



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE/
NASIONALE SENIOR
SERTIFIKAAT**

GRADE/GRAAD 10

NOVEMBER 2019

**PHYSICAL SCIENCES (PHYSICS) P1/
FISIESE WETENSKAPPE (FISIKA) V1
MARKING GUIDELINE/NASIENRIGLYN
EXEMPLAR/EKSEMPLAAR**

MARKS/PUNTE: 150

*This marking guideline consists of 12 pages./
Hierdie nasienriglyn bestaan uit 12 bladsye.*

QUESTION 1/VRAAG 1

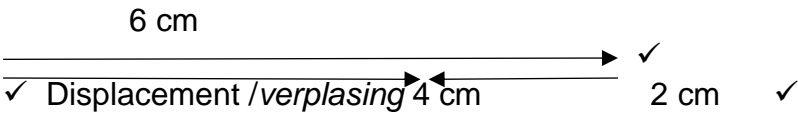
- 1.1 B ✓✓ (2)
- 1.2 D ✓✓ (2)
- 1.3 B ✓✓ (2)
- 1.4 B ✓✓ (2)
- 1.5 B ✓✓ (2)
- 1.6 D ✓✓ (2)
- 1.7 A ✓✓ (2)
- 1.8 A ✓✓ (2)
- 1.9 C ✓✓ (2)
- 1.10 B ✓✓ (2)
- [20]**

QUESTION 2/VRAAG 2

2.1 A single vector having the same effect as two or more vectors acting together. ✓✓

’n Enkele vektor wat dieselfde effek het as twee of meer vektore wat saamwerk.

(2)

2.2 

 ✓ Displacement / *verplasing* 4 cm 2 cm ✓

Displacement / *Verplasing* = $4 \times 20/1 = 80 \text{ m}$ ✓ east ✓

(5)

2.3 2.3.1 Total distance / *Totale afstand* = 160 m ✓✓

(2)

2.3.2 **Positive marking from 2.2/Positiewe nasien vanaf 2.2.**

$$\text{Average speed / } \textit{gemiddelde spoed} = \frac{\text{total distance / } \textit{totale afstand}}{\text{total time / } \textit{total tyd}} \quad \checkmark$$

$$= \frac{160}{300} \quad \checkmark$$

$$v = 0,53 \text{ m} \cdot \text{s}^{-1} \quad \checkmark$$

(3)

[12]

QUESTION 3/VRAAG 3

3.1 Acceleration is the rate of change of velocity. ✓✓
Versnelling is die tempo van verandering in snelheid. (2)

3.2 3.2.1 $v = 0 \text{ m}\cdot\text{s}^{-1}$ ✓ (1)

3.2.2 SOUTH/Suid ✓ (1)

3.2.3 $a = 0$ ✓ (1)

3.3 3.3.1 Acceleration/*versnelling* = gradient/*gradiënt* = $\frac{\Delta v}{\Delta t}$ ✓
 $\frac{v(f)-v(i)}{t(f)-t(i)}$
 $\frac{30-0}{3-0}$ ✓✓
 $a = 10 \text{ m}\cdot\text{s}^{-2}$ ✓ (4)

3.3.2 Total displacement = total area under the graph
Totale verplasing = totale area onder die grafiek

$$\Delta X = A_1 + A_2 + A_3 + A_4$$

$$\Delta X = (1/2 \text{ b} \times \text{h}) + (\text{l} \times \text{b}) + (1/2 \text{ b} \times \text{h}) + (1/2 \text{ b} \times \text{h}) \checkmark$$

$$\Delta X = (1/2 \times 3 \times 30) \checkmark + (4 \times 30) \checkmark + (1/2 \times 2 \times 30) \checkmark + (1/2 \times 1 \times -20) \checkmark$$

$$\Delta X = 45 + 120 + 30 - 10$$

$\Delta X = \underline{185\text{m}}$ ✓ (in the direction of motion/*in die rigting van beweging*) (6)
[15]

