en die spoed van lig in 'n materiaal/medium. (2)

6.2 $n = \frac{c}{v}$ ✓

$1{,}47 = \frac{3 \times 10^8}{v}$ ✓

$v = 2{,}04 \times 10^8 \text{ m·s}^{-1}$ ✓ (3)

6.3 $n_i \sin\theta_i = n_r \sin\theta_r$ ✓
$1{,}33 \sin 37° \checkmark = 1{,}47 \sin\theta \checkmark$
$\theta = 32{,}99°$ ✓ (4)

6.4 Olive oil has a higher optical density than water ✓✓
Olyfolie het 'n groter optiese digtheid as water
OR/*OF*
Water has a lower optical density than olive oil
Water het 'n laer optiese digtheid as olyfolie (2)

6.5.1 Away from the normal ✓
Weg van die normale (1)

6.5.2 The speed of light in air is faster than the speed of light in oil ✓ because the refractive index of oil is higher than of air. ✓ (When a light ray speeds up it refracts away from the normal.)
Die spoed van lig in lug is vinniger as die spoed van lig in olie omdat die brekingsindeks van olie groter is as van lug. (Wanneer die ligstraal vinniger beweeg breek dit weg van die normale.)
OR/OF
Light is moving from an optically more dense ✓ to less dense medium ✓
Lig beweeg vanaf 'n opties digter medium na 'n minder digte medium (2)

6.6.1 Oil and air ✓
Olie en lug (1)

6.6.2 (One of the conditions) for total internal reflection is that the light has to travel from a medium with high optical density ✓ to a medium of lower optical density. ✓
(Een van die voorwaardes) vir totale interne weerkaatsing is dat die lig van 'n medium met 'n hoë optiese digtheid na 'n medium met 'n laer optiese digtheid moet beweeg. (2)

6.7 Wavelength ✓
Golflengte (1)

[18]

QUESTION 7/*VRAAG 7*

7.1 Every point of a wave front serves as a point source of spherical, secondary waves. ✓✓ The positions of the new wave front will be that of the surface tangent to the secondary waves.
Elke punt van 'n golffront dien as 'n puntbron van sferiese, sekondêre golwe. Die posisies van die nuwe golffront sal dié van die oppervlakraaklyn tot die sekondêre golwe wees.. (2)

7.2.1 Slit width ✓
Spleetwydte (1)

7.2.2 (Degree of) diffraction ✓
(Mate van) diffraksie (1)

7.2.3 Wavelength/Frequency/Colour of light ✓
Golflengte/Frekwensie/Kleur van lig (1)

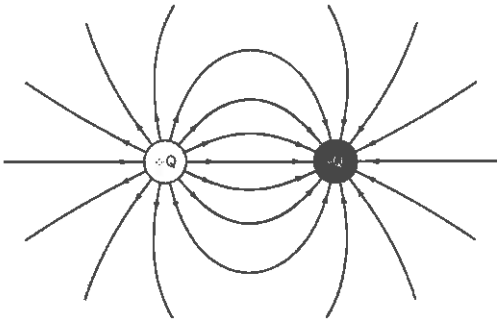
7.3 The greater the width of the slit, the less the amount/degree of diffraction ✓✓
Hoe groter die wydte van die spleet, hoe kleiner die mate van diffraksie
OR/*OF*
The smaller the width of the slit, the greater the amount/degree of diffraction
Hoe kleiner die spleetwydte, hoe groter die mate van diffraksie
OR/OF
The amount of diffraction is inversely proportional to the slit width
Die mate van diffraksie is omgekeerd eweredig aan die spleetwydte
OR/OF
Diffraction $\alpha\ ^{1}/_{\text{width}}$
Diffraksie $\alpha\ ^{1}/_{\text{wydte}}$ (2)

7.4.1 The bright, central band will increase ✓
The coloured bands will be red instead of green ✓
Die helder, sentrale band sal vergroot/toeneem
Die gekleurde bande sal rooi in plaas van groen wees (2)

7.4.2 If the wavelength increases, the (degree of) diffraction will increase. ✓
Indien die golflengte vergroot/toeneem, sal die (mate van) diffraksie vergroot/toeneem
OR/*OF*
Degree of diffraction is directly proportional to wavelength. ✓
Die mate van diffraksie is direk eweredig aan die golflengte (1)
[10]

