GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION/ *PROVINSIALE EKSAMEN*

NOVEMBER 2021

GRADE/*GRAAD* 11

MARKING GUIDELINES/*NASIENRIGLYNE*

PHYSICAL SCIENCES (PHYSICS) (PAPER 1)/
FISIESE WETENSKAPPE* (*FISIKA*) *(VRAESTEL 1)

7 pages/*bladsye*

EXEMPLAR

QUESTION/*VRAAG* 1

1.1 A ✓✓ (2)

1.2 C ✓✓ (2)

1.3 C ✓✓ (2)

1.4 A ✓✓ (2)

1.5 D ✓✓ (2)

1.6 A ✓✓ (2)

1.7 D ✓✓ (2)

1.8 B ✓✓ (2)

1.9 D ✓✓ (2)

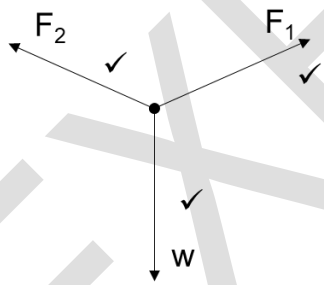
1.10 B (2)

[20]

QUESTION/*VRAAG* 2

2.1 The eagle is stationary./*Die arend is stilstaande.*
Therefore/*Daarom* F_{net} = 0N/I ✓✓
(No unit ONLY one mark./*Geen eenheid SLEGS een punt.)* (2)

2.2



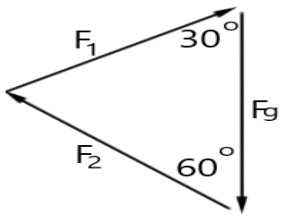
- ✓ F_g/w (lower case) and direction of arrow/*F_g/w (kleinletter) en rigting van pylpunt*
- ✓ F_1 and direction correct/*F_1 en rigting korrek*
- ✓ F_2 and direction correct/*F_2 en rigting korrek*

-1 for any extra force/*-1 vir enige addisionele kragte* (3)

2.3 F_g = mg ✓
= (5)(9,8) ✓
= 49 N ✓ (down/*afwaarts*) (3)

EXEMPLAR

2.4



$F_1 = F_g \sin 60°$ ✓
$= 5 \times 9,8 \times \sin 60°$
$= 42,44$ N ✓

OR/*OF* $F_1 = F_g \cos 30°$ ✓
$= 5 \times 9,8 \times \cos 30°$
$= 24,50$ N ✓

$F_2 = F_g \cos 60°$ ✓
$= 5 \times 9,8 \times \cos 60°$
$= 24,50$ N ✓

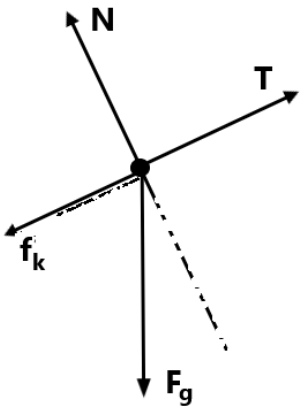
OR/*OF* $F_2 = F_g \sin 30°$ ✓
$= 5 \times 9,8 \times \sin 30°$
$= 24,50$ N ✓ (4)

[12]

QUESTION/*VRAAG* 3

3.1 When a resultant/net force acts on an object, the object will accelerate in the direction of the force at an acceleration directly proportional to the force and inversely proportional to the mass of the object./*Wanneer 'n resultante/netto krag op 'n voorwerp inwerk, versnel die voorwerp in die rigting van die krag teen 'n versnelling direk eweredig aan die resultante krag en omgekeerd eweredig aan die massa van die voorwerp.* ✓✓
(2 marks or none/*2 punte of geen*) (2)

3.2



Marking guidelines/*Nasienriglyne*
✓ F_T/T
✓ F_N/N
✓ F_g/ w
✓ f_k
-1 for every extra force added (max. ¾)
-1 for elke addisionele krag bygevoeg (maks. ¾)

(4)

3.3 $F_{net\ 9kg} = m \times a$ ✓ $= +F - f_k - T$
$(7 \times 1,23) = +51 - 12 - T$ ✓
$T = 30,39$ N ✓ (3)