QUESTION 4/VRAAG 4

4.1.1 $V_f = v_i + a\Delta t$ ✓

$V_f = 0 + (2)(10)$ ✓

$V_f = 20\text{m}\cdot\text{s}^{-1}$ ✓

(3)

4.1.2

Option 1/Opsie 1	Option 2/Opsie 2 Positive marking from 4.1/Positiewe nasien vanaf 4.1	Option 3/Opsie 3 Positive marking from 4.1/Positiewe nasien vanaf 4.1
$\Delta x = v_i\Delta t + \frac{1}{2} a\Delta t^2$ ✓	$v_f^2 = v_i^2 + 2a\Delta x$ ✓	$\Delta x = \left(\frac{v_f + v_i}{2}\right)\Delta t$ ✓
$\Delta x = (0)(10) + \frac{1}{2} (2)(10)^2$ ✓	$20^2 = 0^2 + 2(2)\Delta x$ ✓	$\Delta x = \left(\frac{20+0}{2}\right)10$ ✓
$\Delta x = 0 + 100$	$\Delta x = 100\text{ m}$ ✓	$\Delta x = 100\text{ m}$ ✓
$\Delta x = 100\text{m}$ ✓		

(3)

4.2 $V_f^2 = v_i^2 + 2a\Delta x$ ✓

$(2v_i)^2$ ✓ = $v_i^2 + 2(5)(3500)$ ✓

$4v_i^2 = v_i^2 + 35\,000$

$3v_i^2 = 35\,000$

$V_i^2 = 11\,666.67$

$V_i = 108,01\text{ m}\cdot\text{s}^{-1}$

$V_f = v_i + a\Delta t$

$216,02$ ✓ = $108,01 + (5)\Delta t$ ✓

$5\Delta t = 108,01$

$\Delta t = 21,60\text{ s}$ ✓

(6)
[12]

QUESTION 5/VRAAG 5

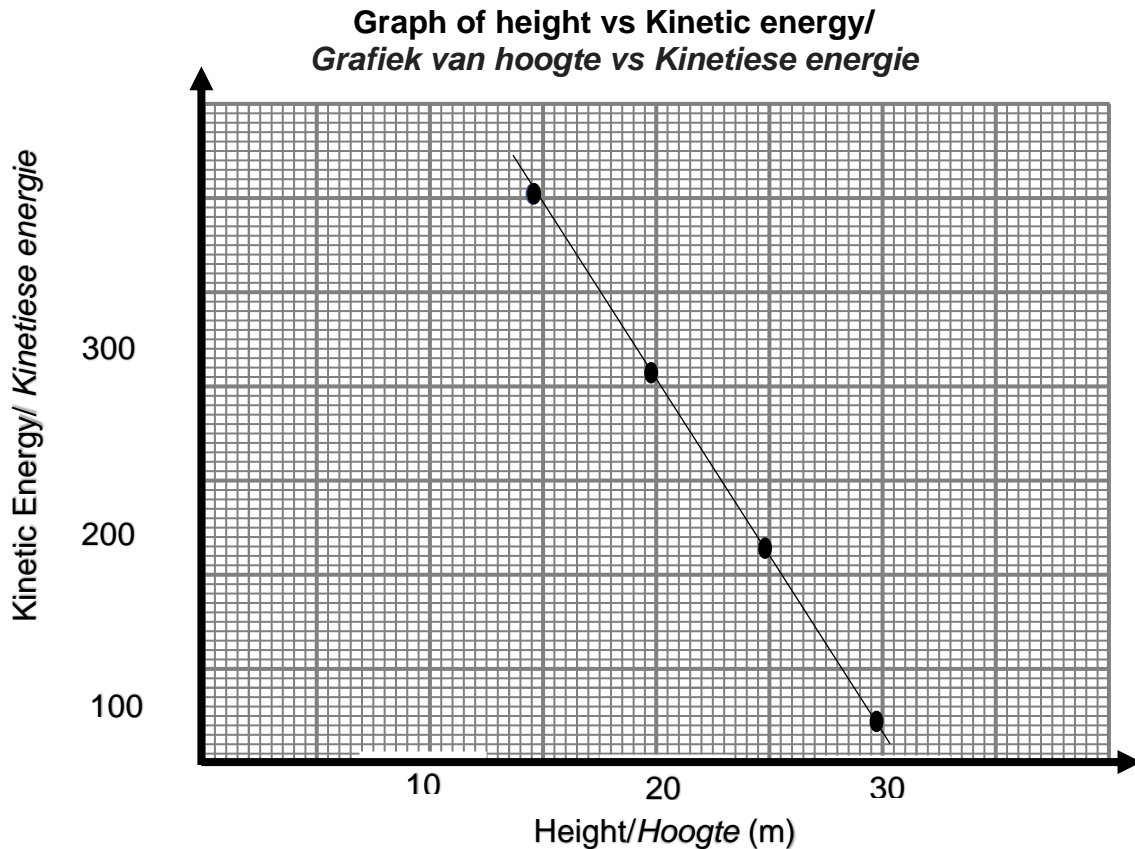
5.1 Mechanical energy/*Meganiese energie* ✓ (1)