QUESTION 8/*VRAAG 8*

8.1



Shape/*Vorm*	✓
Direction/*Rigting*	✓
Touching the charge, no crossing lines, etc. *Raak aan die lading/geen lyne wat kruis, ens.*	✓

(3)

8.2

$$F = \frac{kQ_1Q_2}{r^2} \checkmark$$

$$F = \frac{9\times10^{9}\left(5\times10^{-6}\right)\left(5\times10^{-6}\right)}{(0{,}04)^2} \checkmark \checkmark$$

$F_{Y\ on\ X} = 140{,}63$ N ✓ (right/*regs* accept attraction/*aanvaar aantrekkend)*

(4)

8.3.1 No ✓
Nee (1)

8.3.2 The electric field is stronger closer to the charges / not a uniform field/not constant ✓ which means the force will not be constant/ increase ✓
Die elektriese veld is sterker nader aan die ladings/nie 'n uniforme veld nie/nie konstant nie wat beteken die krag sal ook nie konstant wees nie/toeneem (2)

8.4

POSITIVE MARKING FROM 8.2
POSITIEWE NASIEN VAN 8.2

$$F = \frac{kQ_1Q_2}{r^2}$$

$$F = \frac{9\times10^{9}\left(4\times10^{-6}\right)\left(5\times10^{-6}\right)}{(0{,}03)^2} \quad \checkmark \checkmark$$

$F_{Z\text{ on }X} = 200\text{ N}$

$(F_{net})^2 = (F_{Y\text{ on }X})^2 + (F_{Z\text{ on }Y})^2$

$(F_{net})^2 = 140{,}63^2 + 200^2$ ✓

$F_{net} = \sqrt{140{,}63^2 + 200^2}$

$F_{net} = 244{,}49\text{ N}$ ✓

(4)
[14]

QUESTION 9/*VRAAG 9*

9.1 $\Phi = BA\cos\theta$ ✓
$\Phi = (3,2)\pi(0,04)^2\cos 0°$ ✓ accept/*aanvaar* $(3,2)\pi(0,04)^2$
$\Phi = 0,016$ Wb ✓ (or 0,02 Wb) (3)

9.2 **POSITIVE MARKING FROM 9.1**
POSITIEWE NASIEN VAN 9.1

$$\varepsilon = \frac{-N\Delta\Phi}{\Delta t}$$ ✓

$$2,8 \checkmark = \frac{-250(0,016\cos 25° - 0,016\cos 0°)}{\Delta t}$$ ✓

$\Delta t = 0,13$ s ✓ (0,17 s if 0,02 Wb was used/ *gebruik was*) (4)

9.3 Faraday's law. ✓ 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. ✓ .
Faraday se wet. Die grootte van die geïnduseerde emk oor die ente van 'n geleier is direk eweredig aan die tempo van verandering in die magnetiese vloedkoppeling met die geleier. (2)

NOTE: Since the panel found that not all controlled variables were given for QUESTION 9.4, this question could not be accurately answered. Hence do NOT mark this question. The total for the paper will be 147 marks.

LET WEL: Aangesien die paneel ontdek het dat nie al die gekontoleerde veranderlikes vir VRAAG 9.4 gegee is nie, kon hierdie vraag nie akkuraat beantwoord word nie. Moet dus NIE hierdie vraag nasien NIE. Die totaal vir die vraestel sal 147 punte wees.

