GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

GAUTENGSE DEPARTEMENT VAN ONDERWYS

PROVINCIAL EXAMINATION

PROVINSIALE EKSAMEN

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GRADE / *GRAAD* 10

PHYSICAL SCIENCES
FISIESE WETENSKAPPE

PAPER / *VRAESTEL* 1

MEMORANDUM

8 pages / *bladsye*

GAUTENG DEPARTMENT OF EDUCATION
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PROVINSIALE EKSAMEN

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

QUESTION / *VRAAG 1*

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

[20]

QUESTION / *VRAAG* 2

2.1 Transverse / *Transversale* √ (1)

2.2 The direction of wave motion is perpendicular to direction of medium. / *Die beweging van die golf is loodreg tot die medium* √√ (2)

2.3 5 √ (1)

2.4 2.4.1 a and b √ / *a en b* √ (2)

2.4.2 a and c √ / b and d √ / *a en c / b en d* (2)

2.4.3 ab √ (1)

2.5 amplitude = 2,5 ÷ 2 = 1.25 m √√ (2)

2.6 Period / *Periode* = 4÷6
0.67 s √√ (2)

2.7 f = 1/T = 1/0.67 = 1.493 Hz √√ (2)

2.8 v = f x ʎ √
= 1.493 ×10 √
= 14.93 m.s $^{-1}$ √

OR / *OF*

= *15 m.s^{-1}* (3)
[18]

QUESTION / *VRAAG* 3

3.1 **A photon is a <u>packet of energy/ quantum of energy.</u>*/ 'n Foton is 'n kwantum van energie.*** √√ (2)

3.2 Electromagnetic waves are propagated when accelerating charges √ move perpendicular to the direction of propagation therefore induces a magnetic field √ resulting in an electromagnetic wave. √ /

Versnellende elektriese lading wat in 'n reguit lyn deur 'n magnetiese veld beweeg. Die versnelling van hierdie elektriese lading versteur die elektriese en magnetiese velde rondom dit, wat veroorsaak dat hierdie velde ossileer en elektro-magnetiese straling produseer. (3)

3.3 3.3.1 Ultraviolet (radiation) / *Ultraviolet lig* √ (1)

3.3.2 Infra-red (radiation) / *Infrarooi* √ (1)

3.3.3 Gamma rays / *Gamma-straler* √ (1)

3.3.4 Radio waves / *Radiogolwe* √ (1)

3.4 3.4.1 X rays have a high penetrating ability compared to ultraviolet radiation √, therefore ultraviolet rays are less harmful to a foetus than x-rays. √ /

X-strale het hoë penetreringsvermoë en is skadelik vir die baba. Ultraklank is minder skadelik. (2)

3.4.2 $E = \frac{hc}{\lambda}$ √

$E = \frac{(6{,}63x10^{-34})(3x10^{8})}{(3{,}2\,x\,10-9)}$ √ √

$E = 6{,}42 \times 10^{-17}$ J √ (3)

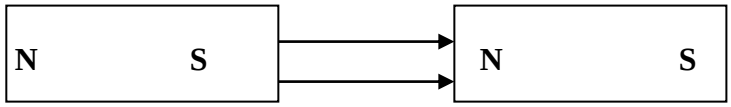
[14]

QUESTION / *VRAAG* 4

4.1 A magnetic field is any area in which a magnetic substance will experience a force. / *Dit is die ruimte waar 'n magneet / 'n voorwerp gemaak van 'n magnetiese stof 'n krag sal ondervind.* √√ (2)

4.2 Cobalt and nickel / *kobalt en nikkel* √√ (2)

4.3



(4)

4.4 4.4.1 Remains the same / *Bly dieselfde* √√ (2)

4.4.2 Increases / *Verminder* √√ (2)

[12]

QUESTION / *VRAAG* 5

5.1 The nett amount of charge in an isolated system remains constant. / *Die netto lading in 'n geslote stelsel bly konstant gedurende enige fisiese proses.* √√ (2)

5.2 Opposite charges attract each other. / *Teenoorgestelde ladings trek mekaar aan.* √√ (2)

5.3 $Q = \frac{Q_1 + Q_2}{2}$ √

$Q = \frac{(-5nC + (+2nC)}{2}$ √ OR / *OF* $Q = \frac{(-5x10^{-9}) + (+2x10^{-9})}{2}$ √

Q =-1,5 nC √ Q=-1,5 x $10^{-9}C$ √ (3)

