



**NATIONAL
SENIOR CERTIFICATE/
NASIONALE
SENIORSERTIFIKAAT**

GRADE/GRAAD 11

NOVEMBER 2024

**TECHNICAL SCIENCES P1/
TEGNIESE WETENSKAPPE V1
MARKING GUIDELINE/NASIENRIGLYN**

MARKS/PUNTE: 150

This marking guideline consists of 11 pages.
Hierdie nasienriglyn bestaan uit 11 bladsye.

QUESTION 1/VRAAG 1

- 1.1 C ✓✓ (2)
- 1.2 A ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 D ✓✓ (2)
- 1.6 A ✓✓ (2)
- 1.7 C ✓✓ (2)
- 1.8 C ✓✓ (2)
- 1.9 B ✓✓ (2)
- 1.10 C ✓✓ (2)
- [20]**

QUESTION 2/VRAAG 2

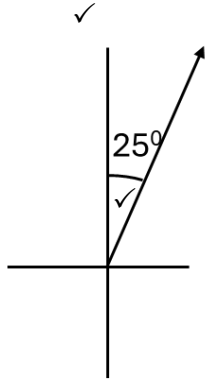
2.1 100° ✓

S 80° E / 80° east of south / E 10° S / 10° south of east ✓

S 80° O / 80° oos van suid / O 10° S / 10° suid van oos

(2)

2.2 2.2.1



Marking criteria / Nasienkriteria

QUESTION/VRAAG 2.2.1 and/en 2.2.2

The emphasis is on the correct **measurement** of the angle. Do not penalise if the size of the angle is not indicated/

Die klem is op die korrekte **meting** van die hoek. Moenie penaliseer as die grootte van die hoek nie aangedui word nie

Reference line (North)/
Verwysingslyn (Noord)

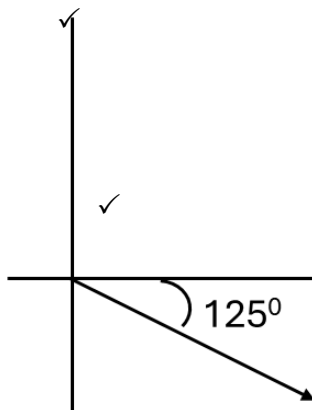
✓

Correct measurement of angle /
Korrekte meting van die hoek

✓

(2)

2.2.2



(2)

2.3 2.3.1 A ✓

(1)

2.3.2 (4;2) ✓

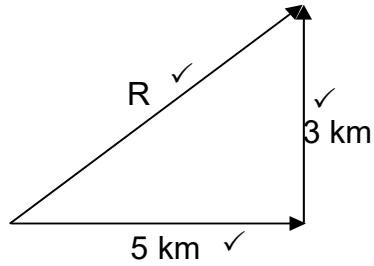
(1)

2.3.3

OPTION 1 / OPSIE 1	OPTION 2 / OPSIE 2
$\text{Gradiënt} = \frac{\Delta y}{\Delta x} \checkmark$ $= \frac{-6-2}{-4-4} \checkmark$ $= 1 \checkmark$	$\text{Gradiënt} = \frac{\Delta y}{\Delta x} \checkmark$ $= \frac{2-(-6)}{4-(-4)} \checkmark$ $= 1 \checkmark$

(3)

2.4 2.4.1



Marking criteria/ Nasienkriteria	
Correct direction and label for the 5 km vector. / Korrekte rigting en byskrifte vir die 5 km vektor	✓
Correct direction and label for the 3 km vector. / Korrekte rigting en byskrifte vir die 3 km vektor.	✓
Tail-to-head method correctly used with a label for the resultant vector. / Kop-aan-stert-metode korrek gebruik met byskrif vir die resulterende vektor.	✓

(3)

$$\begin{aligned}
 2.4.2 \quad R^2 &= x^2 + y^2 \quad \checkmark \\
 &= 5^2 + 3^2 \quad \checkmark \\
 &= 5,83 \text{ km} \quad \checkmark
 \end{aligned}$$

(3)
[17]

