KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

FINAL

NATIONAL SENIOR CERTIFICATE

GRADE 10

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PHYSICAL SCIENCES

COMMON TEST
MARKING GUIDELINE
MARCH 2025

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MARKS: 100

DURATION: 2 hours

This marking guideline consists of 7 pages.

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QUESTION 1

1.1 D ✓✓ (2)
1.2 B ✓✓ (2)
1.3 B ✓✓ (2)
1.4 A ✓✓ (2)
1.5 C ✓✓ (2)
1.6 A ✓✓ (2)
[12]

QUESTION 2

2.1 Destructive Interference. ✓ The phenomenon that occurs when the crest of one pulse overlaps with the trough of another✓ resulting in a pulse of reduced amplitude. ✓ (3)

Accept if the learner missed the word *crest* for resultant amplitude (max. 2 marks)

2.2

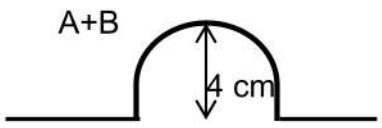
x – 6 = 4 ✓	6 – x = 4 (No mark)
x = 10 cm	x = 2 cm
Amplitude of C = ½ (10) ✓	Amplitude of C = ½ (2) ✓
= 5 cm	= 1 cm
Amplitude$_{(A+C)}$ = 6 + 5 ✓	Amplitude$_{(A+C)}$ = 6 + 1 ✓
= 11 cm ✓	= 7 cm (No Mark for answer)

(4)

POSITIVE MARKING FROM QUESTION 2.2

2.3 Criteria
Shape: Pulse drawn as crest ✓
Amplitude of pulse = 4 cm ✓

(2)



[9]

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QUESTION 3

3.1

3.1.1 A wave in which the particles of the medium vibrate at right angles to the direction of the motion of the wave.✓ ✓ (2)

3.1.2 (point) C ✓ (1)

3.1.3 Out of phase✓
Points B and C are not separated by a whole number multiple of complete wavelengths. ✓✓
OR
Points B and C are only half a wavelength apart. ✓✓
OR
Points B and C are not moving in exactly the same direction at the same time.✓✓
OR
Particle in point B is not moving in the same direction as particle in point C.✓✓ (3)

3.1.4 2 s ✓ (1)

3.1.5 **POSITIVE MARKING FROM QUESTION 3.1.4**

OPTION 1	**OPTION 2**
$f = \frac{1}{T}$ ✓	$f = \frac{2,25 ✓}{4,5 ✓}$
$f = \frac{1}{2}$ ✓	f = 0,5 Hz ✓
f = 0,5 Hz ✓	

(3)

3.1.6 **POSITIVE MARKING FROM QUESTION 3.1.5**

OPTION 1	**OPTION 2**
$speed = \frac{distance}{time}$ ✓	$\lambda = \frac{2,8}{2} = 1,4\ m$
$speed = \frac{2,8✓}{4✓}$	v = f × λ ✓
= 0,7 m.s^{-1} ✓	= 0,5 ✓ x 1,4 ✓
	= 0,7 m.s^{-1} ✓

(4)

3.2

3.2.1 T = 2 x 1,5 ✓
= 3 s ✓ (2)

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3.2.2 **POSITIVE MARKING FROM QUESTION 3.2.1**

OPTION 1

speed = $\frac{\text{distance}}{\text{time}}$

4 ✓ = $\frac{\lambda}{3}$ ✓

λ = 12 m ✓

OPTION 2

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

f = $\frac{1}{3} = 0{,}33\ Hz$

v = f × λ

4 ✓ = 0,33 ✓ × λ

λ = 12,12 m ✓ (3)

3.2.3 **POSITIVE MARKING FROM QUESTION 3.2.2**

OPTION 1

Distance = 12 x 3 ✓

= 36 m ✓

OPTION 2

Distance = 12,12 x 3 ✓

= 36,36 m ✓ (2)

