



GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PROVINCIAL EXAMINATION

NOVEMBER 2023

GRADE 10

MARKING GUIDELINES

PHYSICAL SCIENCES: PHYSICS (PAPER 1)

5 pages

QUESTION 1

- 1.1 B ✓✓ (2)
- 1.2 A ✓✓ (2)
- 1.3 C ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 D ✓✓ (2)
- 1.6 B ✓✓ (2)
- 1.7 D ✓✓ (2)

[14]

QUESTION 2

- 2.1 A transverse wave is a wave in which the particles of the medium vibrate at right angles to the direction of the motion of the wave. ✓✓ (2)
- 2.2 2.2.1 A and C ✓ (1)
- 2.2.2 Trough ✓ (1)
- 2.2.3 Crest ✓ (1)
- 2.3 2.3.1 Amplitude = 0,5(20) ✓
= 10 cm ✓
= 0,1 m ✓ (3)
- 2.3.2 Wavelength = $\frac{1}{2}$ (4) ✓
= 2 m ✓ (2)
- 2.4 2.4.1 $T = 1/f$ ✓
= $1/1,5$ ✓
= 0,67 s ✓ (3)
- 2.4.2 $v = f \cdot \lambda$ ✓
= (1,5)(2) ✓
= $3 \text{ m} \cdot \text{s}^{-1}$ ✓ (3)

[16]

QUESTION 3

- 3.1 Originates from accelerating electric charge/propagate as electric and magnetic fields that are perpendicular to each other. ✓ (1)
- 3.2 Microwave ✓ Infrared ✓ and Visible radiation ✓ (3)
- 3.3 3.3.1 $E = h \frac{c}{\lambda}$ ✓
 $E = 6,63 \times 10^{-34} \times \frac{3 \times 10^8}{700 \times 10^{-9}}$ ✓
 $E = 2,84 \times 10^{-19} \text{ J}$ ✓ (4)
- 3.3.2 $E = hf$ ✓
 $2,84 \times 10^{-19} = 6,63 \times 10^{-34} f$ ✓
 $f = 4,29 \times 10^{14} \text{ Hz}$ ✓ (3)
- [11]

QUESTION 4

- 4.1 A single vector that produces the same effect as is produced by a number of vectors collectively. ✓✓ (2)
- 4.2 $\vec{F}_{net} = \vec{F}_1 + \vec{F}_2$ ✓
 $F_{net} = 5 + (-2)$ ✓
 $F_{net} = 3 \text{ N}$ regs ✓✓ (magnitude and direction) (4)
- [6]

QUESTION 5

- 5.1 5.1.1 $10 \text{ m} \cdot \text{s}^{-1}$ ✓ (1)
- 5.1.2 The object moves at constant velocity ✓ of $10 \text{ m} \cdot \text{s}^{-1}$ east. ✓ (2)
- 5.1.3 $a = \frac{y_2 - y_1}{x_2 - x_1}$ ✓
 $a = \frac{-10 - 10}{7 - 3}$ ✓
 $a = -5 \text{ m} \cdot \text{s}^{-2}$
 $a = 5 \text{ m} \cdot \text{s}^{-2}$ ✓ west ✓ (size and direction) (4)
- 5.2 5.2.1 $200 \text{ m} - 200 \text{ m} = 0 \text{ m}$ ✓ (1)
- 5.2.2 Average speed is the total distance travelled by an object per total time. ✓✓
Average velocity is the rate of the change in position or displacement divided by the time intervals in which displacement occurs. ✓✓ (4)

5.2.3 $V_{speed} = \frac{\Delta x}{\Delta t}$
 $= \frac{400}{240} \checkmark$
 $= 1,67 \text{ m} \cdot \text{s}^{-1} \checkmark$ (3)
[15]

QUESTION 6

6.1 The principle of conservation of charge states that the net charge of an isolated system remains constant during any physical process. $\checkmark \checkmark$ (2)

6.2 A \checkmark Electrons move from the negative sphere to the positive sphere. \checkmark or B has excess number of electrons or A has deficit number of electrons. (2)

6.3 6.3.1 $Q_{net} = Q_1 + Q_2 \checkmark$
 $= +5 \times 10^{-9} + (-2 \times 10^{-9}) \checkmark$
 $= +3 \times 10^{-9} \text{ C} \checkmark$ (2)

6.3.2 $Q = \frac{Q_1 + Q_2}{2} \checkmark$
 $= \frac{(5 \times 10^{-9}) + (-2 \times 10^{-9})}{2} \checkmark$
 $= +1,5 \times 10^{-9} \text{ C} \checkmark$ (3)

6.3.3 $Q = n q_e \checkmark$ or $n = \frac{Q}{e} \checkmark$
 $3,5 \times 10^{-9} \checkmark = n \times 1,6 \times 10^{-19} \checkmark$ $= \frac{3,5 \times 10^{-9}}{1,6 \times 10^{-19}} \checkmark$
 $n = 2,19 \times 10^{10} \text{ electrons} \checkmark$ $= 2,19 \times 10^{10} \text{ electrons} \checkmark$ (4)
[13]

QUESTION 7

7.1 Work done per unit charge by the battery. $\checkmark \checkmark$ (2)

7.2 $1,5 \times 4 = 6 \text{ V} \checkmark \checkmark$ (2)

7.3 7.3.1 $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} \checkmark$
 $\frac{1}{R_p} = \frac{1}{3} + \frac{1}{6} \checkmark$
 $R_p = 2 \Omega$
 $R_T = R_s + R_p$
 $R_T = 8 + 2 \checkmark$
 $R_t = 10 \Omega \checkmark$ (4)

7.3.2 Positive marking from 7,2.

$$V_{\text{Total}} = V_2 + V_3 \checkmark$$

$$6 = V_2 + 4,8 \checkmark$$

$$V_2 = 1,2 \text{ V} \checkmark$$

(3)

7.3.3 $Q = I \Delta t \checkmark$

$$Q = (0,6)(20) \checkmark$$

$$Q = 12 \text{ C} \checkmark$$

(3)

7.4 DECREASES \checkmark

The total effective resistance of the circuit increases. \checkmark

(2)

[16]

QUESTION 8

8.1 Kinetic energy is the energy an object possesses as a result of its motion. $\checkmark\checkmark$

(2)

8.2 $E_k = \frac{1}{2} mv^2 \checkmark$

$$= \frac{1}{2} (0,18) \times (30)^2 \checkmark\checkmark$$

$$= 81 \text{ J} \checkmark$$

(4)

8.3 $E_k = \frac{1}{2} mv^2$

$$162 \checkmark = \frac{1}{2} (0,18) \cdot v^2 \checkmark$$

$$v = 42,43 \text{ m} \cdot \text{s}^{-1} \checkmark$$

(3)

[9]

TOTAL: 100