



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



Testpapers.co.za

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 $F_y = F \sin \theta$ $F_y = 25 \checkmark \sin 30^\circ \checkmark$ $= 12,5 \text{ N} \checkmark$	Option 2/Opsie 2 $F_y = F \cos (90^\circ - \theta)$ $F_y = 25 \checkmark \cos (60^\circ) \checkmark$ $= 12,5 \text{ N} \checkmark$	(3)
-----	---	--	-----

2.3	Option 1/Opsie 1 $F_x = F \cos \theta$ $F_x = 20 \checkmark \cos 50^\circ \checkmark$ $= 12,86 \text{ N} \checkmark$	Option 2/Opsie 2 $F_x = F \cos (90^\circ - \theta)$ $F_x = 20 \checkmark \sin (40^\circ) \checkmark$ $= 12,86 \text{ N} \checkmark$	(3)
-----	--	---	-----

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

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

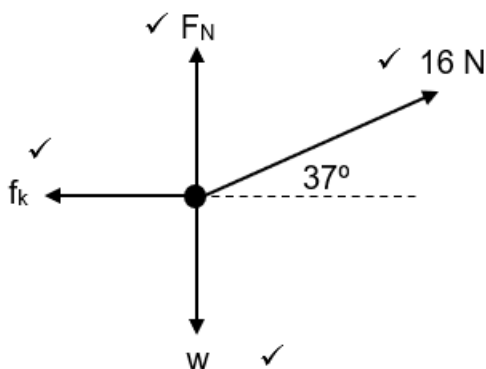
QUESTION 3/VRAAG 3

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 $f_f = F_{x(16N)} \checkmark$ $= 16 \cos 37^\circ \checkmark$ $f_f = 12,78 \text{ N} \checkmark$	Option 2/Opsie 2 $f_f = F_{x(16N)} \checkmark$ $= 16 \sin 53^\circ \checkmark$ $f_f = 12,78 \text{ N} \checkmark$	(3)
-----	---	---	-----

3.4



(4)

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

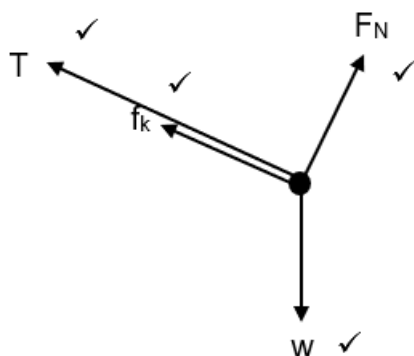
QUESTION 4/ VRAAG 4

- 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

$F_{\text{net}} = ma$ ✓ Block/Blok A $F_g = mg$ $19,6 = m \times 9,8$ ✓ $m = 2 \text{ kg}$ ✓ $T - F_g = ma$ $T - 19,6 = 2a$ ✓ $T = 2a + 19,6 \dots (1)$	Block/Blok B $F_{g\parallel} - T - f_k = ma$ $18 \times 9,8 \sin 35^\circ - T - 20 = 18a$ ✓ $T = 81,18 - 18a \dots (2)$
$2a + 19,6 = 81,18 - 18a$ ✓ $20a = 61,58$ $a = 3,08 \text{ m.s}^{-2}$ ✓	

(7)

4.4

Option 1/Opsie 1 $T = 81,18 - 18(3,08)$ ✓ $T = 25,74 \text{ N}$ ✓	Option 2/Opsie 2 $T = 2(3,08) + 19,6$ ✓ $T = 25,76 \text{ N}$ ✓ (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
$$g = \frac{GM}{r^2} \checkmark$$

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

$$r = 6,01 \times 10^3 \text{ m} \checkmark (6004,5 \text{ m})$$
 (4)

5.3
$$F_g = \frac{GMm}{r^2} \checkmark$$

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

$$F_g = 7,39 \times 10^2 \text{ N} \checkmark (738,65 \text{ N})$$
 (4)

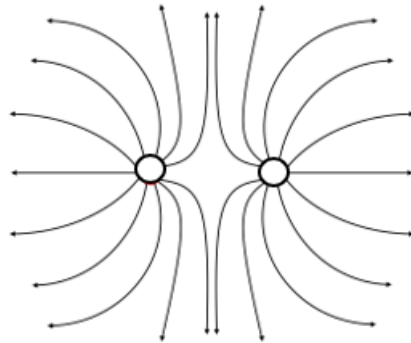
- 5.4 Equal to/Gelyk aan. ✓ (1)
[11]

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 electrostatic force exerted by one point charge on another is directly proportional to the product of the charges ✓ and inversely proportional to the square of the distance 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)

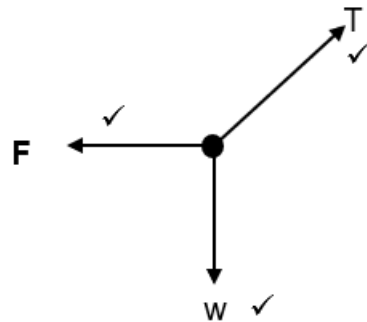
6.3.2 $F = \frac{KQq}{r^2}$ ✓

$$3,09 \text{ ✓} = \frac{9 \times 10^9 \times 6 \times 10^{-6} \times q}{(0,2)^2} \text{ ✓}$$

$$q = 2,29 \times 10^{-6} \text{ C } \text{ ✓}$$

(4)

6.3.3



(3)

6.3.4 $\sin \theta = \frac{\text{opp}}{\text{hyp}} = \frac{\text{teenoorstaand}}{\text{skuins}}$
 $\sin 10^\circ = \frac{3,09}{T}$
 $T = 17,8 \text{ N}$

(3)

6.3.5 $T^2 = F_g^2 + F_e^2$
 $17,8^2 = F_g^2 + 3,09^2$
 $F_g = 17,529 \text{ N}$
 $F_g = mg$
 $17,53 = m \times 9,8$
 $m = 1,79 \text{ kg}$

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

$E_{\text{net}} = 130\,102,04 \text{ N.C}^{-1} (1,3 \times 10^5 \text{ N.C}^{-1})$ ✓ 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 $\Delta\Phi = \Delta BA \cos \theta$ ✓

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

$$= -6 \times 10^{-4} \text{ Wb} \checkmark \quad (3)$$

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

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

$$\Delta t = 0,5 \text{ s} \checkmark \quad (4)$$

- 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 $\text{Emf} = I(R + r)$ ✓

6 ✓ = $I(9 + 1)$ ✓

$I = 0,6 \text{ A}$ ✓

(4)

9.1.4 $P = I^2 R$ ✓

1,8 = $(0,6)^2 R$ ✓

$R = 5 \Omega$

$R_p = 9 - 5 = 4 \Omega$ ✓

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

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

$R_2 = 5 \Omega$ ✓

(6)

9.1.5 Increase/Verhoog ✓

(1)

9.1.6 The total external resistance increases and current decreases ✓. The external voltage will decrease ($V \propto I$) ✓. Emf remains the same ✓ and thus V_{lost} increases.

Die totale eksterne weerstand verhoog en die stroom verlaag. ✓ Die eksterne spanning sal afneem ($V \propto I$). ✓ Emk bly dieselfde ✓ en daarom verlaag die verlore volts.

(3)

9.2 $P = VI$ ✓

= $250(8,5)$ ✓

= 2 125 W

Cost/Koste = $2,125 \times \frac{10}{60} \times 1,67$ ✓

= R0,59 ✓

(5)

[22]

TOTAL/TOTAAL:

150