education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

PROVINCIAL TASK/*PROVINSIALE TAAK*

GRADE/*GRAAD* 10

PHYSICAL SCIENCES

FISIESE WETENSKAPPE

16 MARCH/*MAART* 2026

MARKING GUIDELINES/*NASIENRIGLYNE*

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Marks/*Punte*: 100

These marking guidelines consists of 6 pages.
Hierdie nasienriglyne bestaan uit 6 bladsye.

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QUESTION/*VRAAG* 1

1.1 B ✓✓ (2)

1.2 B ✓✓ (2)

1.3 D ✓✓ (2)

1.4 B ✓✓ (2)

1.5 D ✓✓ (2)

1.6 A ✓✓ (2)

1.7 A ✓✓ (2)

[14]

QUESTION/*VRAAG* 2

Marking criteria/*Nasienkriteria:*
If any of the underlined key words/phrases in the correct context is omitted deduct 1 mark. */Indien enige van die onderstreepte sleutelwoorde/frases in die korrekte konteks uitgelaat is, trek 1 punt af.*

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2.1 Principle of superposition.✓ The algebraic sum of the amplitudes of two pulses✓ that occupy the same space at the same time.✓

Beginsel van superposisie. Die algebraïese som van die amplitudes van twee pulse wat dieselfde ruimte op dieselfde tyd beslaan (3)

2.2

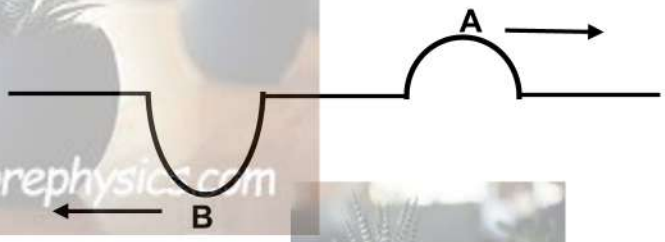
OPTION/*OPSIE* 1	OPTION/*OPSIE* 2
Let the amplitude of Pulse A=x The amplitude of Pulse B = -3x x + (-3x)✓= -6✓ x= 3 cm amplitude of Pulse B= 3(x) = 3(3) = 9 cm✓ *Laat die amplitude van Puls A=x* *Die amplitude van Puls B = -3x* *x + (-3x)✓= -6✓* *x= 3 cm* *amplitude van Puls B= 3(x)* *= 3(3)* *= 9 cm✓*	Let the amplitude of Pulse A=$\frac{1}{3}$x The amplitude of Pulse B= -x $\frac{1}{3}$x + (-x) ✓= -6 ✓ x= 9 cm ✓ *Laat die amplitude van Puls A=x*$\frac{1}{3}$ *Die amplitude van Puls B= -x* $\frac{1}{3}$*x + (-x) ✓= -6 ✓* *x= 9 cm ✓*$\frac{1}{3}$

(3)

2.3 5 cm ✓ (1)

2.4

CRITERIA/*Kriteria*	
Pulse A drawn as crest and pulse B drawn as trough with labels *Puls A geteken as 'n kruin en puls B geteken as 'n trog met byskrifte.*	✓
Pulse B has a greater amplitude than pulse A *Puls B het 'n groter amplitude as puls A*	✓
Pulse B drawn left of pulse A *Puls B is links van puls A*	✓



(3)

2.5.1 A pulse is a single disturbance ✓✓ whereas a wave is a series of disturbances.✓✓
'*n Puls as 'n enkele steuring in 'n medium, terwyl 'n golf 'n reeks versteurings is.* (4)

2.5.2 a) IB or/*of* IH ✓ (1)

b) E ✓ (1)

c) C ✓ (1)

d) D and/*en* F ✓ (1)
[18]

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QUESTION/*VRAAG* 3

3.1 6 ✓ (1)

3.2 Transverse✓. The particles of the medium vibrate perpendicular to the direction of motion of the wave.✓✓

Transversale. Die deeltjies van die medium vibreer reghoekig met die bewegingsrigting van die golf. (3)

3.3 $T = \frac{1}{f}$ ✓

$= \frac{1}{5}$ ✓

$= 0,2$ s✓ (3)

3.4

OPTION/*OPSIE* 1	OPTION/*OPSIE* 2
$v = \frac{\text{distance/afstand/d}}{\text{time/tyd/t}}$ ✓ $v = \frac{0,48}{6 \times 0,2}$ ✓ $v = 0,4\ m \cdot s^{-1}$ ✓	$v = f \times \lambda$ ✓ $v = 5$ ✓$\times 0.08$ ✓ $v = 0,4\ m \cdot s^{-1}$ ✓

(4)
[11]

QUESTION/*VRAAG* 4

4.1 A rarefaction is a region of low pressure (in a longitudinal wave).✓✓
'n Verdigting is 'n gebied van hoë druk (in 'n longitudinale golf).
(2 or/*of* 0) (2)

4.2 0,25 x 2 = 0.5 s ✓✓
(One complete wavelength is generated at 0,5 s from the middle of one compression to the middle of the next successive compression/ *Een volledige golflengte is by 0,5 s gegenereer vanaf die middel van een verdigting tot die middel van die volgende opeenvolgende verdigting)*

OR/*OF*

$\text{Period/}Periode = \frac{\text{time/tyd/}}{\text{number of waves/aantal golwe}}$

$\text{Period/}Periode = \frac{1,5}{3}$ ✓

$= 0,5$ s ✓ (2)

4.3 0,6 m ✓ (1)

4.4 1,8 m ✓ (1)

