LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE/*GRAAD* 10

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ERRATA/AMENDED MG

PHYSICAL SCIENCES/*FISIESE WETENSKAPPE*

CONTROL TEST 1/*KONTROLE TOETS 1*

17 MARCH/*MAART* 2025

MARKING GUIDELINES/*NASIENRIGLYNE*

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MARKS/*PUNTE*: 100

TIME/*TYD*: 2 hours/*ure*

This marking guidelines consists of 7 pages/

Hierdie nasienriglyne bestaan uit 7 bladsye

QUESTION 1/*VRAAG 1*

1.1. C✓✓
1.2. D✓✓
1.3. C✓✓
1.4. D✓✓
1.5. A✓✓
1.6. D✓✓
1.7. B✓✓ **[14]**

QUESTION 2/*VRAAG 2*

2.1. Pulse is a single disturbance in a medium. ✓✓/ *Puls is 'n enkele versteuring in 'n medium* (2)

2.2. 2.2.1. Destructive interference✓/ *Destruktiewe interferensie* (1)

2.2.2. Two pulses meet at a point and sum up to no pulse or smaller pulses. ✓✓ OR when a crest/trough overlaps to form a pulse with a lower amplitude / *Twee pulse ontmoet op 'n punt en tel op tot geen puls of kleiner pulse OF Wanneer 'n kruin/trog oorvleuel om 'n puls met 'n laer amplitude te vorm* (2)

2.2.3. Amplitude of pulse L/*amplitude van puls L* + (-7 cm) = - 4 cm✓
Amplitude of pulse L/*amplitude van puls L* = 3 cm✓ (2)

2.2.4. TO THE LEFT✓/*NA LINKS* (1)

2.3. 2.3.1. V= f x λ✓
20 = 50 x λ✓
λ = 0.4m✓ (3)

2.3.2 2.3.2.1 The same✓/no effect/*Dieslfde/geen effek* (1)

2.3.2.2 The same✓/no effect/*Dieselfde/geen effek* (1)

2.3.2.3 Change in **amplitude influences the energy** of the particles and not the number of waves that pass a fix point in one second✓ /*Verandering in **amplitude beïnvloed die energie** van die deeltjies en nie die aantal golwe wat 'n vaste punt in een sekonde verbygaan nie.* (1)

[14]

QUESTION 3

3.1.1. Time taken for one complete wave to pass a fix point. ✓✓ /*Tyd wat dit neem vir een volledige golf om by 'n vaste punt verby te beweeg.* (2)

3.1.2. $f = \frac{1}{T}$ ✓

$= \frac{1}{0,06}$ ✓

$= 16,67\ Hz$ ✓

OR/*OF*

3 waves in 0,18 s✓/*3 golwe in 0.18s*

X waves in 1 s✓/*X golwe in 1s*

f = 16,67 s^{-1}✓ (3)

OR/*OF*

$f = \frac{number\ of\ waves}{t}$

$= \frac{3}{0,18}$

$f = 16,67\ Hz$

3.1.3. **POSITVE MARKING FROM 3.1.3/*POSITIEWE NASIEN VAN 3.1.3***

$V = f \times \lambda$ ✓

$= 16.67 \times 0,21$ ✓ (3)

$= 3,50\ m.s^{-1}$ ✓

3.1.4. Halved ✓/*Halveer* or/*of* $\lambda = \frac{v}{f}\ \therefore \lambda \propto \frac{1}{f} \therefore\ \lambda \propto \frac{1}{2}$ (1)

3.1.5. Negative Marking from 3.1.4/*Negatiewe nasien vanaf 3.1.4*

- Using/*gebruik* $c = f \times \lambda$ ✓
- If frequency is doubled then wavelength must be halved✓ or since frequency is inversely propotional to wavelength/ *As frekwensie verdubbel word, moet golflengte gehalveer word*
- In order to keep speed constant✓/ *Om spoed konstant te hou* (3)

3.2.1 Sound with a frequency range of between 20 kHz to 100 kHz✓✓/ *Klank met 'n frekwensiereeks van tussen 20 kHz tot 100 kHz* (2)

3.2.2 Part of the sound is absorbed by the seabed✓✓/ *'n Deel van die klank word deur die seebodem geabsorbeer* (2)

3.2.3 Bat ✓ or Dolphins / *Vlermuis of dolfyne* (1)

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QUESTION 4/*VRAAG 4*

4.1. A wave in which the disturbance of particles is parallel to the direction of propagation. ✓✓or a wave in which the particles of a medium vibrate parallel to the direction of motion of the wave/ *'n Golf waarin die versteuring van deeltjies parallel is met die voortplantingsrigting of 'n golf waarin die deeltjies van 'n medium parallel met die bewegingsrigting van die golf vibreer.* (2)

4.2. *4.2.1.* Rarefaction✓/*Verdunning*

The region of low pressure in a longitudinal wave✓✓ /*Die gebied van lae druk in 'n longitudinale golf* (3)

4.2.2. Compression✓/*verdigting*

The region of high pressure in a longitudinal wave ✓✓/ *Die gebied van hoë druk in 'n longitudinale golf* (3)

4.3. The particles move forward and backward. (parallel to direction of propagation) ✓✓/ *Die deeltjies beweeg vorentoe en agtertoe. (parallel met voortplantingsrigting)* (2)

4.4.