5.2 $E_m(A) = E_k(A) + E_p(A)$
 $= \frac{1}{2}mv^2 + mgh$ ✓
 $= \frac{1}{2}(2)(10)^2$ ✓ + $(2)(9,8)(30)$ ✓
 $= 149,6 \text{ J}$ ✓ (4)

5.3 $E_m(A) = E_m(B)$
 $(\frac{1}{2}mv^2 + mgh)_A = (\frac{1}{2}mv^2 + mgh)_B$ ✓
 $149,6$ ✓ = $\frac{1}{2}(2)v^2 + (2)(9,8)(0)$ ✓
 $v = 12,23 \text{ m}\cdot\text{s}^{-1}$ ✓ (4)

5.4 The principle of conservation of mechanical energy ✓ states that the total mechanical energy in an isolated system remains constant. ✓✓
Die beginsel van die behoud van meganiese energie stel dat die totale meganiese energie in 'n geïsoleerde stelsel konstant bly (3)

5.5 **Marking guide/Nasienriglyn**
 Correct shape (STRAIGHT LINE)/Korrekte vorm (REGUIT LYN) ✓
 All points plotted correctly/Al die punte korrek aangedui ✓✓
 If at least 2 points plotted correctly/As ten minste 2 punte korrek aangedui is 1/2



(3)
[15]

QUESTION 6/VRAAG 6

6.1 Pulse is a single disturbance in a medium ✓✓ /
Pols is 'n enkele steuring in 'n medium. (2)

6.2 Up/Af ✓ (1)

6.3 6.3.1 $T = 1/f$ ✓
 $= 1/30$ ✓
 $= 0,033$

$\Delta t = 0,033 \times 3$ ✓
 $\Delta t = 0,10 \text{ s}$ ✓ (4)

6.3.2 Wavelength/*Golflengte*(m) = $12/3$ ✓
 $= 4 \text{ m}$ ✓ (2)

6.3.3	Option 1/Opsie 1 Positive marking from 6.3.2/Positiewe nasien vanaf 6.3.2 $v = f\lambda$ ✓ $= (30)(4)$ ✓ $V = 120 \text{ m}\cdot\text{s}^{-1}$ ✓	Option 2/Opsie 2 $\Delta x = v\Delta t$ ✓ $12 = v(0.10)$ ✓ $V = 120 \text{ m}\cdot\text{s}^{-1}$ ✓	Option 3/Opsie 3 Positive marking from 6.3.1 and 6.3.2/Positiewe nasien vanaf 6.3.1 en 6.3.2 $V = \frac{\lambda}{T}$ ✓ $V = \frac{4}{0,033}$ ✓ $V = 121,21 \text{ m}\cdot\text{s}^{-1}$ ✓
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(3)
[12]