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4.5

OPTION/*OPSIE* 1	OPTION/*OPSIE* 2
$v = \frac{\text{distance/}afstand}{\text{time/}tyd}$ ✓ $= \frac{1.8}{1,5}$ ✓ $= 1,2\ m{\cdot}s^{-1}$ ✓	$f = \frac{1}{T}$ $= \frac{1}{0,5}$ $= 2\ s$ $v = f\lambda$ ✓ $= 2 \times 0.6$ ✓ $= 1,2\ m{\cdot}s^{-1}$ ✓

(3)
[9]

QUESTION/*VRAAG* 5

5.1 Reflection of sound waves.✓✓ (2)

5.2 $v = f \times \lambda$ ✓
$1500 = 25\ 000 \times \lambda$ ✓
$\lambda = 0,06$ m ✓ (3)

5.3 No/*Nee* ✓
The frequency is beyond range for the human ear./*Die frekwensie is buite die hoorbare klank vir die menslike oor.* ✓

OR/*OF*

Frequency is greater than 20 kHz/*Frekwensie is groter as 20 kHz* (2)

5.4 $\text{Speed/}Spoed = \frac{\text{distance/}afstand}{\text{time/}tyd}$ ✓

1500 ✓ $= \frac{\text{distance/}afstand}{5}$ ✓
distance/*afstand* = 7500 m ✓ (4)

5.5 A photon is a quantum/packet of energy found in light. ✓✓
'n Foton is 'n kwantum/pakkie energie wat in lig voorkom. **(2 or/*of* 0)** (2)

5.6.1 A: Visible light/*Sigbare lig* ✓ (1)

5.6.2 B: X-rays/*X-strale* ✓ (1)

5.7 $E = hf$ ✓
$= (6,63 \times 10^{-34}) \times (2,5 \times 10^{16})$ ✓
$= 1,66 \times 10^{-17}$ J ✓ (3)

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5.8 Radiation **B** has a higher frequency/energy✓ hence a higher penetrating ability.
*Straling **B** het 'n hoër frekwensie/energie en dus 'n hoër penetrasievermoë.*

OR/*OF*

X-rays are absorbed by bones to appear bright white ✓ but visible light is deflected by soft tissues of the body
X-strale word deur bene geabsorbeer om helder wit te lyk, maar sigbare lig word deur sagte weefsels van die liggaam weerkaats. (2)

5.9 $E = \frac{hc}{\lambda}$ ✓

$7,25 \times 10^{-13}$ ✓ $= \frac{6.63 \times 10^{-34}}{\lambda} (3 \times 10^{8})$ ✓

$\lambda = 2,74 \times 10^{-13}$ m ✓ (4)
[24]

QUESTION/*VRAAG* 6

6.1 All charges in the universe consists of an integer multiple of the charge of one electron. ✓✓
Alle ladings in die heelal bestaan uit 'n heelgetalveelvoud van die lading op een elektron. **(2 or/*of* 0)** (2)

6.2 $n = \frac{q}{e}$ ✓

$= \frac{-5,3 \times 10^{-6}}{-1,6 \times 10^{-19}}$ ✓

$= 3,3125 \times 10^{13}$ electrons/*elektrone* ✓ (3)

6.3 To prevent the loss of electrons or charges /*Om die verlies van elektrone of ladings te voorkom.* ✓
OR/*OF*
To prevent leakage of charges./*Om lekkasie van ladings te voorkom.* (1)

6.4 X to/*na* Y ✓
X has excess electrons./*het 'n oormaat elektrone* ✓ (2)

6.5 $Q = \frac{Q_1 + Q_2}{2}$ ✓

$= \frac{4,7 \times 10^{-6} + (-5,3 \times 10^{-6})}{2}$ ✓

$= -3 \times 10^{-7}$ C ✓ (3)

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6.6 **POSITIVE MARKING FROM QUESTION 6.5/*POSITIEWE NASIEN VANAF VRAAG 6.5***

OPTION/*OPSIE* 1	OPTION/*OPSIE* 2
$\Delta Q = -3 \times 10^{-7} - (-5{,}3 \times 10^{-6})$ ✓ $= 5 \times 10^{-6}$ C	$\Delta Q = (-3 \times 10^{-7}) - 4{,}7 \times 10^{-6}$ ✓ $= -5 \times 10^{-6}$ C
$n = \frac{q}{e}$ $n = \frac{5 \times 10^{-6}}{1{,}6 \times 10^{-19}}$ ✓ $n = 3{,}125 \times 10^{13}$ electrons/ *elektrone* ✓	$n = \frac{q}{e}$ $n = \frac{-5 \times 10^{-6}}{-1{,}6 \times 10^{-19}}$ ✓ $n = 3{,}125 \times 10^{13}$ electrons/ *elektrone* ✓

(3)
[14]

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QUESTION/*VRAAG* 7

7.1 The energy transferred per unit electric charge flowing through it. ✓✓
Die energie oorgedra per eenheidslading wat daardeur vloei. **(2 or/*of* 0)** (2)

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7.2 $I = \frac{Q}{\Delta t}$ ✓
$1{,}5 = \frac{Q}{120}$ ✓
$Q = 180$ C

$V = \frac{W}{Q}$ ✓
$= \frac{8000}{180}$ ✓
$= 44{,}44$ V ✓ (5)

7.3 $I = \frac{Q}{\Delta t}$ ✓
$= \frac{18}{6}$ ✓
$= 3$ A ✓ (3)
[10]

TOTAL/*TOTAAL*: 100

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