3.4 $F_{net\ 4kg} = m \times a$
$= 4 \times 1,23$ ✓
$= 4,92$ N ✓ (2)

EXEMPLAR

3.5 $F_{net\ 4kg}$ = m x a ✓ = + T – f_k – $F_{g//}$
4,92 ✓ = + 30,39 – f_k – (4 x 9,8 x sin 18°) ✓
f_k = 13,36 N (down plane/*teen die vlak af)*
$F_{net\ \perp}$ = 0N
∴ N = $F_{g\perp}$
= (4 x 9,8 x cos 18°) ✓
= 37,28 N
$\mu_k = f_k/N$ ✓
$\frac{13,36}{37,28}$
= 0,358 ✓ (accept/*aanvaar* 0,36) (6)

3.6 Block on string and string on block/*Blok op tou en tou op blok* ✓✓
Block on surface and surface on block/*Blok op oppervlak en oppervlak teen blok*
Block on earth and earth on block/*Blok op aarde en aarde op blok*
(ANY ONE applicable Newton's Third Law pair./*ENIGE EEN van Newton se Derde Wet kragpare wat van toepasslng is.)* (2)
[19]

QUESTION/*VRAAG* 4

4.1 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 liggaam in die heelal trek elke ander liggaam aan met 'n krag ***direk eweredig aan die produk van hul massas en omgekeerd eweredig aan die kwadraat van die afstand tussen hul middelpunte.*** ✓✓ (2)

4.2 $F = (Gm_1\ m_2)/r\text{^}2$ ✓
$= (6,67 \times 10\text{^}(-11))(6,417 \times 10\text{^}23)(5,98 \times 10\text{^}24)/(3,40 \times 10\text{^}6 + 6,38 \times 10\text{^}6 + 3,17 \times 10\text{^}11)\text{^}2$ ✓✓
$= 2,55 \times 10^{15}$ N ✓ (4)

4.3 4.3.1 $g = GM/R\text{^}2$ ✓
$= \frac{(6,67\times10^{-11})(6,417\times10^{23})}{(3.40\times10^{6})^2}$ ✓
$= 3,70$ m.s^{-2} ✓ (3)

4.3.2 REMAINS THE SAME/*BLY DIESELFDE* ✓ (1)

4.3.3 The mass of *Perseverance* is so small that it will not affect the gravitational acceleration of the planet./*Die massa van Perseverance is so klein dat dit nie die gravitasie versnelling van die planet sal beïnvloed nie*. ✓✓

OR/*OF*

EXEMPLAR

Acceleration due to gravity is dependent on the mass and radius of the planet only./*Swaartekragversnelling as gevolg van gravitasie is afhanklik van die massa en radius van die planeet alleenlik*. (2)
[12]

QUESTION/*VRAAG* 5

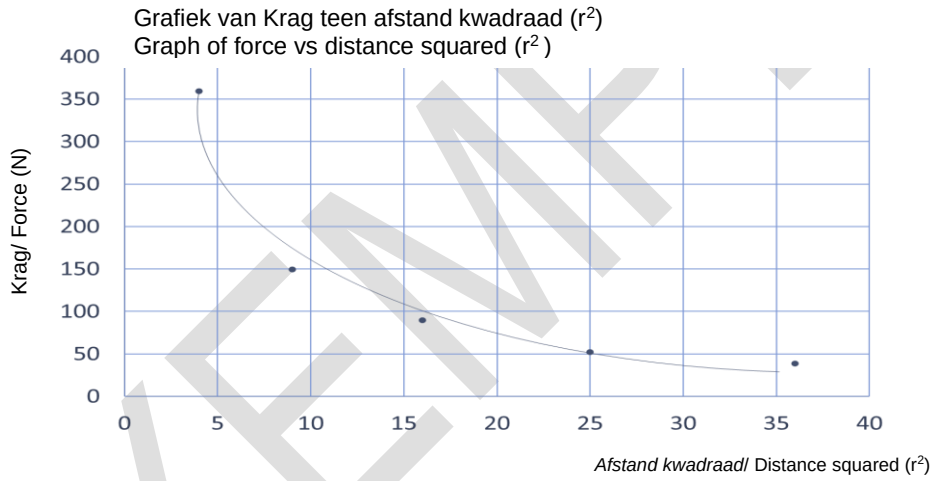
5.1 What is the relationship between the electrostatic force between two charges and the distance between the charges?/*Wat is die verband tusssen die elektrostatiese krag tussen die ladings en die afstand tussen die ladings?* ✓✓
(relationship indicated correctly/*verband korrek aangedui,* ✓ variables/ *veranderlikes* ✓) (2)