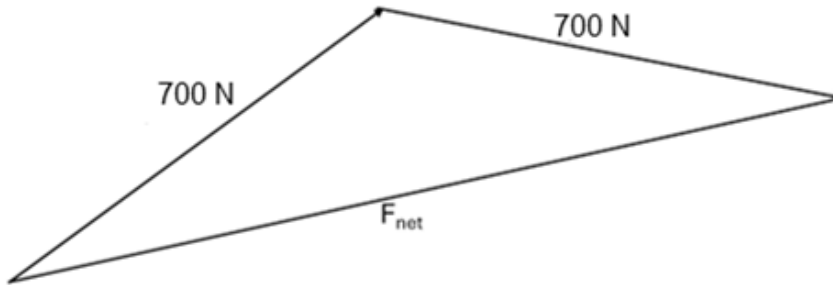
QUESTION 3/VRAAG 3

3.1 Vectors that are in the same plane. ✓✓
Vektore wat op dieselfde vlak is.

(2)

3.2 3.2.1

Scale/Skaal: 1mm = 10 N



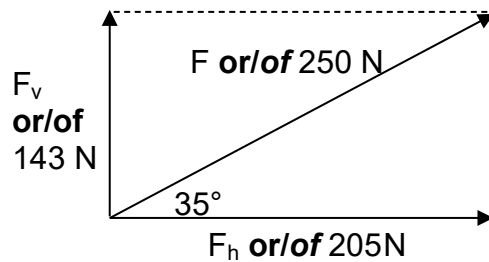
Marking criteria / Nasienkriteria	
Tail-to-head method correctly used. / Kop-aan-stert-metode korrek gebruik	✓
Lengths of 700 N vectors correct (70 mm)/ Lengte van 700 N vektore korrek (70 mm)	✓
Correct angle / Korrekte hoek	✓
Correct answer (1 342 N–1 362 N) and labels for all three vectors/ Korrekte antwoord (1 342 N–1 362 N) en byskrifte vir al drie vektore	✓

(4)

3.2.2 Increase / Neem Toe ✓

(1)

3.3 3.3.1 Scale / Skaal: 10 mm : 25 N



Marking criteria / Nasienkriteria	
Parallelogram method correctly used. / Parallelogram-metode korrek gebruik	✓
Length of $F = 250$ N correct (100 mm) and label / Lengte van $F = 250$ N korrek (100 mm) en byskrifte	✓
Correct answer for F_h (203 N – 207 N) and label / Korrekte antwoord van F_h (203 N – 207 N) en byskrif	✓
Correct answer for F_v (141 N – 145 N) and label / Korrekte antwoord F_v (141 N – 145 N) en byskrif	✓

(4)

$$3.3.2 \quad F_v = 250 \sin 35^\circ \quad \text{OR/OF} \quad 250 \cos 55^\circ \checkmark = 143,39 \text{ N } \checkmark$$

$$F_h = 250 \cos 35^\circ \quad \text{OR/OF} \quad 250 \sin 55^\circ \checkmark = 204,79 \text{ N } \checkmark$$

(4)
[15]**QUESTION 4/VRAAG 4**4.1 Zero/ Nul / 0 \checkmark (1)4.2 Weight \checkmark and normal force \checkmark
Gewig en normale krag (2)4.3 4.3.1 Four (4) / Vier (4) \checkmark (1)4.3.2 18 N \checkmark to the right / na regs \checkmark (2)4.3.3 $f_s^{\text{max/maks}} = \mu_s N \checkmark$
 $= 0,3 \times 10 \times 9,8 \checkmark$
 $= 29,4 \text{ N } \checkmark$ minimum force / *minimum krag* $> 29,4 \checkmark$ (4)4.4 4.4.1 Kinetic friction/ *Kinetiese wrywing* \checkmark (1)

$$4.4.2 \quad \begin{array}{l} w = F_y + N \\ mg = F_y + N \end{array} \quad \left. \vphantom{\begin{array}{l} w = F_y + N \\ mg = F_y + N \end{array}} \right\} \checkmark$$

$$(10 \times 9,8) \checkmark = 40 \sin 30^\circ + N \checkmark$$

$$N = 78 \text{ N}$$

$$f_k = \mu_k N \checkmark$$


$$= (0,2)(78) \checkmark$$

$$= 15,6 \text{ N } \checkmark$$

(6)
[17]

QUESTION 5/VRAAG 5

5.1 Region in space where another magnet (or ferromagnetic) material will experience a force. ✓✓
Streek in die ruimte waar 'n ander magneet (of ferromagnetiese) materiaal 'n krag sal ervaar. (2)