5.4 X to Y. / *X na Y.* √
X has an excess of electrons√ therefore electrons move to Y that has a deficiency of electrons. / *X het 'n oormaat elektrone en dus sal dit na Y beweeg wat 'n tekort van elektrone het.* √ (3)

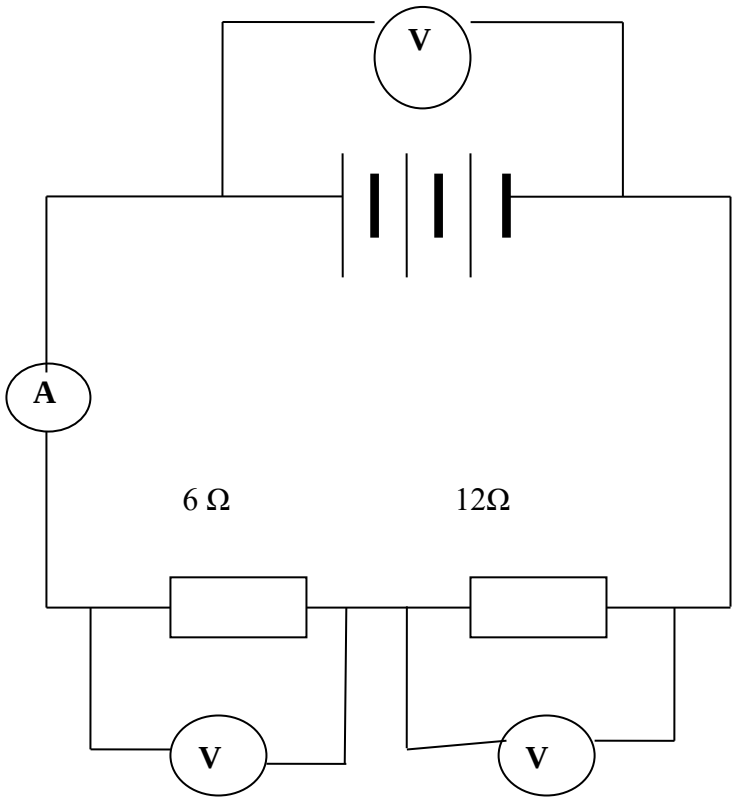
5.5 5.5.1 Increase / *Verhoog* √√ (2)

5.5.2 Increase / *Verhoog* √√ (2)
[14]

QUESTION / *VRAAG* 6

6.1 To determine if the effective resistance is greater when resistors are connected as potential dividers than when they are connected in parallel.√√ / *Om te bepaal of resistors wat as potensiaalverdelers gekoppel is, se weerstand groter is as dié wat parallel geskakel is.* (2)

6.2



√ Voltmeter correctly connected across 3 cells
√ 3 cells
√ Ammeter connected correctly
√ Two resistors in series
√ Two voltmeters connected correctly across two resistors

√ *Voltmeter oor 3 selle*
√ *3 selle*
√ *Ammeter korrek*
√ *Twee resistors in series*
√ *Twee voltmeters oor 2 resistors*

(5)

6.3 6.3.1 A: $R_T = R_1 + R_2$√
$= 3 + 3$
$= 6\Omega$ √

B: $R_T = R_1 + R_2$
$= 3 + 1,7$ √
$= 4,7\Omega$ √ (4)

6.3.2

Option 1 / *Opsie 1*	Option 2 / *Opsie 2*
V=IR √	$V_T = V1 = V2$ √
V_C= (0,75)(3) = 2,25V √	V_{2C} =4,5 – 2,25 = 2,25V √
V_D= (0,96)(3) = 2,87V √	V_{2D} = 4,5 – 1,63 = 2,87V √

(3)

6.3.3 Experiment / *Eksperiment* 1: $V_1 + V_2 = 2,25 + 2,2,5 = 4,5V$ √
Experiment / *Eksperiment* 2: $V_1 + V_2 = 2,87+1,63 = 4,5V$ √
Thus resistors in series are potential dividers. / *Resistors is in series en dus potensiaalverdelers.* √ (5)

6.4 Increases √
Current is proportional to resistance. √
As the resistors are connected in parallel, resistance decreases √ therefore current increases i.e. $I = \frac{V}{R}$.
Toeneem √
Elektriese stroom is proporsioneel tot weerstand √
Indien die resistors parallel geskakel is, verminder die weerstand √ *dus – vergroot die stroom:* $I = \frac{V}{R}$.

(3)
[22]

TOTAL / *TOTAAL*: 100