GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

GAUTENGSE DEPARTEMENT VAN ONDERWYS

PROVINCIAL EXAMINATION

PROVINSIALE EKSAMEN

JUNE / *JUNIE* 2018

GRADE / *GRAAD* 10

PHYSICAL SCIENCES
FISIESE WETENSKAPPE

PAPER / *VRAESTEL* 1

MEMORANDUM

7 pages / *bladsye*

GAUTENG DEPARTMENT OF EDUCATION
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PROVINSIALE EKSAMEN

PHYSICAL SCIENCES / *FISIESE WETENSKAPPE*
(Paper / *Vraestel* 1)

QUESTION / *VRAAG* 1

1.1	D ✓✓	1.2	A✓✓	1.3	A✓✓	1.4	B✓✓
1.5	D✓✓	1.6	C✓✓	1.7	C✓✓	1.8	D ✓✓
1.9	A✓✓	1.10	B✓✓				

[20]

QUESTION / *VRAAG* 2

2.1 The distance between two consecutive / successive points that are in-phase. ✓✓
Die afstand tussen twee opeenvolgende punte in fase ✓✓ (2)

2.2 2.2.1 $\lambda = \frac{1,8}{12}$ ✓
λ = 0,15 m ✓ (2)

2.2.2

POSITIVE MARKING FROM ***2.2.1***
POSITIEWE NASIEN VANAF 2.2.1

$v = f.\lambda$ ✓
$\underline{0,225 = f\,(0,15)}$ ✓
$f = 1,5$ Hz ✓ (3)

2.3 2.3.1 Upwards / *beweeg opwaarts* ✓ (1)
2.3.2 A and / *en* D ✓ (1)

2.4 2.4.1 **OPTION / *OPSIE* 1**

$f = \frac{\text{no. of pulses}}{\text{time}}$ ✓ $\frac{\textit{aantal pulse}}{\textit{tyd}}$

$f = \frac{2}{0,8}$ ✓

f = 2,5 Hz✓

OPTION / *OPSIE* 2

$f = \frac{1}{T}$ ✓

$f = \frac{1}{0,4}$ ✓

f = 2,5 Hz✓

(3)

2.4.2

POSITIVE MARKING FROM 2.4.1/
POSITIEWE NASIEN VANAF 2.4.1

v = f. λ ✓

12 = 2,5. λ ✓

λ = 4,8 m ✓ (3)

2.5 The maximum displacement / distance of disturbance of particles of the medium from rest / equilibrium position. ✓✓

Die maksimum versteuring vanaf rus maksimum verplasing van deeltjies vanaf rus / of ekwilibrium posisie. ✓✓ (2)

2.6 20 m ✓✓ (2)

[19]

QUESTION / *VRAAG* 3

3.1 A single disturbance that occurs in a medium wherein particles of the medium move perpendicular to the direction of propagation. ✓✓ *'n Enkele versteuring in 'n medium waartydens die deeltjies van die medium loodreg beweeg tot die rigting van voortplanting van die puls* ✓✓ (2)

3.2 Superposition / (destructive) interference ✓ / *Superposisie/ Destruktiewe interferensie* ✓ (1)

3.3 Resultant amplitude/ *Resulterende amplitude* = 12 + (-8) ✓
= (+) 4 cm ✓ (2)

3.4 v = $\frac{d}{\Delta t}$ ✓

v = $\frac{0,6}{1,5}$ ✓

v = 0,4 m.s^{-1} ✓ (3)

3.5 3.5.1 Longitudinal wave / longitudinale golf ✓ (1)

3.5.2 R – compression/ Verdigting ✓
S – rarefaction / verdunning ✓ (2)

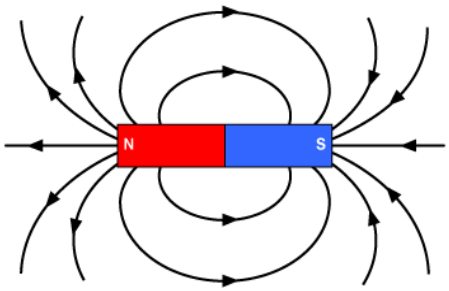
3.5.3 $T = \frac{1}{f}$ ✓
$T = \frac{1}{100}$ ✓
T = 0,01 s ✓ (3)

3.6 Light travels faster than sound ✓✓ / *lig beweeg vinniger as klank* ✓✓ (2)
[16]

QUESTION / *VRAAG* 4

4.1 A compass needle points along the earth's magnetic ✓ axis so that the north end of the magnet aligns with the earth's magnetic field. ✓/ *'n Kompas dui die Aarde* ✓ *se magnetise noord aan. Die naald wys in die rigting van die magnetiese noord.* ✓ (2)

