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KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

PHYSICAL SCIENCES P1

COMMON TEST

MARKING GUIDELINE

JUNE 2024

SEE ACADEMY

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 B ✓✓ (2)
1.5 B ✓✓ (2)
[10]

QUESTION 2

2.1 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 Wavelength ✓ (1)

2.2.2 Amplitude ✓ (1)

2.3

2.3.1 $v = f \times \lambda$ ✓
$10 = 20 \times \lambda$ ✓
$\lambda = 0,5$ m ✓ (3)

2.3.2 **POSITIVE MARKING FROM QUESTION 2.3.1**

OPTION 1

$T = \frac{1}{f}$ ✓
$= \frac{1}{20}$ ✓
$= 0,05$ s
time = 3✓ x 0,05✓
= 0,15 s ✓

OPTION 2

Distance = 3 ✓ x 0,5✓
= 1,5 m
$\text{speed} = \frac{\text{distance}}{\text{time}}$ ✓
$10 = \frac{1,5}{\text{time}}$ ✓
time = 0,15 s ✓

OPTION 3

$\text{speed} = \frac{\text{distance}}{\text{time}}$ ✓
$10 = \frac{0,05}{\text{time}}$ ✓
time for 1 wave = 0,05 s
time = 3✓ x 0,05✓
= 0,15 s ✓ (5)

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QUESTION 3

3.1

3.1.1 What is the relationship between frequency and wavelength of sound waves (in air)? ✓✓ (2)

3.1.2 Frequency is inversely proportional to wavelength ✓
OR
Inverse proportion ✓ (1)

3.1.3 The speed of sound in air depends on temperature ✓ (1)

3.1.4 $v = f \times \lambda$ ✓
$= 10\,000 \times 0{,}034$ ✓ OR $= 5000 \times 0{,}068$ ✓
$= 340\ m.s^{-1}$ ✓ (3)

3.1.5 **POSITIVE MARKING FROM QUESTION 3.1.4**
$v = f \times \lambda$
$340 = 1000\ (X)$ ✓
$X = 0{,}34$ m ✓ (2)

3.2

3.2.1 $\text{speed} = \frac{\text{distance}}{\text{time}}$
340 ✓ $= \frac{\text{distance}}{0{,}074}$ ✓
Distance = 25,16 m ✓
(3)

3.2.2 **POSITIVE MARKING FROM QUESTION 3.2.1**
Distance = 100 – 25,16 ✓
= 74,84 m
$\text{speed} = \frac{\text{distance}}{\text{time}}$
340 ✓ $= \frac{74{,}84}{\text{time}}$ ✓
time = 0,22 s ✓ (4)

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QUESTION 4

4.1

4.1.1 Radio waves ✓ (1)

4.1.2 Ultraviolet ✓ (1)

4.2 Gamma rays have the highest energy. ✓
This allows it to easily penetrate through medical equipment ✓ and kill viruses and bacteria ✓. (3)

4.3

OPTION 1

$E = \frac{hc}{\lambda}$ ✓

$6,79\times10^{-23}$ ✓$= \frac{6,63\times10^{-34}\times 3\times10^{8}}{\lambda}$ ✓

$\lambda = 2,93 \times 10^{-3}$ m ✓

OPTION 2

$E = h \times f$ ✓

$6,79 \times10^{-23} = 6,63 \times10^{-34} \times f$ ✓

$f = 1,024 \times10^{11}$ Hz

$c = f \times \lambda$

$3 \times 10^{8} = 1,024 \times10^{11} \times \lambda$ ✓

$\lambda = 2,93 \times 10^{-3}$ m ✓ (4)

[9]

QUESTION 5

5.1 All charges in the universe consist of an integer multiple ✓ of the charge of one electron ✓ (2)

5.2 $Q = n \times q_e$ ✓

$= 1,25\times10^{13} \times -1,6\times10^{-19}$ ✓

$= -2 \times 10^{-6}$ C ✓ (3)

5.3 **POSITIVE MARKING FROM QUESTION 5.2**

5.3.1 $n = \frac{\Delta Q}{q_e}$ ✓

$= \frac{-2\times10^{-6} - (-8\times10^{-6})}{1,6\times10^{-19}}$ ✓ ✓

$= 3,75 \times 10^{13}\ e^{-}$ ✓ (4)

5.3.2 $Q = \frac{Q1 + Q2}{2}$ ✓

-2×10^{-6} ✓ $= \frac{-8\times10^{-6} + Q_B}{2}$ ✓

$Q_B = 4 \times 10^{-6}$ C ✓ (4)

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QUESTION 6

6.1 The rate of flow of charge. ✓✓ (2)

6.2 $V = IR$ ✓
$= 2 \times 4$ ✓
$= 8\ V$ ✓ (3)

6.3 **POSITIVE MARKING FROM QUESTION 6.2**

6.3.1

$V_{8\Omega} = IR$
$8 = I_{8\Omega} \times 8$ ✓

OR

$I_{8\Omega} = ½\ I_{4\Omega}$
$= 0,5(2)$ ✓
$I_{8\Omega} = 1A$
$I_T = 1A + 2A$ ✓
$= 3A$

OPTION 1

$V_{Bulb} = 14 – 8$ ✓
$= 6V$
$V_{Bulb} = IR$
$6 = 3 \times R_{Bulb}$ ✓
$R_{Bulb} = 2\Omega$ ✓

OPTION 2

$V_T = IR$
$14 = 3 \times R_T$ ✓
$R_T = 4,67\ \Omega$
$\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2}$
$\frac{1}{R_P} = \frac{1}{4} + \frac{1}{8}$
$R_P = 2,67\ \Omega$
$R_{Bulb} = 4,67 – 2,67\Omega$ ✓
$= 2\ \Omega$ ✓ (5)

6.3.2

$R_T = 2 + 4 + 8$ ✓
$= 14\ \Omega$
$V_T = IR$
$14 = I_T \times 14$✓
$I_T = 1A$
$Q = I\ \Delta t$ ✓
$= 1 \times 180$ ✓
$= 180\ C$ ✓ (5)

[15]

TOTAL: 75

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