QUESTION 7/VRAAG 7

7.1 7.1.1 $\Delta x = v\Delta t$ ✓

$85 = v(0,25)$ ✓

$v = 340 \text{ m}\cdot\text{s}^{-1}$ ✓

OR / OF

$\Delta x = v\Delta t$ ✓

$170 = v(0,5)$ ✓

$v = 340 \text{ m}\cdot\text{s}^{-1}$ ✓

(3)

7.1.2 **Positive marking from 7.1.1/ Positiewe nasien vanaf 7.1.1.**

$v = f\lambda$ ✓

$340 = (100)\lambda$ ✓

$\lambda = 3,40 \text{ m}$ ✓

(3)

7.2 7.2.1 Ultrasound refers to sound with a frequency of 20 kHz to 100 kHz ✓✓/
Ultraklank verwys na klank met 'n frekwensie van 20 kHz tot 100 kHz

(2)

- 7.2.2
- Detecting invisible cracks in the wings of aircraft ✓
 - *Opsporing van onsigbare krake in die vlerke van vliegtuie.*

OR / OF

- Determining the thickness of metals/plastic ✓
- *Bepaal die dikte van metale/plastiek*

OR / OF

- Cleaning delicate mechanisms of old-fashioned clocks ✓
- *Om delikate meganismes van outydse horlosies skoon te maak*

(1)

7.2.3 Ultrasound does not damage the soft tissue of human organs. ✓✓/
Ultraklank beskadig nie die sagte weefsel van menslike organe nie.

(2)

[11]

QUESTION 8/VRAAG 8

8.1 8.1.1 Infra-red/*infrarooi* ✓ (1)

8.1.2 Sun/*Son* ✓

OR/OF

Gas discharge tube/*Gasafvoerbuis* ✓ (1)

8.2 $E = h \frac{c}{\lambda}$ ✓

$$E = (6.63 \times 10^{-34}) \frac{3 \times 10^8 \checkmark}{4 \times 10^{-5}} \checkmark \checkmark$$

$$E = 4.97 \times 10^{-28} \text{ J } \checkmark \quad (5)$$

8.3 8.3.1 **B**, ✓ • **B** has a highest energy/frequency than ultraviolet ✓✓/
B, • **B** het die hoogste energie/frekwensie as ultraviolet (3)

8.3.2 Type of (electromagnetic) radiation ✓

Tipe (elektromagnetiese) straling

OR/OF

Frequency (of electromagnetic radiation) ✓

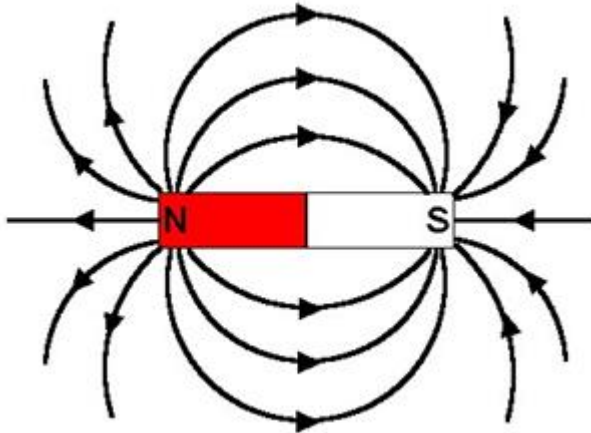
Frekwensie (van elektromagnetiese straling) (1)

8.3.3 Fair test ✓✓ **OR** fair investigation **OR** to have one independent variable/
Billike toets **OF** *billike ondersoek* **OF** *om een onafhanklike veranderlike te hê.* (2)

[13]

QUESTION 9/VRAAG 9

9.1



Poles are correctly labelled/Pole is korrek	✓
Field lines with arrows/Veldlyne met pyle	✓
Correct pattern/Korrekte patroon	✓

(3)

9.2 ATTRACTION/AANTREKKINGKRAAG ✓

(1)

9.3.1 YES/JA ✓

(1)

9.3.2 NO, ✓ They repel each other or same poles of magnet ✓/
NEE, hulle stoot mekaar of dieselfde magneetpole.

(2)

