KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

PHYSICAL SCIENCES P1

FINAL EXAMINATION MARKING MEMORANDUM

NOVEMBER 2025

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MARKS: 100

DURATION: 2 hours

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QUESTION 1:

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

QUESTION 2

2.1.1 Longitudinal ✓ (1)

2.1.2a) $\text{speed} = \frac{\text{distance}}{\text{time}}$ ✓

$= \frac{300000}{45}$ ✓

$= 6666{,}67\ m \cdot s^{-1}$ ✓ (3)

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2.1.2b) **POSITIVE MARKING FROM 2.1.2a)**

$v = f \times \lambda$ ✓

$6666{,}67 = f \times 3600$ ✓

$f = 1{,}85$ Hz ✓ (3)

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2.1.3 **POSITIVE MARKING FROM 2.1.2b)**

OPTION 1

$t = 60 - 45$ ✓

$= 15$ s

$1{,}85$ ✓ $= \frac{\text{number of waves}}{15}$ ✓

$= 27{,}75$ waves ✓

OPTION 2

$t = 60 - 45$ ✓

$= 15$ s

$T = \frac{1}{f}$

$T = \frac{1}{1{,}85}$

$= 0{,}54$ s

$\text{number of waves} = \frac{15}{0{,}54}$ ✓ ✓

$= 27{,}75$ waves ✓ (4)

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2.2.1 The distance between two successive points in phase. ✓✓ (2)

2.2.2
$$\text{speed} = \frac{\text{distance}}{\text{time}}$$
$$= \frac{6500\ ✓}{19\ ✓}$$
$$= 342{,}11\ \text{m·s}^{-1}$$
$v = f \times \lambda$ ✓
$342{,}11 = 490 \times \lambda$ ✓
$\lambda = 0{,}7\ \text{m}$ ✓ (5)

[18]

QUESTION 3

3.1

OPTION 1	**OPTION 2**
$E = h \times f$ ✓	$E = h \times f$ ✓
$= 6{,}63 \times 10^{-34} \times 1{,}2 \times 10^{15}$ ✓	$4{,}5 \times 10^{-19} = 6{,}63 \times 10^{-34} \times f$ ✓
$= 7{,}96 \times 10^{-19}$ J ✓	$f = 6{,}79 \times 10^{14}$ Hz ✓
$E_{(UV-B)} > 4{,}5 \times 10^{-19}$ J ✓	$f_{(UV-B)}$ OR $(1{,}2 \times 10^{15}\ \text{Hz}) > 6{,}79 \times 10^{14}$ Hz ✓

(4)

3.2 $c = f \times \lambda$ ✓
$3 \times 10^{8} = f \times 300 \times 10^{-9}$ ✓
$f = 1 \times 10^{15}$ Hz ✓
It will NOT provide protection against UV-B (since $f < 1{,}2 \times 10^{15}$ Hz) ✓ (4)

[8]

QUESTION 4

4.1 All charges in the universe consists of an integer multiple ✓ of the charge on one electron. ✓ (2)

4.2 $Q = n \times q_e$ ✓
$4 \times 10^{-6} = n \times 1{,}6 \times 10^{-19}$ ✓
$n = 2{,}5 \times 10^{13}$ ✓ (3)

4.3.1 $Q_Y = 2 \times 10^{-6} + 4 \times 10^{-6}$ ✓
$= 6 \times 10^{-6}$ C (2)

4.3.2 **POSITIVE MARKING FROM 4.3.1**
$$Q = \frac{Q1 + Q2}{2} ✓$$
$$2 \times 10^{-6} = \frac{Q_X + 6 \times 10^{-6}}{2} ✓$$
$Q_X = -2 \times 10^{-9}$ C ✓ (3)

[10]

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QUESTION 5

5.1 The ratio of the potential difference across a resistor to the current in the resistor. ✓✓ (2)

5.2.1

OPTION 1

$V_{6\Omega} = IR$
$= 0,5 \times 6$ ✓
$= 3$ V
$V_{12\Omega} = IR$✓
$3 = I \times 12$ ✓
$I = 0,25$ A ✓

OPTION 2

$I_{12\Omega} = ½ I_{6\Omega}$ ✓
$= ½ (0,5)$ ✓✓
$= 0,25$ A ✓

(4)

5.2.2 **POSITIVE MARKING FROM QUESTION 5.2.1**

$V_{Rx} = 18 - 3$ ✓
$= 15$ V
$I_{Rx} = 0,5 + 0,25$ ✓
$= 0,75$ A

$R_x = \frac{V}{I}$
$= \frac{15}{0,75}$ ✓
$= 20\ \Omega$ ✓



(4)