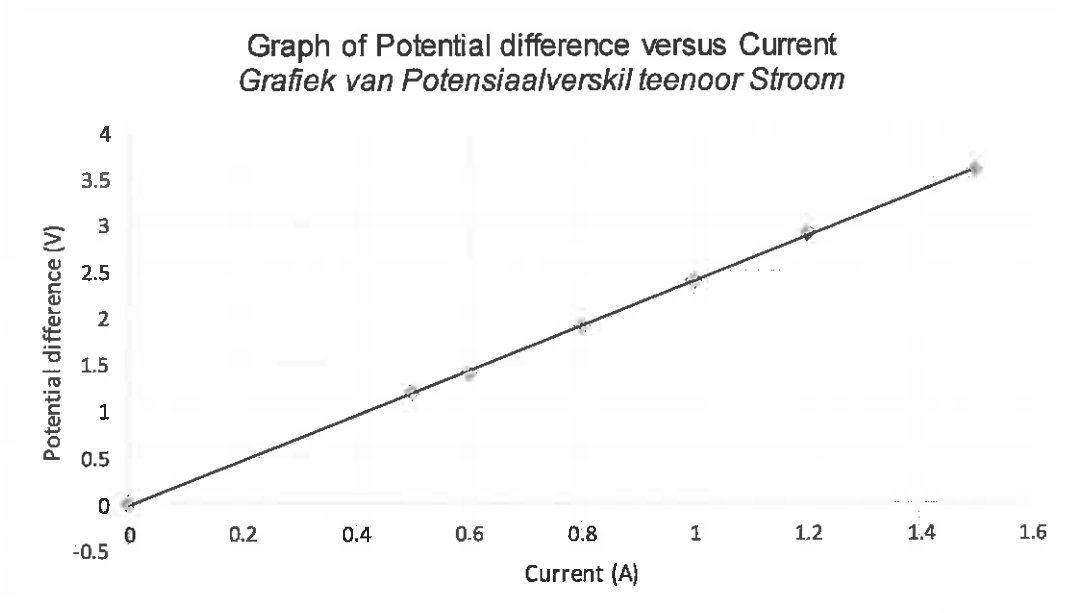
9.4.1 Smaller ✓
Kleiner as (1)

9.4.2 The area of a square is smaller than the area of a circle ✓(with the radius equal to the side length of the square), if the amount of turns are the same✓
Die oppervlakte van 'n vierkant is kleiner as die oppervlakte van 'n sirkel met die radius gelyk aan die sylengte van die vierkant.
OR/*OF*
$0,04^2 < \pi \times 0,04^2$ area of square is smaller than area of circle.
$0,04^2 < \pi\, x\, 0,04^2$ *oppervlakte van vierkant is kleiner as oppervlakte van sirkel.*
OR/*OF*
ε directly proportional to A
ε direk eweredig aan A (2)
[9]

QUESTION 10/*VRAAG 10*

10.1 Ohm's law✓
Ohm se wet (1)

10.2 Graph/*Grafiek*



Marking criteria for graph ***Nasienkriteria vir grafiek***	
Axes with correct/appropriate scale (It must be possible to plot ALL the coordinates on the graph and the divisions must be evenly spaced. If an inappropriate scale is used maximum $^1/_4$) *Asse met korrekte en toepaslike skaal* *(Dit moet moontlik wees om AL die koördinate op die grafiek te plot en die verdeling moet eweredig gespasieer wees. Indien nie-toespaslik skaal gebruik word, maksimum $^1/_4$)*	✓
5 or more of the 6 coordinates correctly plotted (3–4 one mark only) *5 of meer van die 6 koördinate korrek gestip* *(3–4 slegs een punt)*	✓✓
Drawing a line of best fit *Teken 'n lyn van beste passing*	✓

(4)

10.3 Resistance of the parallel connection ✓
Weerstand van die parallel kombinasie (1)

10.4 Stay the same ✓
Bly dieselfde (1)

10.5 Increase ✓
Toeneem (1)

10.6

OPTION 1/*OPSIE 1*

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$\frac{1}{R_p} = \frac{1}{4} + \frac{1}{6} \quad ✓$$

$R_p = 2,4\ \Omega$

$$R_{tot} = \frac{V}{I} \quad ✓$$

$$R_{tot} = \frac{6}{0,8} \quad ✓$$

$R_{tot} = 7,5\ \Omega$

$R = R_{tot} - R_{par}$
$= 7,5 - 2,4$ ✓
$= 5,1\ \Omega$ ✓

Mark allocation/Puntetoekenning:
Formula/formule ✓
2 for substitution/2 vir invervanging ✓✓
Subtraction/Aftrek ✓
Answer/antwoord ✓

(5)

OPTION 2/*OPSIE 2*

$V_{tot} = 6\ V$
$V_R = V_{tot} - V_2$
$= 6 - 1,9$ ✓
$= 4,1\ V$

$$R = \frac{V}{I} \quad ✓$$

$$R = \frac{4,1}{0,8} \quad ✓✓$$

$R = 5,13\ \Omega$ ✓

Mark allocation/Puntetoekenning:
Formula/formule ✓
2 for substitution/2 vir invervanging ✓✓
Subtraction/Aftrek ✓
Answer/antwoord ✓

