education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT
PROVINSIALE ASSESSERING

GRADE/*GRAAD 11*

PHYSICAL SCIENCES P1
FISIESE WETENSKAPPE V1
NOVEMBER 2024
MARKING GUIDELINES/*NASIENRIGLYNE*

MARKS/*PUNTE*: 150

These marking guidelines consist of 10 pages.
Hierdie nasienriglyne bestaan uit 10 bladsye.

QUESTION 1/*VRAAG 1*

1.1	D	✓✓	(2)
1.2	B	✓✓	(2)
1.3	B	✓✓	(2)
1.4	C	✓✓	(2)
1.5	C	✓✓	(2)
1.6	A	✓✓	(2)
1.7	C	✓✓	(2)
1.8	B	✓✓	(2)
1.9	D	✓✓	(2)
1.10	A	✓✓	(2)

[20]

QUESTION 2/*VRAAG 2*

2.1 A physical quantity that has both magnitude and direction. ✓✓
'n Fisiese hoeveelheid met grootte en eenheid, maar geen rigting nie. (2)

2.2

Option 1/*Opsie 1*	**Option 2/*Opsie 2***
$F_y = F \sin \theta$ $F_y = 25$✓ $\underline{\sin 30^o}$ ✓ $= 12,5$ N✓	$F_y = F \cos (90^o - \theta)$ $F_y = 25$ ✓$\underline{\cos (60^o)}$ ✓ $= 12,5$ N✓

(3)

2.3

Option 1/*Opsie 1*	**Option 2/*Opsie 2***
$F_x = F \cos \theta$ $F_x = 20$✓ $\underline{\cos 50^o}$✓ $= 12,86$ N✓	$F_x = F \cos (90^o - \theta)$ $F_x = 20$ ✓$\underline{\sin (40^o)}$ ✓ $= 12,86$ N✓

(3)

2.4 $F_{x(net)} = F_{x(20N)} + F_{x(25N)} - F_{x(P)}$
$15,49$ ✓$= 12,86 + 25 \cos 30^o$✓ $\underline{- F_{x(P)}}$ ✓
$F_{x(P)} = 19,02$ N ✓
$\cos 20 = 19,02 / F$ ✓
$F = 20,24$ N ✓ (6)

2.5

Option 1/*Opsie 1*	**Option 2/*Opsie 2***
$F_{y(p)} = F \sin \theta$ $F_{y(p)} = \underline{20,24 \sin 20^o}$✓ $= 6,92$ N	$F_{y(p)} = F \cos \theta$ $F_{y(p)} = \underline{20,24 \cos 70^o}$✓ $= 6,92$ N
$F_{y(20\ N)} = F \sin \theta$ $F_{y(20\ N)} = \underline{20 \sin 50^o}$ ✓ $= 15,32$ N	$F_{y(20\ N)} = F \cos \theta$ $F_{y(20\ N)} = \underline{20 \cos 40^o}$ ✓ $= 15,32$ N✓
$F_{x(net)} = \underline{6,92 + 12,5}$ ✓$\underline{- 15,32}$ ✓ $F_{x(net)} = 4,1$ N ✓ north/upwards/*up/noord/opwaarts/op* ✓	

(6)
[20]

QUESTION 3/*VRAAG 3*

3.1 The rate of change of velocity of an object. ✓✓ (2)
Die tempo van verandering in snelheid van 'n voorwerp.

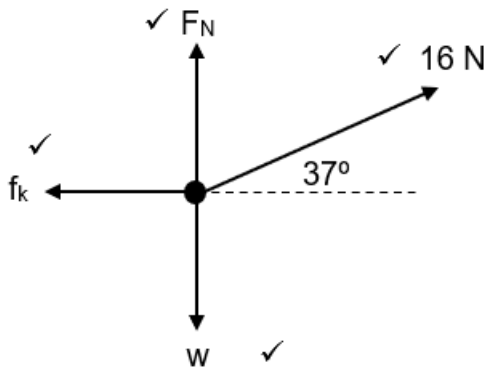
3.2 $0\ m.s^{-2}$ ✓ (1)

3.3

Option 1/*Opsie 1*	**Option 2/*Opsie 2***
$f_f = F_{x(16N)}$ ✓	$f_f = F_{x(16N)}$ ✓
$= 16 \cos 37^o$ ✓	$= 16 \sin 53^o$ ✓
$f_f = 12{,}78$ N ✓	$f_f = 12{,}78$ N ✓

(3)

3.4



(4)

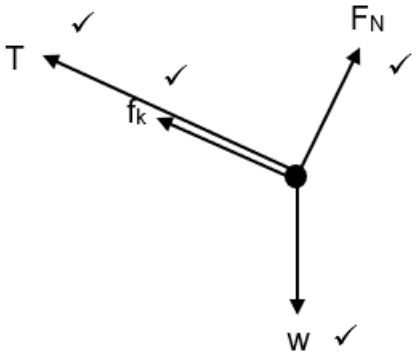
3.5 $F_N = F_g - F_{y(16N)}$
$F_N = mg - F_{y(16N)}$
$F_N = (3 \times 9{,}8)$ ✓ $- 16 \sin 37^o$ ✓
$F_N = 19{,}77$ N
$F_f = \mu F_N$ ✓
$12{,}78 = \mu \times 19{,}77$ ✓
$\mu = 0{,}65$ ✓ (5)