5.2.3

OPTION 1

$Q = I\Delta t$
$= 0,5 \times 180$ ✓
$= 90$

$W = VQ$✓
$= 3$✓ $\times 90$ ✓
$= 270$ J✓

OPTION 2

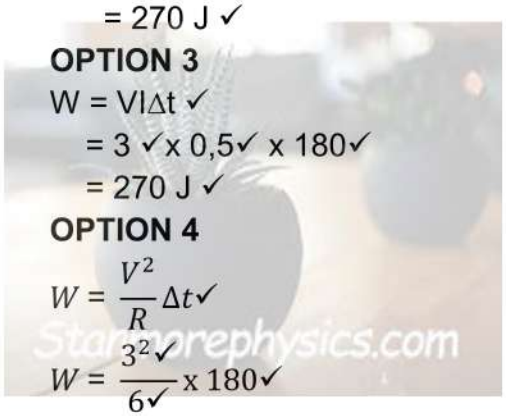
$W = I^2R\Delta t$ ✓
$= 0,5^2$ ✓$\times 6$ ✓$\times 180$ ✓
$= 270$ J ✓

OPTION 3

$W = VI\Delta t$ ✓
$= 3$ ✓$\times 0,5$✓ $\times 180$✓
$= 270$ J ✓

OPTION 4

$W = \frac{V^2}{R}\Delta t$✓
$W = \frac{3^2}{6}$✓ $\times 180$✓
$= 270$ J ✓



(5)

[15]

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QU

6.1.1 The difference in position in space ✓✓ (2)

6.1.2 20 m west ✓ (1)

6.1.3 $\Delta x = 30 - 15 + 25$ ✓
$= 40$ m
$v = \frac{\Delta x}{\Delta t}$ ✓
$= \frac{40}{14}$ ✓
$= 2{,}86\ m \cdot s^{-1}$ West ✓ (4)

6.1.4 Greater than✓ (3)
Since the player changes direction/pushed east ✓, the distance is greater than displacement. ✓

6.2.1 $\Delta x = \frac{1}{2} \times 4 \times 8$ ✓ $+ 6 \times 8$ ✓ $\times \frac{1}{2} \times 3 \times 8$ ✓
Distance = 76 m✓ (4)

6.2.2 $a = \frac{y_2 - y_1}{x_2 - x_1}$
$-0{,}5$✓ $= \frac{Z - 0}{17 - 13}$ ✓
$Z = -2\ m \cdot s^{-1}$
$\Delta x_{13-17\ s} = ½ \times 4 \times (-2)$ ✓
$= -4$ m
$\Delta x = 76 - 4$ ✓
$= 72$ m west ✓ (5)
[19]

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QU

7.1 Rate of change of velocity ✓✓ (2)

7.2 $v_f = v_i + a\Delta t$ ✓
$50 = 0 + 4\Delta t$ ✓
$\Delta t = 12,5$ s ✓ (3)

7.3 **POSITIVE MARKING FROM QUESTION 7.2**

Car:
$\Delta x = v_i\Delta t + \frac{1}{2} a\Delta t^2$ ✓
$= (0)(12,5) + \frac{1}{2}(4)(12,5^2)$ ✓
$= 312,5$ m

OR $v_f^2 = v_i^2 + 2a\Delta x$ ✓
$(50)^2 = 0^2 + 2(4)\Delta x$ ✓
$\Delta x = 312,5$ m

Train:
$\Delta x = v_i\Delta t + \frac{1}{2} a\Delta t^2$
$= (20)12,5 + \frac{1}{2}(0)(12,5^2)$ ✓
$= 250$ m

OR $\Delta x = v\Delta t$
$= (20)12,5$ ✓
$= 250$ m

Distance = 250 + 180 - 312,5 ✓
= 117,5 m ✓ (5)

[10]

QUESTION 8

8.1 $E_T = mgh + \frac{1}{2}mv^2$ ✓
$= \underline{0,5 \times 9,8 \times 50} + \underline{\frac{1}{2} \times 0,5 \times (12)^2}$ ✓
$= 281$ J ✓ (3)

8.2.1 $E_P = mgh$
$= \underline{0,5 \times 9,8}$ ✓ x $\underline{30}$ ✓
$= 147$ J ✓ (3)

8.2.2 **POSITIVE MARKING FROM 8.1 AND 8.2.1**
$E_k = 281 - 147$ ✓
$= 134$ J
$E_k = \frac{1}{2}mv^2$
134 ✓$= \frac{1}{2} \times 0,5 \times v^2$ ✓
$v = 23,15$ m·s^{-1} ✓ (4)

[10]

TOTAL: 100

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