5.2 North ✓
 Magnetic field lines are always from the north pole to the south pole. ✓
Noord
Magnetiese veldlyne is altyd vanaf noordpool na suidpool. (2)

5.3

- Magnetic field lines never cross each other. ✓
- The closer the magnetic field lines, the stronger the magnetic field strength. ✓
- Magnetic field lines are continuous. ✓
- The magnetic field lines are more concentrated at the poles. ✓
- *Magneetveldlyne kruis mekaar nooit.*
- *Hoe nader die magnetiese veldlyne, hoe sterker die magnetiese veldsterkte.*
- *Magneetveldlyne is aaneenlopend.*
- *Die magneetveldlyne is meer gekonsentreerd by die pole.* (4)

5.4

- Electric motors / *Elektriese motors* ✓
- TVs ✓
- Computers / *Rekenaars*
- Speakers / *Luidsprekers*

Any other **TWO** correct uses should be accepted./
*Enige ander **TWEE** korrekte gebruike is aanvaarbaar.* (2)

[10]

QUESTION 6/VRAAG 6

6.1 Wave is succession of pulses. / *Golf is opeenvolging van pulse.* ✓✓ (2)

6.2 Transverse (wave). ✓

Particles in the wave move perpendicular to the direction of motion of the wave. ✓✓

Transversale (golf)

Deeltjies in die golf beweeg loodreg in die rigting van beweging van die golf. (3)

6.3 6.3.1 L and/en M **OR/OF** N and/en O ✓✓ (2)

6.3.2 L and/en N **OR/OF** L and/en O **OR/OF** M and/en N **OR/OF**
M and/en O ✓✓ (2)

6.4 Down / *Af* ✓ (1)

6.5 $v = f\lambda$ ✓
 $= \frac{1}{2} \times 3,15$ ✓
 $= 1,58 \text{ m.s}^{-1}$ ✓ (3)

6.6 $T = \frac{1}{f}$ ✓ **OR/OF** Period (T) = $\frac{\text{time}}{\text{number of completed waves}}$ /
 $= \frac{1}{1.5}$ ✓ $\frac{\text{tyd}}{\text{aantal volledige golwe}}$ ✓
 $= 0,67\text{s}$ ✓ $= \frac{2}{3}$ ✓
 $= 0,67\text{s}$ ✓ (3)

[16]

QUESTION 7/VRAAG 7

7.1 7.1.1 Frequency is the number of waves per second. ✓✓
Frekwensie is die aantal golwe per sekonde. (2)

7.1.2 **ANY / ENIGE EEN:** A and/en C; C and/en E ✓✓

OR/OF

ANY / ENIGE EEN: B and/en D; D and/en F (2)

7.1.3 Rarefraction / *Breking* ✓ (1)

7.1.4 $v = \lambda f$ ✓
 $= (0,8)(500)$ ✓
 $= 400 \text{ m}\cdot\text{s}^{-1}$ ✓ (3)

7.2 7.2.1 Remains the same / *Bly dieselfde* ✓ (1)

7.2.2 Increases / *Neem Toe* ✓ (1)

7.3 Speed / *Spoed* = $\frac{\text{Distance / Afstand}}{\text{time / tyd}}$ ✓
 $= \frac{2 \times 136}{0,8}$ ✓
 $= 340 \text{ m}\cdot\text{s}^{-1}$ ✓ (4)

7.4 7.4.1 Sound with frequencies greater than 20 000 Hz (20 kHz)./
Klank met frekwensies groter as 20 000 Hz (20 kHz) ✓✓ (2)

7.4.2 **Any THREE from the list; Accept any other correct answers./**
Enige DRIE van die lys; Aanvaar enige ander korrekte antwoorde

- Examine tumours. / *Ondersoek gewasse*
- Measuring blood flow / *Meting van bloedvloei*
- Examine narrowing of arteries / *Ondersoek vernouing van are*
- Examine kidney and gallstones / *Ondersoek niere en galstene*

(3)

[19]

