



education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL ASSESSMENT PROVINSIALE ASSESSERING

GRADE 11/GRAAD 11

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

MARKS/PUNTE: 100

**These marking guidelines consist of 8 pages.
Hierdie nasienriglyne bestaan uit 8 bladsye.**

QUESTION 1/VRAAG 1

- 1.1 C ✓✓ (2)
- 1.2 B ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 A ✓✓ (2)
- 1.6 A ✓✓ (2)
- [12]**

QUESTION 2/VRAAG 2

- 2.1 A vector that gives the same effect as all the vectors acting on an object.
Accept: *The vector sum of all vectors acting on an object* ✓✓
'n enkele vektor wat dieselfde effek het as twee of meer vektore tesame.
Aanvaar: *die vektorsom van twee of meer vektore.* ✓✓ (2)

- 2.2 **Option 1/Opsie 1** **Option 2/Opsie 2**
- $F_y = F \sin \theta$ $F_y = F \cos (90 - \theta)$
- $F_y = \underline{300 \checkmark \sin 20 \checkmark}$ $F_y = \underline{300 \checkmark \cos (90 - 20) \checkmark}$
- $= 102,6 \text{ N} \checkmark$ $= 102,6 \text{ N} \checkmark$ (3)

- 2.3 $T_y = T_x = T \sin \theta$ $T_y = T_x = T \cos \theta$
- or $= \underline{500 \checkmark \cos 45 \checkmark}$
- $= \underline{500 \sin 45}$ $= 353,55$
- $= 353,55$

r_x component

$$r_x = T_x - F_x$$

$$r_x = \underline{353,55 - 281,91} \checkmark$$
$$= 71,64$$

r_y component

$$r_y = T_y + F_y - W$$

$$= \underline{102,61 + 353,55 - 200} \checkmark$$
$$= 256,16$$

$$r^2 = x^2 + y^2 \checkmark$$

$$r^2 = \underline{71,64^2 + 256,16^2} \checkmark$$

$$r = 265,99 \text{ N} \checkmark$$

(7)
[12]

QUESTION 3/VRAAG 3

3.1

3.1.1 $0 \text{ m}\cdot\text{s}^{-2}$ ✓ (1)

3.1.2 Newton's first law of motion. ✓ - A body/object will remain in its state of rest or motion at constant velocity unless a non-zero resultant/net force acts on it. ✓✓ (3)

Newton se Eerste Bewegingswet, ✓-'n Liggaam sal in sy toestand van rus of beweging teen konstante snelheid volhard tensy 'n nie nul resulterende/netto krag daarop inwerk. ✓✓

3.1.3 $F_{\text{net}} = ma$ or $F_{\text{net}} = 0$ or $F = f_f + mg \sin \theta$ ✓(any 1)

$$F = \frac{(6 \times 9,8 \sin 37^\circ) + 14,614}{1} \checkmark$$
$$F = 50 \text{ N} \checkmark \quad (3)$$

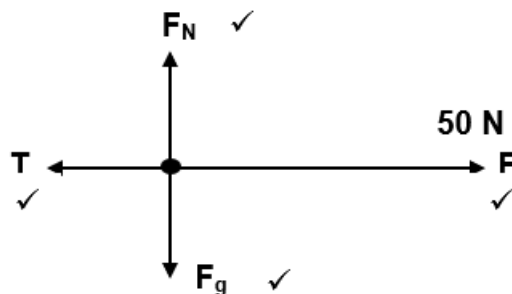
3.1.4 $F_f = \mu F_N$ ✓
 $14,614 = \mu \times (6 \times 9,8 \cos 37^\circ)$ ✓
 $\mu = 0,31$ ✓ (3)

3.2

3.2.1 A force applied by a surface on an object and acts perpendicular to the surface. ✓✓ (2)

Die krag wat 'n oppervlak op 'n voorwerp wat daarmee in kontak is, en wat loodreg op die oppervlak is, uitoefen. ✓✓

3.2.2



- Tension/ F_T /T/spanning
- F_g /W/gravity/gravitasiekrag
- F_N /Normal/N/normaal
- F_{app} / F_a /F/50N/ F_T

Note: deduct 1 mark it.../Nota: trek 1 punt af...

