June 2026

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

**FINAL**

# NATIONAL SENIOR CERTIFICATE

## GRADE 10

## PHYSICAL SCIENCES P1

PROVINCIAL STANDARDISED ASSESSMENT

**MARKING MEMORANDUM**
**JUNE 2026**

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**MARKS: 75**

**DURATION: 1,5 hours**

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## QUESTION 1:

1.1 D ✓✓ (2)
1.2 B ✓✓ (2)
1.3 C ✓✓ (2)
1.4 A ✓✓ (2)
1.5 D ✓✓ (2)
**[10]**

## QUESTION 2

2.1 The overlapping/occupying/addition of a crest of one pulse with the trough of another✓ resulting in a pulse of reduced amplitude✓ (2)

2.2 -2 = +3 + B✓
B = -5cm✓ (2)

FULL MARKS FOR CORRECT ANSWER ONLY

2.3.1 Pulse C has an amplitude of -3cm or Pulse C has a trough 3cm below rest position or Pulse C has a trough of equal amplitude ✓ (1)

2.3.2 Destructive (interference) ✓ (1)

**[6]**

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## QUESTION 3

3.1.1 0.1 s. ✓ (1)

3.1.2 4 cm✓ (1)

3.2.1 λ =30 × 2✓
= 60 cm✓ **accept 0.60m** (2)

**FULL MARKS FOR ANSWER ONLY**

3.2.2

**OPTION 1**

$f = \frac{1}{T}$
$= \frac{1}{0,1}$
= 10 Hz
V = f × λ ✓
= 10× 0.6✓
= 6m.s$^{-1}$ ✓

**OPTION 2**

$V = \frac{1}{T} \times \lambda$ ✓
$= \frac{1}{0.1} \times 0.6$✓
= 6m.s$^{-1}$ ✓

**OPTION 3**

speed = $\frac{\text{distance}}{\text{time}}$✓
$= \frac{0.6}{0.1}$ ✓
= 6m.s$^{-1}$ ✓
(Accept $\Delta x = v \times \Delta t$)

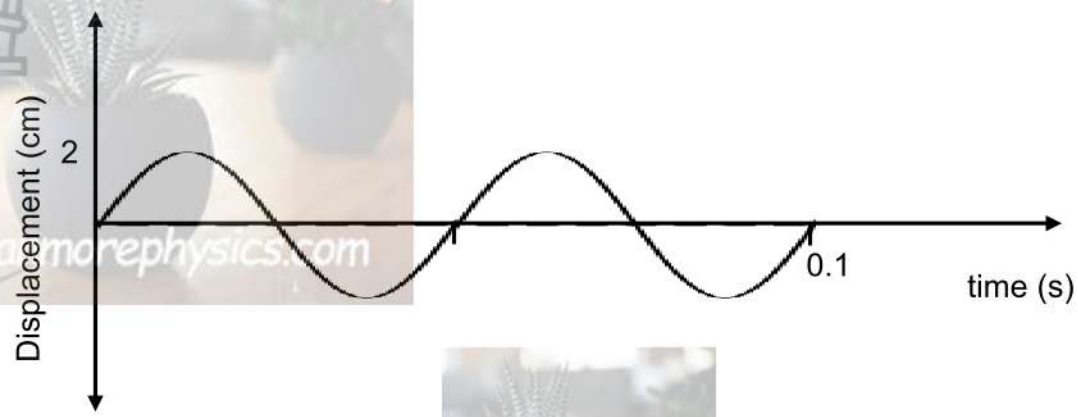
(3)

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3.3 **POSITIVE MARKING FROM QUESTION 3.2**

**CRITERIA**:
wave drawn with amplitude of 2 cm ✓
Two waves drawn for the 0.1 second interval ✓




(2)

**[9]**

**QUESTION 4**

4.1.1 rarefaction✓ (1)

4.1.2 compression✓ (1)

4.2 $\lambda = 20 \times 2$✓
$= 40$ mm✓

**FULL MARKS FOR ANSWER ONLY** (2)

4.3 **POSITIVE MARKING FROM QUESTION 4.2**

$v = f \times \lambda$
$0.5 = f \times 0.04$✓
$f = 12,5$ Hz

OR

$V = \Delta x/\Delta t$ ✓
$0,5$✓ $= 0,04/\Delta t$ ✓
$\Delta t = 0,08$s ✓

$T = \frac{1}{f}$ ✓
$= \frac{1}{12,5}$ ✓
$= 0,08$ s ✓ (4)

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4.4

**Accept** $\Delta x = v \times \Delta t$

**OPTION 1**

$\Delta t$ for sound to travel from position 1 to position 2:

Distance = speed x time

300 = 340 x t ✓

t = 0,88 s

$\Delta t$ for sound to travel from position 2 to the building : ✓

$\Delta t = \frac{2 - 0.88✓}{2✓}$

= 0,56 s

Distance = speed x time

= 340 x 0,56✓

= 190,4m✓

**OPTION 2**

$\Delta t$ for sound to travel from position 1 to position 2:

Distance = speed x time

300 = 340 x t ✓

t = 0,88 s

$\Delta t$ for sound to travel from position 1 to the building: ✓

$\Delta t = \frac{2 + 0,88✓}{2✓}$

= 1,44 s

Distance = speed x time

= 340 x 1,44✓

= 489,6m

Distance from position 2 to the building :