QUESTION 8/VRAAG 8

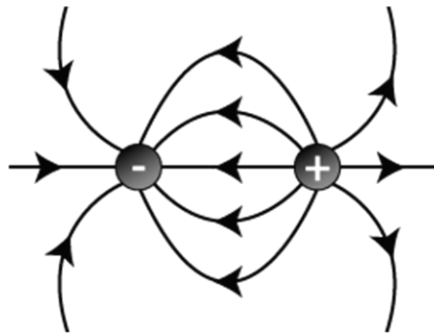
8.1 The spheres carry the same (negative) charge. / ✓✓
 Die sferе dra dieselfde (negatiewe) ladings. (2)

8.2 8.2.1 A region of space where an electric charge experiences a force. ✓✓
 'n Gebied van die ruimte waar 'n elektriese lading 'n krag ervaar.

OR/ OF

The force experienced per unit positive charge placed at a point. ✓✓
 Die krag ervaar per eenheid positiewe lading by 'n punt geplaas. (2)

8.2.2



Criteria for electric field/ <i>Kriteria vir elektriese veld</i>	
Direction from positive to negative/ <i>Rigting van positief na negatief</i>	✓
Shape as shown / <i>Vorm soos aangedui</i>	✓
Field lines do not touch each other / <i>Veldlyne raak nie aan mekaar nie</i>	✓

(3)

8.2.3

$$\begin{aligned}
 E &= \frac{F}{Q} \quad \checkmark \\
 &= \frac{7,2 \times 10^{-4}}{4 \times 10^{-9}} \quad \checkmark \\
 &= 1,8 \times 10^5 \text{N.C}^{-1} \quad \checkmark
 \end{aligned}$$

(4)

8.2.4

$$\begin{aligned}
 F &= \frac{kQ_1Q_2}{r^2} \quad \checkmark \\
 7,2 \times 10^{-4} \quad \checkmark &= \frac{(9 \times 10^9)(4 \times 10^{-9})(2 \times 10^{-9})}{r^2} \quad \checkmark \\
 r &= 0,01\text{m} \quad \checkmark
 \end{aligned}$$

(5)
[16]

QUESTION 9/VRAAG 9

- 9.1 The potential difference across a conductor is directly proportional to the current in the conductor, ✓ at constant temperature. ✓
Die potensiaalverskil oor 'n geleier is direk eweredig aan die stroom in die geleier ✓ teen konstante temperatuur. ✓ (2)

9.2	9.2.1	OPTION 1 / OPSIE 1 $R = \frac{V}{I} \checkmark$ $= \frac{9}{0,9} \checkmark$ $= 10 \Omega$ $\therefore 10 = 3 + R_x \checkmark$ $R_x = 7 \Omega \checkmark$	OPTION 2 / OPSIE 2 $V_1 = RI_T$ $= 3 \times 0,9$ $2,7V$ $V_2 = 9 - 2,7$ $V_2 = 6,3 V$	$R = \frac{V}{I} \checkmark$ $= \frac{6,3}{0,9} \checkmark$ $= 7 \Omega \checkmark$	(4)
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9.2.2 $V_1 = IR \checkmark$
 $= 0,9 \times 3 \checkmark$
 $= 2,7 V \checkmark$ (3)

9.3 9.3.1 $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$
 $\frac{1}{R_p} = \frac{1}{3} + \frac{1}{6} \checkmark$
 $R_p = 2 \Omega \checkmark$ (3)

9.3.2 **Positive marking from QUESTION 9.3.1 / Positiewe nasien vanaf VRAAG 9.3.1**

$R_T = R_p + R_x$
 $= 2 + 7 \checkmark$
 $= 9 \Omega \checkmark$ (2)

9.3.3 $V = IR$
 $9 \checkmark = I(9) \checkmark$
 $I = 1A \checkmark$ (3)

9.3.4	OPTION 1 / OPSIE 1 $V_1 = IR_p$ $= 1 \times 2$ $= 2 V$ $V = IR$ $2 \checkmark = I(6) \checkmark$ $I = 0,33 A \checkmark$	OPTION 2 / OPSIE 2 $I_{3\Omega} = 2I_{6\Omega} \checkmark$ $I_T = I_{3\Omega} + I_{6\Omega} \checkmark$ $1 = 3I_{6\Omega} \checkmark$ $I_{6\Omega} = 0,33 A \checkmark$	(3)
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[20]**TOTAL/ TOTAAL: 150**