- force diagram is drawn/kragtediagram geteken is.
- arrow(s) omitted/ pylpunt(e) weggelaat.
- line(s) do not touch the dot/lyne raak nie die kolletjie nie.
- extra force(s)/ekstra kragte. (4)

3.2.3	For 3kg	For 2kg
	$F_{\text{net}} = ma$	$F_{\text{app}} - T = ma$
	$T - F_f = ma$	$30 - T = 2a \checkmark$
	$T - \mu mg = ma \checkmark$ (any 1)	$T = 30 - 2a$ (eq..2)
	$T - 0,24 \times 3 \times 9,8 = 3a \checkmark$	
	$T = 7,056 + 3a$ (eq..1)	

Equate the 2/Stel 2 vergelykings gelyk

$$7,056 + 3a = 30 - 2a$$

$$a = 4,59 \text{ m.s}^{-2} \checkmark \text{ Right/regs } \checkmark$$

(note: accept if Tension is calculated first)

(Nota: Aanvaar as spanning eerste uitgewerk word) (5)

3.3

3.3.1 Every particle in the universe attracts every other particle with a force directly proportional to the product of their masses \checkmark and inversely proportional to the square of the distance between their centres. \checkmark
Elke deeltjie in die heelal trek elke ander deeltjie aan met 'n gravitasiekrag wat direk eweredig is aan die produk van hulle massas \checkmark en omgekeerd eweredig is aan die kwadraat van die afstand tussen hulle middelpunte. \checkmark (2)

3.3.2

$$F_g = \frac{GMm}{r^2} \checkmark$$
$$F_g = \frac{6,67 \times 10^{-11} \times 5,98 \times 10^{24} \times 700 \checkmark}{(100 + 6,38 \times 10^6)^2 \checkmark}$$
$$F_g = 6859,15 \text{ N } \checkmark$$

(4)

[25]

QUESTION 4/VRAAG 4

4.1

4.1.1 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)

4.1.2 $F = \frac{KQq}{r^2}$ ✓

$$F = \frac{9 \times 10^9 \times 3 \times 10^{-9} \times 5 \times 10^{-9}}{(40 \times 10^{-3})^2}$$
 ✓

$F = 8,44 \times 10^{-5} \text{ N}$ ✓ (4)

4.1.3 Equal to/gelyk aan. ✓ (1)

4.1.4 Negative/negatief. ✓ (1)

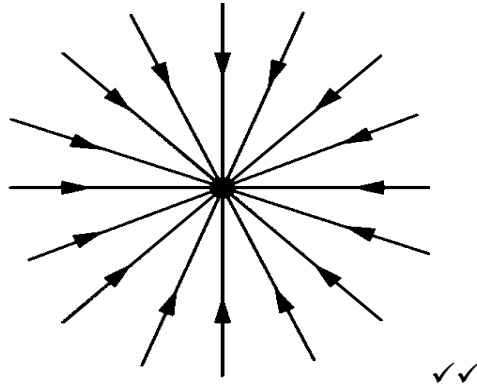
4.1.5 $F = \frac{KQq}{r^2}$ ✓

$$0 \checkmark = \frac{9 \times 10^9 \times 3 \times 10^{-9} \times Q_P}{(10 \times 10^{-3})^2} \checkmark - 8,44 \times 10^{-5} \checkmark$$

$Q_P = 3,13 \times 10^{-8} \text{ C}$ ✓ (5)

4.2

4.2.1



(2)

Note/Let wel:

1 mark – correct shape and direction of arrows

1 punt – korrekte vorm en rigting van pyltjies

1 mark – lines touching the charge but do not cross each other

1 punt – lyne raak lading maar kruis nie mekaar nie

(0 marks if electric field pattern for a positive charge/ 0 punte as elektriese veld vir positiewe lading is)