9.4 Earth's magnetic field deflects charged particles ✓ which would harm the ozone layer./*Die Aarde se magnetiese veld reflekteer gelaaide deeltjies af wat die osoonlaag kan benadeel.**Ozone layer protects Earth from ultraviolet strays. ✓/**Osoonlaag beskerm die Aarde teen ultravioletstrale.*

(2)

[9]

QUESTION 10/VRAAG 10

- 10.1 **A** ✓ (1)
- 10.2 **ELECTRIC/ELEKTRIES** ✓ (1)
- 10.3 To prevent charge leakage/*Om ladinglek te voorkom* ✓✓ (2)
- 10.4 10.4.1 States that the net charge of an isolated system remains constant during any physical process. ✓✓/
Stel dat die netto lading van 'n geïsoleerde stelsel gedurende enige fisiese proses konstant bly. (2)
- 10.4.2 **B** ✓ (1)
- 10.4.3
$$Q = \frac{Q_1 + Q_2}{2}$$

$$\frac{(4.4 \times 10^{-9}) + (-2 \times 10^{-9})}{2} \checkmark$$

$$Q = +1.2 \times 10^{-9} \text{ C}$$

$$n = \frac{\Delta Q}{q} \checkmark$$

$$n = \frac{(1.2 \times 10^{-9}) - (4.4 \times 10^{-9})}{-1.6 \times 10^{-19}} \checkmark \checkmark \text{ OR } = \frac{(1.2 \times 10^{-9}) - (-2 \times 10^{-9})}{1.6 \times 10^{-19}} \checkmark \checkmark$$

$$n = 2 \times 10^{10} \text{ electrons/elektrone } \checkmark$$

(5)
[12]

QUESTION 11/VRAAG 11

- 11.1 Electric current is the rate of flow of charges ✓✓/
Elektriesestroom is die tempo waarteen lading vloei
Accept/Aanvaar
 Electric current is the amount of charge passing a point per unit time. ✓✓/
Elektriesestroom is die hoeveelheid lading wat deur 'n punt gaan per eenheidstyd (2)

- 11.2 11.2.1 Potential difference/*Potensiaalverskil* ✓ (1)

- 11.2.2 Electric current/*Elektriesestroom* ✓ (1)

11.3 11.3.1 $R_{ll} = \frac{R_1 \times R_2}{R_1 + R_2}$ ✓
 $= \frac{6 \times 12}{6 + 12}$ ✓
 $= 4 \Omega$ ✓

OR/OF $1/R_p = 1/R_1 + 1/R_2$
 $= 1/6 + 1/12$

$R_p = 4 \Omega$ (3)

- 11.3.2 **Positive marking from 11.3.1/Positiewe nasien vanaf 11.3.1.**
 $R_{ll} = R_s + R_{ll}$

$= 18 + 4$

$= 22 \Omega$ ✓✓ (2)

11.3.3	Option 1/ <i>Opsie 1</i>	Option 2/ <i>Opsie 2</i>
	$V = IR$ $V = (1)(6)$ ✓ $V = 6 \text{ V}$ $I = \frac{V}{R}$ $I = \frac{6}{4}$ ✓ $I = 1,5 \text{ A}$ $I = Q / \Delta t$ ✓ $1,5 = Q/5$ ✓ $Q = 7,5 \text{ C}$ ✓	$I_{12 \Omega} = 0,5 \text{ A}$ ✓ $I_{A2} = 1 + 0,5$ $= 1,5 \text{ A}$ ✓ $I = Q / \Delta t$ ✓ $1,5 = Q/5$ ✓ $Q = 7,5 \text{ C}$ ✓

(5)

11.4 EQUAL TO ✓ /GELYK AAN

Resistors in parallel work under the same potential difference ✓✓/

Weerstande in parallel werk onder dieselfde potensiele verskil.

(3)

11.5 INCREASE/TOENEEM ✓✓

(2)

[19]

TOTAL/TOTAAL: 150