5.2.1 Distance/*Afstand* ✓ (1)

5.2.2 Force/*Krag* ✓ (1)

5.2.3 Magnitude of the charges/*Grootte van die ladings* ✓ (1)

5.3



- ✓ scale/*skaal*
- ✓ correct x-axis, y-axis label and units/*korrekte x-as, y-as benoeming en eenhede*
- ✓ plotting of points/*plot van punte*
- ✓ smooth curved line of best fit/*gladde gekurfde lyn wat beste pas*

(4)

5.4 As the distance increases, the force decreases/as the distance decreases, the force decreases./*Soos wat die afstand toeneem, neem die krag af/indien die afstand afneem, neem die krag toe.* ✓✓
(Not inversely proportional – not enough information/*Nie omgekeerd eweredig nie- nie genoeg inligting nie*) (2)

EXEMPLAR

5.5 Coulomb's law/*Coulomb se wet* ✓
The magnitude of the electrostatic force exerted by two point charges (Q_1 and Q_2) on each other is **directly proportional to the product of the magnitudes of the charges and inversely proportional to the square of the distance (r) between them.** ✓/*Die grootte van die elektrostatiese krag wat een puntlading (Q_1) op 'n ander puntlading (Q_2) 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)
[13]

QUESTION/*VRAAG* 6

6.1 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 van magnetiese vloed in die geleier*. ✓✓ (2)

6.2 6.2.1 There will be a reading registered on the galvanometer./*Daar sal 'n geregistreerde lesing op die galvanometer wees*. ✓

OR/*OF*

The galvanometer will deflect to a side./*Die galvanometer sal na een kant toe uitwyk.* (1)

6.2.2 NO reading on the galvanometer/Zero reading/*GEEN lesing op die galvanometer/ Nul lesing* ✓ (1)

6.3 6.3.1 North pole/*Noordpool* ✓ (1)

6.3.2 A to B/*A na B* ✓✓ (2)

6.3.3 Use the right hand rule (for solenoids).
The thumb of the right hand will indicate the North pole ✓and the fingers of the right hand will indicate the direction the current will flow in the solenoid. ✓
Gebruik die regterhandreël (vir solenoïede)
Die duim van die regterhand sal die rigting van die Noordpool ✓aandui en die vingers van die regterhand sal die rigting van die stroomvloei in die solenoïed aandui. ✓

(2)
[9]

EXEMPLAR

QUESTION/*VRAAG* 7

7.1 The charge flowing past a specific point in one second./*Die lading wat in 'n sekonde verby 'n punt beweeg.* ✓✓

OR/*OF*

Rate of flow of charge/*Vloeitempo van lading* (2)

7.2 $R = V_1/I$ ✓

6 ✓ $= ((12 - 3)$ ✓$)/I$

I = 1,5 A ✓ (4)

7.3 $R_T = V_T/I$

$= 12/1{,}5$ ✓

= 8 Ω ✓ (2)

7.4 $R_p = V_2/I$

$= 3/1{,}5$ ✓

$= 2\Omega$

$1/R_p = 1/R_1 + 1/R_2 + 1/R_3$ ✓

$1/2 = 1/4 + 1/6 + 1/R$ ✓

$\therefore R = 12\ \Omega$ ✓ (4)

7.5 Decreases/*Neem af* ✓ (1)

7.6 Total resistance increases./*Totale weerstand neem toe*. ✓
Total current will decrease./*Totale stroom sal afneem.* ✓
Since R is constant for V_1, V_1 must decrease./*Aangesien R konstant is vir V_1, moet V_1 afneem.* ✓ (2)

[15]

TOTAL/*TOTAAL* : 100

EXEMPLAR