(5)

OPTION 3/OPSIE 3

$$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} \quad ✓$$

$$\frac{1}{R_p} = \frac{1}{4} + \frac{1}{6} \quad ✓$$

$R_p = 2,4\ \Omega$

$V_R : V_P = 4,1 : 1,9$ ✓
$R_R : R_P = 4,1 : 1,9$

$R_p : 2,4 = 4,1 : 1,9$ ✓
$R_p = 5,18\ \Omega$ ✓

Mark allocation/Puntetoekenning:
Formula/formule ✓
2 for substitution/2 vir invervanging ✓✓
Ratio/verhouding ✓
Answer/antwoord ✓

10.7

OPTION 1/*OPSIE 1*

$V_R = 6 - 2,4 = 3,6$ V

$W = VI\Delta t$ ✓
$W = (3,6)(1)(10)$ ✓
$W = 36$ J ✓

OPTION 2/*OPSIE 2*

$V_R = 6 - 2,4 = 3,6$ V

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

$R = \frac{3,6}{1}$

$R = 3,6\ \Omega$

(The above calculation need not be shown/Bogenoemde berekening hoef nie getoon te word nie)

$W = \frac{V^2 \Delta t}{R}$ ✓

$W = \frac{(3,6)^2(10)}{3,6}$ ✓

$W = 36$ J ✓

OPTION 3/OPSIE 3

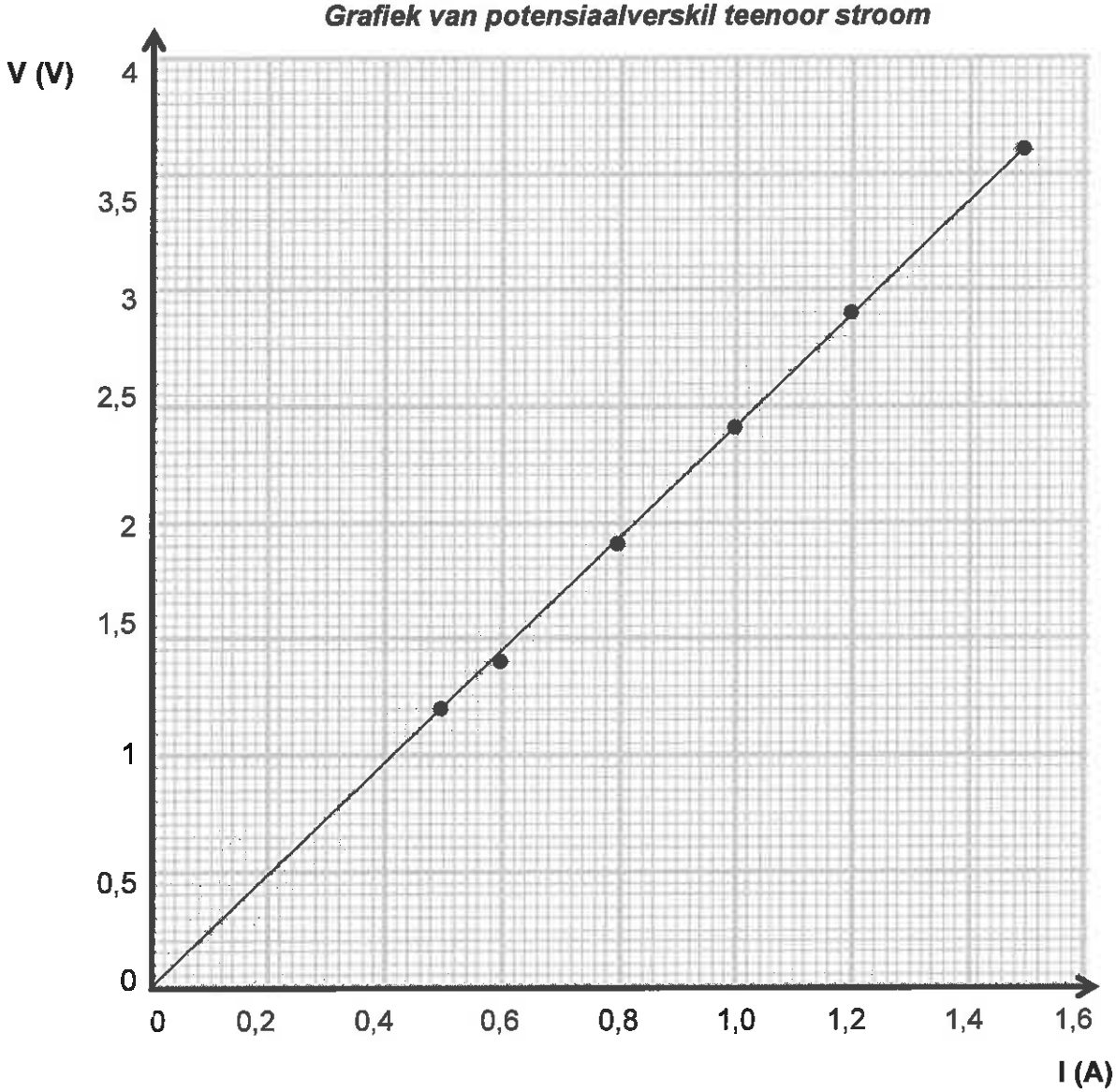
$W = I^2R\Delta t$ ✓
$W = (1)^2\ (3,6)(10)$ ✓
$W = 36$ J ✓