3.6 DECREASES. ✓
F_Y increases, making the F_N to decrease. ✓
F_f is directly proportional to the F_N. ✓
AFNEEM
F_Y verhoog, wat F_N laat verlaag. ✓
F_f is direk eweredig aan F_N (3)
[18]

QUESTION 4/ *VRAAG 4*

4.1 When object/body A exerts a force on object/body B, object/body B will exert the same force on object/body A simultaneously in the opposite direction. ✓✓
Wanneer voorwerp A 'n krag op voorwerp B uitoefen, oefen voorwerp B GELYKTYDIG 'n krag van gelyke grootte in die teenoorgestelde rigting op voorwerp A uit. (2)

4.2



(4)

4.3

F_{net} = ma ✓ **Block/*Blok* A** F_g = mg 19,6 = m x 9,8 ✓ m = 2 kg ✓ T - F_g = ma T – 19,6 = 2a ✓ T = 2a + 19,6 …(1)	**Block/*Blok* B** $Fg_{//}$ - T - f_k = ma/mg sin θ – T – f_k = ma 18 x 9,8 sin 35º - T – 20 = 18a ✓ T = 81,18 -18a …(2)
2a + 19,6 = 81,18 -18a ✓ 20a = 81,58 a = 3,08 m.s^{-2} ✓	

(7)

4.4

Option 1/*Opsie 1*	**Option 2/*Opsie 2***
T = 81,18 -18(3,08) ✓ T = 25,74 N ✓	T = 2(3,08) + 19,6 ✓ T = 25,76 N ✓ **(range 27,56 N – 27,74 N)**

(2)
[15]

QUESTION 5/*VRAAG 5*

5.1 Every particle in the universe attracts every other particle with a force 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 elke ander deeltjie aan met 'n gravitasiekrag wat direk eweredig is aan die produk van hulle massas ✓ en omgekeerd eweredig is aan die kwadraat van die afstand tussen hulle middelpunte. ✓ (2)

5.2 $g = \frac{GM}{r^2}$ ✓

$7,4$ ✓ $= \frac{6,67 \times 10^{-11} \times 4 \times 10^{18}}{r^2}$ ✓

$r = 6,01 \times 10^3$ m ✓ (6004,5 m) (4)

5.3 $F_g = \frac{GMm}{r^2}$ ✓

$F_g = \frac{6,67 \times 10^{-11} \times 4 \times 10^{18} \times 100}{(6,01 \times 10^3)^2}$ ✓ ✓

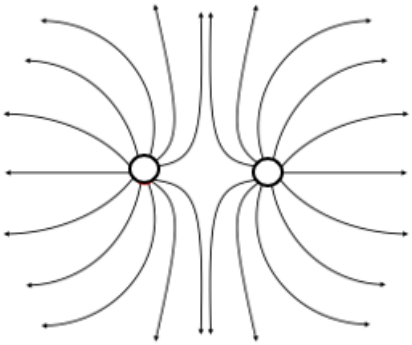
$F_g = 7,39 \times 10^2$ N ✓ (738,65 N) (4)

5.4 Equal to/*Gelyk aan*. ✓ (1)
[11]

QUESTION 6/*VRAAG 6*

6.1 POSITIVE/POSITIEF ✓ (1)

6.2



Note:
1 mark – correct shape. ✓
1 mark - direction of arrows. ✓
1 mark – lines touching the charge but do not cross each other. ✓

(3)

Let wel:
1 punt – korrekte vorm. ✓
1 punt – rigting van pyltjies. ✓
1 punt – Lyne raak die lading maar kruis nie mekaar nie. ✓

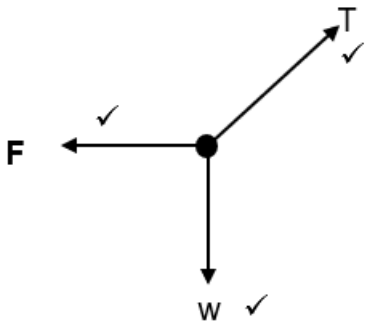
6.3 6.3.1 The <u>electrostatic force</u> exerted by one point charge on another is <u>directly proportional to the product of the charges</u> ✓ and <u>inversely proportional to the square of the distance</u> between them. ✓
Die grootte van die elektrostatiese krag wat deur twee puntladings op mekaar uitgeoefen word, is direk eweredig aan die produk van die grootte van die ladings ✓ *en omgekeerd eweredig aan die kwadraat van die afstand tussen hulle.*✓ (2)