4.2



Direction of lines **in** at south pole, **out** at north pole / *Rigting van lyne **in** by suidpool, **uit** by noordpool* ✓✓
Correct shape for field pattern as shown / *Korrekte vorm vir veldpatroon soos aangedui* ✓

(3)

4.3 Yes / *Ja* ✓ (1)
[6]

QUESTION / *VRAAG* 5

5.1 Less than ✓/ *minder as*✓

NEGATIVE MARKING / *NEGATIEWE NASIEN*

- Sphere B is positively charged, it has excess protons / has lost electrons ✓
- *Sfeer B is positief gelaai, daar is minder elektrone / dit het elektrone verloor*✓

(2)

5.2 5.2.1 The net charge✓ of an isolated system remains constant✓ during any physical process.
Die netto lading✓ *van 'n geïsoleerde sisteem bly konstant* ✓*gedurende enige fisiese proses.* (2)

5.2.2 C to / *na* B ✓ (1)

5.2.3
- sphere C has a negative charge, thus has excess electrons which are shared equally ✓ only electrons can flow ✓
- *sfeer C het 'n negatiewe lading, daar is dus 'n oorvloed elektrone wat gelyk versprei is.* ✓*net elektrone mag beweeg* ✓ (2)

5.2.4

$$Q_B = Q_C = \frac{Q_{net}}{2} \quad ✓$$
$$= \frac{-6 \times 10^{-9} + 2 \times 10^{-9}}{2} \quad ✓$$
$$= -2 \times 10^{-9} \text{C} \quad ✓$$

(3)

5.2.5 $n = \frac{\Delta Q}{q_e}$ ✓

$n = \frac{-2 \times 10^{-9} - (-6 \times 10^{-9}}{1,6 \times 10^{-19}}$ ✓ or / *of* $\frac{-2 \times 10^{-9} + 6 \times 10^{-9}}{-1,6 \times 10^{-19}}$

$n = 2,5 \times 10^{10}$ electrons / *elektrone* ✓ (3)

[13]

QUESTION / *VRAAG* 6

6.1 6.1.1 Radio waves/ *radiogolwe* ✓ (1)

6.1.2 Radio waves have a longer wavelength and can be transmitted over long distances./ *Radiogolwe het 'n langer golflengte en kan oor 'n lang afstand beweeg.* ✓ (1)

6.2 6.2.1 A particle of light energy. / *elementêre deeltjie (kragdraer) van ligenergie* ✓✓ (2)

6.2.2 $3\,x10^{8}\,m.s^{-1}$ ✓✓ (2)

6.2.3 $E = \frac{h.c.}{\lambda}$ ✓

$1{,}46x10^{-24} = \frac{6{,}63x10^{-34}.3x10^{2}}{\lambda}$ ✓

0,136 m ✓ (3)

6.3 Decrease / *Verminder* ✓✓ (2)

NEGATIVE MARKING / *NEGATIEWE NASIEN*

- Wavelength is inversely proportional to energy / penetrating ability. /
- *Golflengte in omgekeerd eweredig aan energie / penetrasievermoë* ✓✓

(2)
[13]

QUESTION / *VRAAG* 7

7.1 7.1.1 Energy transferred per coulomb of charge. ✓✓/ *Energie oorgedra per Coulomb lading* ✓✓

OR

Is the work done in moving a unit charge ✓ between two points. ✓
Die werk verrig om 'n eenheid lading ✓ *tussen twee punte te beweeg.* ✓

(2)

7.1.2

$V = \frac{W}{Q}$ ✓
$V = \frac{90}{20}$ ✓
V = 4,5 V✓

(3)

7.1.3

POSITIVE MARKING FROM ***7.1.2*** / *POSITIEWE NASIEN VANAF 7.1.2*

p.d = $\frac{4,5}{3}$ ✓ = 1,5 V ✓ (2)

7.2.1

$I = \frac{Q}{\Delta t}$ ✓
$= \frac{30}{40}$ ✓
= 0,75 A ✓

7.2.2 POSITIVE MARKING FROM **7.1.2 AND 7.2.1** / *NEGATIEWE NASIEN*

$\frac{1}{Rp} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓
$\frac{1}{Rp} = \frac{1}{12} + \frac{1}{12}$ ✓
$Rp = 6\Omega$ ✓ (3)

7.3 Dimmer ✓ / *Dowwer* ✓ (1)

7.4

NEGATIVE MARKING/ *NEGATIEWE NASIEN*

- The effective resistance will increase ✓ and the total current will remain the same ✓ /
- *Die effektiewe weerstand sal toeneem ✓ en die totale stroomsterkte bly dieselfde* ✓

(2)
[16]

TOTAL SECTION B / *TOTAAL AFDELING B*: 80
TOTAL / *TOTAAL*: 100