



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

NOVEMBER 2021

GRADE 10

MARKING GUIDELINES

PHYSICAL SCIENCES (PHYSICS) (PAPER 1)
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7 pages

SECTION A

QUESTION 1

- 1.1 A (2)
- 1.2 A (2)
- 1.3 A (2)
- 1.4 D (2)
- 1.5 B (2)
- 1.6 A (2)
- 1.7 C (2)
- 1.8 A (2)
- 1.9 B (2)
- 1.10 C (2)
- [20]**

TOTAL SECTION A: 20

SECTION B

QUESTION 2

- 2.1 The algebraic sum of two disturbances that occupy the same space at the same time. (2)
- 2.2 2.2.1 Wavelength (1)
- 2.2.2 Trough (1)
- 2.2.3 Crest (1)
- 2.2.4 Amplitude (1)
- 2.3 2.3.1 B and D
A and F (2)
- 2.3.2 D and C
C and F (2)
- 2.4 0,02 m (2)
- [12]**

QUESTION 3

3.1 Net charge of an isolated system remains constant during any physical process. ✓✓ (2)

3.2 $Q = Q_P + Q_T$ ✓
 $= (-4 \times 10^{-9}) + (+6 \times 10^{-9})$ ✓
 $= +2 \times 10^{-9} \text{ C}$ ✓ (3)

3.3.1 $Q_{\text{New}} = \frac{Q_P + Q_T}{2}$ ✓
 $= \frac{-4 \times 10^{-9} + 6 \times 10^{-9}}{2}$ ✓
 $= +1 \times 10^{-9} \text{ C}$ ✓ (3)

3.3.2 Every charge in the universe consists of the integer multiple of the electron charge. ✓✓ (2)

3.3.3 $Q = n \cdot q_e$ ✓
 $2 \times 10^{-9} = n \cdot (1.6 \times 10^{-19})$ ✓
 $\therefore n = 1.25 \times 10^{10} \text{ electrons}$ ✓ (3)

3.3.4 From P to T ✓

- Sphere P, has excess ✓ number of electrons ✓
OR
- Sphere T, has deficit ✓ number of electrons ✓

(3)
[16]

QUESTION 4

4.1 Voltage is the amount of work done per unit charge. ✓✓

OR

Difference in electric potential between two points in a circuit. ✓✓ (2)

4.2 4.2.1 $\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$ ✓

$$\frac{1}{R_P} = \frac{1}{24} + \frac{1}{8} \quad \checkmark$$

$$\therefore R_P = 6 \, \Omega$$

$$R_{TOT} = R_S + R_P$$

$$= 2 + 6 \quad \checkmark$$

$$= 8 \, \Omega \quad \checkmark$$

(4)

4.2.2 $I = \frac{Q}{\Delta t}$ ✓

$$4 = \frac{Q}{(2 \times 60)} \quad \checkmark$$

$$\therefore Q = 480 \, \text{C} \quad \checkmark$$

(3)

4.3 $V_{TOT} = V_{2\Omega} + V_P$ ✓

$$24 = 6 + V_P \quad \checkmark$$

$$\therefore V_P = 18 \, \text{V} \quad \checkmark$$

(3)

[12]

QUESTION 5

5.1 Photon – A quantum of light/electromagnetic radiation with energy proportional to frequency. ✓✓ (2)

5.2 A – Microwave oven ✓

B – Visible light ✓

C – Ultraviolet light ✓

D – Gamma rays ✓

(4)

5.3 To examine for broken/fractured bones. (1)

5.4 Infrared

– It has highest frequency ✓, thus greater energy. $E \propto F$ ✓ from $E = h.F$ (3)

5.5 $E = h.F$

$$= 6,63 \times 10^{-10} \times 3,2 \times 10^{10} \checkmark$$

$$= 2,12 \times 10^{-23} \text{ J } \checkmark$$

(3)

[13]**QUESTION 6**

6.1 Displacement is the change in position measured as the difference between final and initial points on a straight line. $\checkmark\checkmark$

(2)

6.2 Moving at a constant velocity.

– Same distance is covered in the same time.

(2)

6.3 $\Delta x = 33 - 12 \checkmark$

$$= 21 \text{ m } \checkmark, \text{ East. } \checkmark$$

(3)

6.4 $v = \frac{\Delta x}{\Delta t} \checkmark$

$$= \frac{(33-21)}{7,5-6} \checkmark$$

$$= 8 \text{ m.s}^{-1} \checkmark$$

(3)

[10]**QUESTION 7**

7.1 Energy that an object has as a result of its height/position above the surface of the earth. $\checkmark\checkmark$

(2)

7.2 $EM_A = E_P + E_K \checkmark$

$$= m.g.h + 0$$

$$= (45)(9,8)(0,2) \checkmark + 0 \checkmark$$

$$= 88,2 \text{ J } \checkmark$$

(4)

7.3 **POSITIVE MARKING FROM 7.2**

$$EM_A = EM_B \checkmark$$

$$88,2 \checkmark = \frac{1}{2}mv^2 + 0 \checkmark$$

$$88,2 = \frac{1}{2}(45)v^2 \checkmark + 0 \checkmark$$

$$\therefore v = \sqrt{\frac{88,2}{22,5}}$$

$$= 1,98 \text{ m.s}^{-1}$$

(5)

7.4 Conservation of mechanical energy.

Total mechanical energy of an isolated system ✓ remains constant or is conserved. ✓ (3)

7.5 $\sin 25^\circ = \frac{20}{AB}$ ✓

$$\therefore AB = \frac{20}{\sin 25^\circ} \checkmark$$

$$= 47,32 \text{ cm } \checkmark \text{ or } 0,4732 \text{ m } \checkmark$$

(3)

[17]

TOTAL SECTION B: 80

TOTAL MARKS: 100