6.3.2 $F = \frac{KQq}{r^2}$ ✓

$3{,}09$ ✓$= \frac{9 \times 10^{9} \times 6 \times 10^{-6} \times q}{(0.2)^2}$ ✓

$q = 2{,}29 \times 10^{-6}$ C ✓ (4)

6.3.3



(3)

6.3.4 $\text{Sin } \theta = \frac{\text{opp}}{\text{hyp}} / \frac{\textit{teenoorstaand}}{\textit{skuins}}$

$\text{Sin } 10^o$ ✓ $= \frac{3,09}{T}$ ✓

$T = 17,8$ N ✓

(3)

6.3.5 $T^2 = F_g^2 + F_e^2$

$17,8^2 = F_g^2 + 3,09^2$ ✓

$F_g = 17,529$ N

$F_g = mg$ ✓

$17,53 = m \times 9,8$ ✓

$m = 1,79$ kg ✓

(4)

[20]

QUESTION 7/*VRAAG 7*

7.1 +3 nC ✓ (1)

7.2 Electric field strength is inversely proportional to the distance. ✓✓ (2)
Sterkte van die elektriese veld is omgekeerd eweredig aan die afstand.

7.3 The force per unit charge/*Die krag per eenheidslading*. ✓✓ (2)

7.4 $E_{net} = \frac{KQ}{r^2} - \frac{Kq}{r^2}$ ✓

$E_{net} = \frac{9 \times 10^9 \times 3 \times 10^{-9}}{(0,012)^2}$ ✓- ✓ $\frac{9 \times 10^9 \times 5 \times 10^{-9} \times q}{(0,028)^2}$ ✓

$E_{net} = 130\,102,04$ N.C^{-1} $(1,3 \times 10^5$ N.C$^{-1})$ ✓ Right/East ✓

(6)

[11]

QUESTION 8/*VRAAG 8*

8.1 The magnitude of the induced EMF is equal to the rate of change of magnetic flux. ✓✓
Die grootte van die geïnduseerde emk oor die ente van 'n geleier is direk eweredig aan die tempo van verandering van die magnetiese vloedkoppeling met die geleier. (2)

8.2 8.2.1 $\Delta\Phi = \Delta BA \cos\theta$ ✓

$= (1,5)\ (4 \times 10^{-4})\ (\cos 90^{\circ} - \cos 0^{\circ})$ ✓

$= -6 \times 10^{-4}$ Wb ✓ (3)

8.2.2 $\varepsilon = -N\frac{\Delta\Phi}{\Delta t}$ ✓

$2,5$ ✓ $= -300\ \frac{-6 \times 10^{-4}}{\Delta t}$ ✓

$\Delta t = 0,5$ s ✓ (4)

8.3 It will be halved/divided by 2. ✓
EMF is directly proportional to the number of windings in the coil. ✓
Dit sal halveer/verander met 2. ✓
EMK is direk eweredig aan die aantal windings op die spoel. ✓ (2)

8.4
- Decreasing the number of turns in the coil/decreasing the surface area of the coil. ✓
  Verminder die aantal windings van die spoel/verklein die kontakoppervlak van die spoel.
- Decreasing the strength of the magnets. ✓
  Verminder die sterkte van die magnete.
- Moving the magnets in and out slower or at a lower frequency.
  Beweeg die magneet stadiger in en uit/kleiner frekwensie.
  (any/*enige* 2)

(2)
[13]

QUESTION 9/*VRAAG 9*

9.1 9.1.1 The amount of energy provided by the cell/battery per coulomb charge. ✓✓
Die totale hoeveelheid energie wat 'n sel aan 1 coulomb lading kan verskaf. ✓✓ (2)

9.1.2 0 (A) ✓ (1)

9.1.3 Emf = I (R + r) ✓
6 ✓= I (9 + 1) ✓
I = 0,6 A ✓ (4)

9.1.4 $P = I^2R$ ✓
1,8 = (0, 6)2R ✓
R = 5 Ω

Rp = 9 - 5 = 4Ω ✓

$\frac{1}{R} = \frac{1}{R} + \frac{1}{R}$ ✓

$\frac{1}{4} = \frac{1}{R} + \frac{1}{4R}$ ✓

R_2 = 5Ω ✓ (6)

9.1.5 Increase/*Verhoog* ✓ (1)

9.1.6 The total external resistance increases and current decreases ✓. The external voltage will decrease (V ∝ I) ✓. Emf remains the same ✓ and thus V lost increases.
Die totale eksterne weerstand verhoog en die stroom verlaag. ✓*Die eksterne spanning sal afneem (V ∝ I).* ✓*Emk bly dieselfde* ✓*en daarom verlaag die verlore volts.* (3)

9.2 P = VI ✓
= 250(8,5) ✓
= 2 125 W

Cost/*Koste* = 2,125 ✓ x $\frac{10}{60}$ x 1,67 ✓
= R0,59 ✓ (5)
[22]

TOTAL/*TOTAAL*: 150