4.2.2

$$n = \frac{Q}{q_e} \checkmark$$
$$= \frac{10 \times 10^{-6}}{-1,6 \times 10^{-19}} \checkmark$$
$$n = 6,25 \times 10^{13} \checkmark$$

(3)

4.2.3

$$E = \frac{KQ}{r^2} \checkmark$$
$$= \frac{9 \times 10^9 \times 10 \times 10^{-6}}{(2 \times 10^{-2})^2} \checkmark$$
$$= 225\,000\,000 \text{ N.C}^{-1} \checkmark$$

(4)

[22]

QUESTION 5/VRAAG 5

5.1 Faraday's law of electromagnetic induction. ✓
Faraday se wet van elektromagnetiese induksie ✓ (1)

5.2

5.2.1 $\Delta\Phi = \Delta BA \cos \theta$ ✓
 $= (2,8 \times 10^{-3}) (2,5) (\cos 90^\circ - \cos 0^\circ)$ ✓
 $= -0,007 \text{ Wb}$ ✓ (3)

5.2.2 $\varepsilon = -N \frac{\Delta\Phi}{\Delta t}$ ✓
 $3,5 = -200 \frac{-0,007}{\Delta t}$ ✓
 $\Delta t = 0,4 \text{ s}$ ✓ (3)

- 5.3
- Increase the speed of rotation of the coil. ✓
Verhoog die spoed van rotasie van die spoel.
 - Increase the strength of the magnets/use stronger magnets. ✓
Verhoog die sterkte van die magnete/ gebruik sterker magnete.
 - Increase the number of turns (windings) in the coil/increase surface area of the coil. ✓
Vermeerder die aantal windings op die spoel/ver groot oppervlakarea van die spoel. (3)

[10]

QUESTION 6/VRAAG 6

6.1 A conductor that does not change resistance/conductance when temperature changes. ✓✓
'n Geleier wat se weerstand nie verander as die temperatuur verander nie. ✓✓ (2)

6.2 12 V (1)

6.3 **OPTION 1/OPSIE 1**

$$R_T = \frac{R_1 \times R_2}{R_1 + R_2} \checkmark + R_3$$
$$= \frac{6 \times 10}{6 + 10} \checkmark + 2 \checkmark$$
$$R_T = 5,75 \Omega \checkmark$$

OPTION 2/OPSIE 2

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$$
$$\frac{1}{R_T} = \frac{1}{6} + \frac{1}{10} \checkmark$$
$$R_T = 3,75 + 2 \checkmark$$
$$= 5,75 \Omega \checkmark$$
 (4)

6.4 **POSITIVE MARKING FROM 6.3/MERK POSITIEF VANAF 6.3**

6.4.1 $V = IR \checkmark$
 $10 = I \times 5,75 \checkmark$
 $I = 1,74 \text{ A} \checkmark$ (3)

6.4.2 **POSITIVE MARKING FROM 6.3 AND 6.4**

OPTION 1/OPSIE 1

$$\mathcal{E} = I(R + r) \checkmark$$
$$12 = 1,74(5,75 + r) \checkmark$$
$$r = 1,15 \Omega \checkmark$$

OPTION 2/OPSIE 2

$$V_1 = Ir \checkmark$$
$$12 - 10 = 1,74 \times r \checkmark$$
$$r = 1,15 \Omega \checkmark$$
 (3)

6.5 Decrease. ✓

- Total external resistance decreases, current increases. ✓
Totale eksterne weerstand verlaag, stroom vergroot.
- Voltage directly proportional to current ($V \propto I$). ✓
Spanning direk eweredig aan stroom ($V \propto I$)
- Emf is constant. ✓
Emk is constant.
- Thus, lost volts decrease.
Dus, verlore volts neem af.

(4)

[17]

TOTAL/TOTAAL: 100