4.4.1. $f = \frac{1}{T}$ ✓

$f = \frac{410}{2}$ ✓

$f = 205\ Hz$ ✓

OR/*OF*

$f = \frac{number\ of\ vibrations}{t}$

$= \frac{410}{2}$

$= 205\ Hz$ (3)

POSITVE MARKING FROM 4.4.1/*POSITIEWE NASIEN VANAF 4.4.1*

4.4.2. $v = f \times \lambda$✓

$v = 205 \times 0{,}05$ ✓ (3)

$v = 10{,}25\ m.s^{-1}$ ✓ **[16]**

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QUESTION 5/*VRAAG 5*

5.1.1. How does the change/increase in temperature affect the speed of sound in air? ✓✓OR What is the relationship between temperature and the speed of sound? / *Hoe beïnvloed die verandering/toename in temperatuur die spoed van klank in lug? OF Wat is die verwantskap tussen temperatuur en die spoed van klank?* (2)

5.1.2. Temperature ✓/*Temperatuur* (1)

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5.1.3. Speed of sound in air✓/*Spoed van klank in lug* (1)

5.2. $speed = \frac{distance}{time}$ ✓ / $spoed = \frac{afstand}{tyd}$

$= \frac{50}{0{,}146}$ ✓

$speed/spoed = 342.47\ m.s^{-1}$ ✓ (3)

5.3. As the temperature increases, the speed of sound also increases. ✓✓ OR as the temperature increases, it takes less/shorter/faster time for sound to travel 50m. / *Soos die temperatuur toeneem, neem die spoed van klank ook toe OF soos die temperatuur toeneem, neem dit minder/korter/vinniger tyd vir klank om 50m af te lê* (2)

5.4. Echo ✓/*Eggo* (1)

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QUESTION 6/*VRAAG 6*

6.1. **ANY ONE/*ENIGE EEN***

- Some of its behavior is explained using wave model while other aspects of its behavior are explained using the particle model.✓ / *Sommige van sy gedrag word met behulp van golfmodel verduidelik terwyl ander aspekte van sy gedrag verduidelik word deur die deeltjiemodel te gebruik*
- Has wave and particle characteristics/*het golf en deeltjie eienskappe*
- Can propagate in a vacuum/*kan in 'n vakuum voortplant/*
- electromagnetic waves propagate without a medium/ *elektromagnetiese golwe plant sonder 'n medium voort.*
- Are all transverse waves./*Is almal transversal golwe*.
- Beweeg teen 'n konstante snelheid in 'n vakuum. / *Moves at a constant velocity in a vacuum.*

(1)

6.2. Light possesses wave and particle properties. ✓✓/ *Lig besit golf en deeltjie eienskappe* (2)

6.3. 6.3.1 Photons are packets of energy found in light. ✓✓/ *Fotone is pakkies energie wat in lig gevind word.* (2)

6.3.2 E = hf✓

= $(6{,}63 \times 10^{34})(97{,}60 \times 10^{-6})$ ✓

= $6{,}47 \times 10^{-26}$ J✓ (3)

6.3.3 $c = f \times \lambda$ ✓

3×10^{8}✓ $= f \times (1{,}50 \times 10^{3})$ ✓

$f = 200\,000 Hz$

$f = 0.20\ MHz \neq 2\ MHz$ ✓

OR

$speed/spoed = f \times \lambda$ ✓

$= (2 \times 10^{6}) \times (1{,}5 \times 10^{3}$ ✓✓

$= 3 \times 10^{9} m.s^{-1} \neq 3 \times 10^{8})$ ✓ (4)

6.3.4 Increases ✓/*Verhoog* (1)

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QUESTION 7/*VRAAG 7*

7.1.1. Certain materials become electrically charged after they come into contact with different materials. ✓✓/ *Sekere materiale word elektries gelaai nadat hulle met verskillende materiale in aanraking kom* (2)

7.1.2.
- Electrons move✓/*elektrone beweeg*
- From the glass ball into the cloth✓/*vanaf die glas bal na die lap* (2)

7.1.3. Positively charged✓/*positief gelaai* (1)

7.1.4. To the left✓/*beweeg na links* (1)

7.2.1. $n = \frac{Q}{Q_e}$ ✓

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

$= 1,88 \times 10^{13}$ ✓ (3)



7.2.2. The net charge on an isolated system remains constant✓✓/*Die netto lading in 'n geïsoleerde sisteem bly konstant* (2)

7.2.3. $Q = \frac{Q_1+Q_2}{2}$ ✓

$-0,5$✓ $= \frac{-3+Q_Y}{2}$ ✓

$Q_Y = +2\mu C$ ✓ (4)

7.2.4. Gain ✓/*bygekry* (1)

[16]

TOTAL MARKS/*TOTALE PUNTE* = 100