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education

Department:
Education
North West Provincial Government
REPUBLIC OF SOUTH AFRICA

# PROVINCIAL ASSESSMENT

## GRADE 10

## PHYSICAL SCIENCES: PHYSICS (P1)

## JUNE 2024

## MARKING GUIDELINES

**MARKS: 75**

**These marking guidelines consist of 5 pages and a cognitive table.**

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## QUESTION 1

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

**[14]**

## QUESTION 2

2.1 The number of waves/wave pulses ✓ passing a point per second.✓ (2)

2.2. 2.2.1 A&B or A&D or B&C or B&D or C&D ✓ (any one) (1)

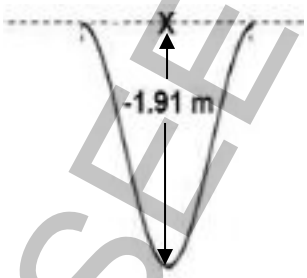
2.2.2 Crest ✓ (1)

2.3 2.3.1 Wavelength = ½ (6) ✓
= 3 m ✓ (2)

2.3.2 Amplitude = 0,5(18) ✓
= 9 cm ✓
= 0,09 m ✓ (3)

2.4 2.4.1 Destructive interference ✓ (1)

2.4.2 **Positive marking from question 2.3.2**




| Marking criteria: | |
|---|---|
| Trough | ✓ |
| Correct amplitude | ✓ |

(2)

**[12]**

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## QUESTION 3

3.1 3.1.1 Temperature ✓ (1)

3.1.2 Speed of sound✓ or
Time taken for the sound to travel.✓ (1)

3.2 $V = \frac{\Delta x/d}{\Delta t}$ ✓
$= \frac{80}{0,236}$ ✓
$= 338,98\ m.s^{-1}$ ✓ (3)

3.3 The speed of sound increases/time taken for the sound to travel decreases/as the temperature increases. ✓✓ (2)

3.4 3.4.1 Wave A ✓ (1)

3.4.2 Wave A ✓ (1)
**[9]**

## QUESTION 4

4.1 Wave-particle duality ✓
No need for a medium to propagate. ✓
Speed of EM waves are constant at 3 × $10^{-8}$ m.$s^{-1}$ in a vacuum.
Oscillation between alternating accelerating charges cause magnetic waves. (any two) (2)

4.2 4.2.1 Radio waves OR microwaves ✓ (1)

4.2.2 Infrared radiation/waves ✓ (1)

4.3 Gamma rays ✓ (1)

4.4 Gamma rays have the shortest wavelengths or the highest frequencies in the electromagnetic spectrum. ✓ (1)

4.5 4.5.1 Packet of energy found in light. ✓✓ (2)

4.5.2

| Option 1 | Option 2 |
|---|---|
| $c = f\lambda$<br>380 x $10^{8}$ = f (700 x $10^{-9}$) ✓<br>f = 5,428 x $10^{16}$ Hz<br>E = hf ✓<br>= 6,63 x $10^{-34}$ (5,428 x $10^{16}$)✓<br>= 3,598 x $10^{-17}$ J ✓<br>≈ 3,60 x $10^{-17}$ J | $E = h\frac{c}{\lambda}$ ✓<br>= 6,63 x $10^{-34}$ ✓$\frac{380 \text{ x } 10^{8}}{700 \text{ x } 10^{-9}}$ ✓<br>= 3,598 x $10^{-17}$ J ✓<br>≈ 3,60 x $10^{-17}$ J |

(4)
**[12]**

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## QUESTION 5

5.1 The principle of conservation of charge states that the net charge of an isolated system remains constant during any physical process. ✓✓ (2)

5.2 EXCESS ✓ (1)

5.3 FROM B TO A ✓ (1)

5.4 $Q = \frac{Q_1+Q_2}{2}$ ✓
$= \frac{5\times10^{-9}+(-2\times10^{-9})}{2}$ ✓
= + 1,5 x $10^{-9}$ C ✓ (3)

5.5

| Option 1 | Option 2 |
|---|---|
| Q = $nq_e$ ✓<br>1,5 x $10^{-9}$ = n x 1,6 x $10^{-19}$ ✓<br>n = 9,375 x $10^9$ electrons ✓ | n = $\frac{Q}{e}$ ✓<br>= $\frac{1,5\times10^{-9}}{1,6\times10^{-19}}$ ✓<br>= 9,375 x $10^9$ electrons ✓ |

(3)

5.6 When the charged plastic ruler is brought closer to the uncharged pieces of paper, the paper is polarised. ✓ The negative charges on the paper are repelled by the negative charges on the ruler. This leaves the side of the paper closest to the ruler positive. ✓ (2)
**[12]**

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## QUESTION 6

6.1 Current strength: rate of flow of charge ✓✓ (2)

6.2 6.2.1 $V_1 = 1,5 \times 4$
$= 6$ V ✓✓ (2)

6.2.2 **Positive marking from question 6.2.1**

| Option 1 | Option 2 |
|---|---|
| $V_{Total} = V_2 + V_3$ ✓<br>$6 = V_2 + 4,8$ ✓<br>$V_2 = 1,2$ V ✓ | $I = \frac{V}{R}$<br>$= \frac{4,8}{8}$<br>$= 0,6$ A<br><br>$\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$<br>$= \frac{1}{6} + \frac{1}{3}$<br>$R_p = 2\ \Omega$<br><br>$V_2 = I \times R$ ✓<br>$= 0,6 \times 2$ ✓<br>$= 1,2$ V ✓ |

(2)

6.3 **Positive marking from questions 6.2.1 and 6.2.2**

| Option 1 | Option 2 |
|---|---|
| $I = \frac{V}{R}$ ✓<br>$= \frac{4,8}{8}$ ✓<br>$= 0,6$ A ✓ | $I = \frac{V}{R}$ ✓<br>$= \frac{6}{10}$ ✓<br>$= 0,6$ A ✓ |

(3)

6.4 6.4.1 **Positive marking from questions 6.2.1, 6.2.2 and 6.3**

| Option 1 | Option 2 |
|---|---|
| $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$<br>$= \frac{1}{6} + \frac{1}{3}$<br>$R_p = 2\ \Omega$<br>$R_T = R_s + R_p$ — Any equation ✓<br>$= 8 + 2$ ✓<br>$= 10\ \Omega$ ✓ | $R = \frac{V}{I}$ ✓<br>$= \frac{6}{0,6}$ ✓<br>$= 10\ \Omega$ ✓ |

(3)

6.4.2 $Q = I \times t$ ✓
$Q = (0,6)(20)$ ✓
$Q = 12$ C ✓ (3)

6.5 DECREASES ✓ (1)

**[16]**

**TOTAL: 75**

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