(3)
[16]

ANSWER SHEET FOR QUESTION 10.2/*ANTWOORDBLAD VIR VRAAG 10.2*

**HAND IN THIS ANSWER SHEET TOGETHER WITH THE ANSWER BOOK./
LEWER HIERDIE ANTWOORDBLAD SAAM MET DIE ANTWOORDEBOEK IN.**

Graph of potential difference versus current
Grafiek van potensiaalverskil teenoor stroom



TOTAL/*TOTAAL*: 150

basic education
Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

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TO: HEADS OF EXAMINATION SECTIONS
HEADS OF CURRICULUM SECTIONS

EXAMINATION INSTRUCTION NO. 31 OF 2016

AMENDMENTS TO THE MARKING GUIDELINE OF THE 2016 COMMON EXAMINATION FOR GRADE 11: PHYSICAL SCIENCES P1

Error on both English and Afrikaans versions: Applicable to Eastern Cape, Gauteng, KwaZulu-Natal, Mpumalanga, Northern Cape, and North West Provinces

1. An error was identified in sub question 9.4. All the necessary controlled variables were not given.

2. This sub question which carried 3 marks must not be marked, and, these 3 marks must be excluded.

3. Consequently the total marks for the question paper must be reduced to 147 marks, then scaled up to 150 marks.

4. Refer to **Annexure A** that provides the conversion table that must be used to calculate the learner's total marks.

5. For further information please contact the Director: Examinations and Assessment, Ms P Ogunbanjo at 012 357 3909 or email: Ogunbanjo.p@dbe.gov.za

DR RR POLIAH
CHIEF DIRECTOR: NATIONAL ASSESSMENT AND PUBLIC EXAMINATIOS
DATE: 7-11-16.

Annexure A: English and Afrikaans versions. Marks converted from 147 to 150

Mark out of 147	Converted to 150
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
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33	34
34	35
35	36
36	37
37	38
38	39
39	40
40	41
41	42
42	43
43	44
44	45

Mark out of 147	Converted to 150
45	46
46	47
47	48
48	49
49	50
50	51
51	52
52	53
53	54
54	55
55	56
56	57
57	58
58	59
59	60
60	61
61	62
62	63
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67	68
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77	79
78	80
79	81
80	82
81	83
82	84
83	85
84	86
85	87
86	88
87	89
88	90

Mark out of 147	Converted to 150
89	91
90	92
91	93
92	94
93	95
94	96
95	97
96	98
97	99
98	100
99	101
100	102
101	103
102	104
103	105
104	106
105	107
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108	110
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110	112
111	113
112	114
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114	116
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118	120
119	121
120	122
121	123
122	124
123	126
124	127
125	128
126	129
127	130
128	131
129	132
130	133
131	134
132	135

Mark out of 147	Converted to 150
133	136
134	137
135	138
136	139
137	140
138	141
139	142
140	143
141	144
142	145
143	146
144	147
145	148
146	149
147	150