



**GAUTENG PROVINCE**  
EDUCATION  
REPUBLIC OF SOUTH AFRICA

**GAUTENG DEPARTMENT OF EDUCATION  
PROVINCIAL EXAMINATION  
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GRADE 10**

**PHYSICAL SCIENCES**

**PAPER 1**

**MARKING GUIDELINE**

**6 pages**

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PROVINCIAL EXAMINATION****PHYSICAL SCIENCES  
(Paper 1)****MARKING GUIDELINE**

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**QUESTION 1: MULTIPLE CHOICE QUESTIONS**

1.1 C ✓✓

1.2 A ✓✓

1.3 A ✓✓

1.4 C ✓✓

1.5 C ✓✓

1.6 B ✓✓

1.7 C ✓✓

1.8 D ✓✓

1.9 A ✓✓

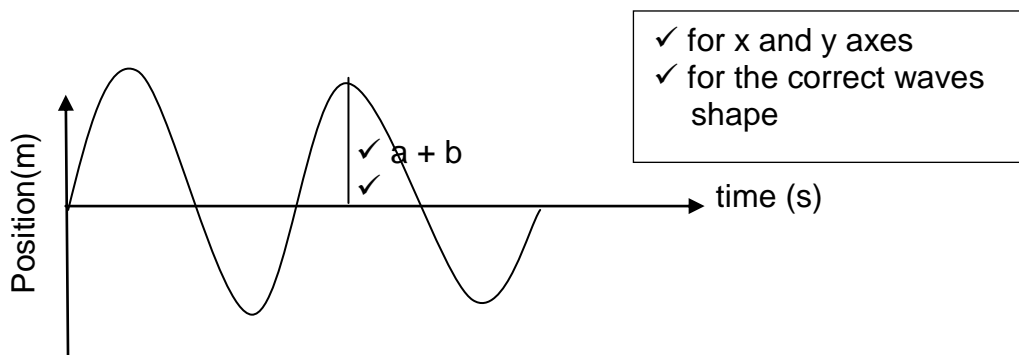
1.10 C ✓✓

**[20]**

## QUESTION 2

2.1 2.1.1 The distance between two consecutive / successive points in phase. ✓✓ (2)

2.1.2



(4)

2.1.3 (Constructive) interference / superposition ✓✓ (2)

2.1.4 When two waves meet at a point, the resultant disturbance is the algebraic sum of the two waves. ✓✓ (2)

2.2 2.2.1 The time taken to complete a single oscillation. ✓✓ (2)

2.2.2 Downwards ✓✓

2.3 2.3.1  $f = \frac{1}{T}$  ✓  
 $= \frac{1}{5}$  ✓ = 0,2 Hz ✓ (4)

2.3.2  $v = \lambda f$  ✓  
 $= 1,5$  ✓ × 0,2 ✓  
 $= 0,3 \text{ m} \cdot \text{s}^{-1}$  ✓ (4)

[22]

## QUESTION 3

3.1 A single disturbance that occurs in a medium. ✓✓ (2)

3.2 3.2.1 Wavelength ✓ (1)

3.2.2 Compression ✓ (1)

3.3 3.3.1  $v = f\lambda$  ✓

$$342\checkmark = f (9/1000) \checkmark$$

$$f = 38\,000 \text{ Hz} = 38 \text{ kHz} \checkmark$$

$$38 \text{ kHz} > 20 \text{ kHz}$$

∴ humans cannot hear this sound. ✓ (5)

3.3.2 ultrasound ✓ (1)

3.4 Distance from device to building B

$$s = v \times t \checkmark$$

$$= 340 \times 0,75 \checkmark \quad (1, 5 / 2)$$

$$= 255 \text{ m} \checkmark$$

Distance from device to building A

$$s = 340 \times 0,5 \checkmark \quad (1/2)$$

$$= 170 \text{ m} \checkmark$$

∴ Distance between two buildings :255 + 170 = 425 m ✓ (6)  
[16]

## QUESTION 4

4.1 4.1.1 Radio and TV broadcast / Communication / Locating information about our universe. ✓  
**ANY ONE** (1)

4.1.2  $E = h.f$  ✓

$$E = \frac{6,63 \times 10^{-34}}{0,14} (3 \times 10^8) \checkmark \checkmark$$

$$E = 1,42 \times 10^{-24} \text{ J} \checkmark (4)$$

- 4.2 4.2.1  $3,0 \times 10^8 \text{ m}\cdot\text{s}^{-1} \checkmark$  (1)
- 4.2.2  $c = \lambda f \checkmark$
- $$3 \times 10^8 \checkmark = 1,5 \times 10^{-11} \checkmark \times f$$
- $$f = 2 \times 10^{19} \text{ Hz} \checkmark$$
- (4)
- 4.3 They are a high-frequency / energy type of electromagnetic radiation with a relatively high penetrating ability.  $\checkmark\checkmark$  (2)  
[12]

**QUESTION 5**

- 5.1 5.1.1 The spheres are carrying opposite charges  $\checkmark$  and will attract each other  $\checkmark$  (2)
- 5.1.2 Sphere A  $\checkmark$  (1)
- 5.2 5.2.1  $Q_{\text{new}} = \frac{Q_A + Q_B}{2} \checkmark$
- $$= \frac{-8 + 20 \checkmark}{2}$$
- $$= +6 \text{ C} \checkmark$$
- (3)
- 5.2.2 Repulsion  $\checkmark$ , the spheres are now carrying the same charge, they are both positively / like charged  $\checkmark$  and they repel each other since like charges repel. (2)
- 5.2.3 Every charge in the universe is a scalar multiple of the charge of a single electron.  $\checkmark\checkmark$  (2)
- 5.2.4  $n = \frac{\Delta Q}{e} \checkmark$
- $$n = \frac{6-20}{-1,6 \times 10^{-19}} \checkmark\checkmark \quad \text{OR} \quad n = \frac{6-(-8)}{1,6 \times 10^{-19}} \checkmark\checkmark$$
- $$n = 8,75 \times 10^{19} \text{ electrons} \checkmark$$
- (4)
- 
- [14]

## QUESTION 6

- 6.1 6.1.1 The voltage across the terminals of a battery / cell when no current is flowing. ✓✓

ACCEPT

The maximum energy that a battery / cell can dissipate per coulomb of charge. ✓✓

(2)

$$6.1.2 \quad \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$$

$$= \frac{1}{6} + \frac{1}{4} \checkmark$$

$$= \frac{5}{12}$$

$$R = 2,4 \Omega \checkmark \checkmark$$

(3)

$$6.1.3 \quad I = 5 - 3 \checkmark = 2 A \checkmark$$

(2)

$$6.2 \quad 6.2.1 \quad R = R_1 + R_2 + R_3 \checkmark$$

$$= 5 + 7 + 8 \checkmark$$

$$= 20 \Omega \checkmark$$

(3)

$$6.2.2 \quad V = 4 - (1,6 + 1) \checkmark = 1,4 V \checkmark$$

(2)

$$6.2.3 \quad 0,2 A \checkmark, \text{ the current flowing through resistors in series is the same. } \checkmark$$

(2)

$$6.3 \quad I = \frac{Q}{\Delta t} \checkmark$$

$$= \frac{48}{120} \checkmark$$

$$= 0,4 A \checkmark$$

(3)

[17]

TOTAL: 100