489,6-300 =189,6m✓

**OPTION 3**

Distance = speed x time✓

2x-300 ✓ = 340 x 2 ✓

x = 490m ✓

= position 1 from the building

Position 2 from building = 490-300✓

= 190m✓

(outgoing distance =x. Return distance is x-300. Therefore x+ (x-300)= 680m. This equates to: 2x-300= 680m

(6)

**[14]**

**QUESTION 5**

5.1 Infrared and ultraviolet ✓ (1)

5.2.1 **OPTION 1**

$E = \frac{hc}{\lambda}$ ✓

$= \frac{6,63 \times 10^{-34} \times 3 \times 10^{8} ✓}{600 \times 10^{-9} ✓}$

$= 3,32 \times 10^{-19}$ J✓

**OPTION 2**

$c = f \times \lambda$

$3 \times 10^{8} = f \times 600 \times 10^{-9}$✓

$f = 5 \times 10^{14}$Hz

$E = h \times f$ ✓

$= 6,63 \times 10^{-34} \times 5 \times 10^{14}$ ✓

$= 3,32 \times 10^{-19}$ J✓ (4)

5.2.2 **OPTION 1**

$c = f \times \lambda$ ✓

$3 \times 10^{8} = f \times 600 \times 10^{-9}$ ✓

$f = 5 \times 10^{14}$Hz✓

**OPTION 2** POSITIVE MARKING FROM 5.2.1

$E = h \times f$ ✓

$3.32 \times 10^{-19} = 6,63 \times 10^{-34} \times f$ ✓

$f = 5 \times 10^{14}$Hz ✓ (3)

**[8]**

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**QUESTION 6**

6.1 Net/total charge remains constant✓ in an isolated system during any physical process. ✓

(2)

6.2 $Q = \frac{Q_1 + Q_2}{2}$ ✓

$[1.6 \times 10^{-9} = \frac{3 \times 10^{-9} + Q_Y}{2}]$ ✓

$Q_Y = +2 \times 10^{-10}$ C (or 0.2nC) ✓ (3)

6.3 $\Delta Q = + 1.6 \times 10^{-9} - 3 \times 10^{-9}$ OPTION 1

$= - 1.4 \times 10^{-9}$ C

$Q = n \times q_e$ ✓

$1.4 \times 10^{-9} = n \times 1,6 \times 10^{-19}$ ✓ accept: $-1.4 \times 10^{-9} = n \times -1,6 \times 10^{-19}$ ✓

$n = 8,75 \times 10^{9}$ (electrons) ✓ (3)

$\Delta Q = + 1.6 \times 10^{-9} - 2 \times 10^{-10}$ OPTION 2

$= 1,4 \times 10^{-9}$ C

$Q = n \times q_e$ ✓

$1.4 \times 10^{-9} = n \times 1,6 \times 10^{-19}$ ✓

$n = 8,75 \times 10^{9}$ (electrons) ✓ **[8]**

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## QUESTION 7

7.1 The potential difference across a conductor is directly proportional to the current✓ through the conductor at constant temperature ✓ (2)

7.2.1 $\frac{1}{R} = \frac{1}{R1} + \frac{1}{R2}$ ✓ **accept** $R_P = \frac{R1\ X\ R2}{R1+R2}$

$= \frac{1}{12} + \frac{1}{6}$ ✓

$R_P = 4\Omega$

$R_T = 4 + 10 + 6$✓

$= 20\ \Omega$ ✓ (4)

7.2.2 $R = \frac{V}{I}$ ✓

**POSITIVE MARKING FROM 7.2.1**

$20 = \frac{48}{I}$ ✓

$I = 2,4\ A$ ✓ (3)

7.2.3 $V = IR$✓ or $V = IR$✓

**POSITIVE MARKING FROM 7.2.2**

$= 2.4 \times 16$✓ $= 2,4 \times 4$✓

$= 38,4\ V$✓ $= 9,6V$ and $48V - 9,6V = 38,4V$✓ (3)

7.2.4

**POSITIVE MARKING FROM 7.2.3**

$V_P = V_T - V$

$= 48 - 38.4$✓

$= 9,6V$

$I_{12\ \Omega} = \frac{V}{R}$

$= \frac{9.6}{12}$ ✓

$= 0,8\ A$

**Accept ratio method**

$I_{12\ \Omega} = \frac{1}{3} \times 2.4$ ✓

$= 0,8\ A$✓

**MARKING CRITERIA**

- calculate $I_{12\ \Omega}$ ✓✓
- calculate charge through the $R_{12\ \Omega}$ using $Q = I \times \Delta t$ ✓
- calculate number of electrons using $Q = n \times q_e$ ✓✓

$Q = I \times \Delta t$

$= 0.8 \times (5 \times 60)$ ✓

$= 240\ C$

$Q = n \times q_e$

$240 = n \times 1.6 \times 10^{-19}$✓

$n = 1,5 \times 10^{21}$ (electrons) ✓ (5)

7.3 Decreases✓

Total resistance (in the circuit) increases✓

Current is inversely proportional to resistance, so total current decreases✓ (3)

( $R = \frac{V}{I}$ : Learners may also make use of the equation to explain )

**[20]**

**TOTAL: 75**

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