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QUESTION 4

4.1

4.1.1 Compression ✓ (1)

4.1.2 Rarefaction ✓ (1)

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

4.3 **OPTION 1**

speed = $\frac{\text{distance}}{\text{time}}$

1,6 ✓ = $\frac{\text{distance}}{0{,}3}$ ✓

Distance = 0,48 m

$\lambda = \frac{0{,}48}{2}$ ✓

λ = 0,24 m ✓

OPTION 2

f = $\frac{2}{0{,}3}$ ✓

f = 6,67 Hz

v = f × λ

1,6 ✓ = 6,67 ✓ × λ

λ = 0,24 m ✓

OPTION 3

T = $\frac{0{,}3}{2}$

= 0,15 s

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

f = $\frac{1}{0{,}15}$ ✓

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$f = 6{,}67\ Hz$
$v = f \times \lambda$
1,6 ✓ = 6,67✓ × λ (4)
λ= 0,24 m ✓ **[8]**

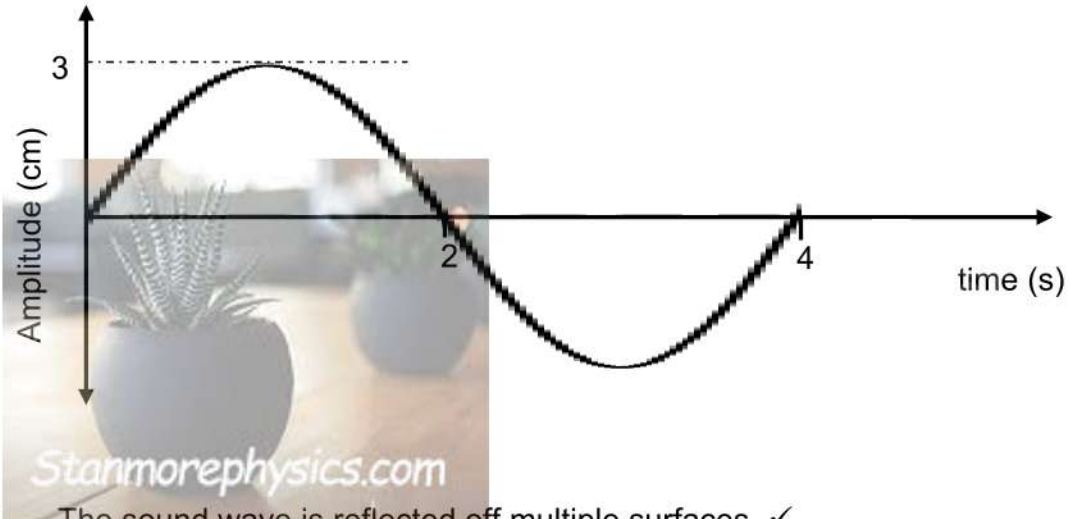
QUESTION 5

5.1 Longitudinal (waves) ✓ (1)

5.2 The particles are closer in iron than sea water. ✓
OR (1)
Iron is more dense than sea water. ✓

5.3
5.3.1 A ✓
Sound wave A has a higher amplitude ✓
A larger amplitude results in a louder sound ✓ (3)

5.3.2 Criteria:
Sound wave drawn with same amplitude of 3 cm ✓
One wave drawn for the 4 second interval ✓ (2)



5.4
5.4.1 The sound wave is reflected off multiple surfaces. ✓
The distance between the drummer and each surface isn't the same. ✓ (2)

5.4.2 $v = f \times \lambda$ ✓
$= 250 \times 1{,}36$ ✓
$= 340\ m.s^{-1}$ ✓ (3)

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5.4.3 **POSITIVE MARKING FROM QUESTION 5.4.2**

$\Delta t = \frac{0,24}{2}$ ✓

= 0,12 s

speed = $\frac{\text{distance}}{\text{time}}$

340 ✓ = $\frac{\text{distance}}{0,12}$ ✓

Distance = 40,8 m ✓ (4)

[16]



QUESTION 6

6.1 Wave model ✓
Particle model ✓ (2)

6.2.1 Radio waves ✓ (1)

6.2.2 X-ray ✓ (1)

6.3

6.3.1 A packet of energy found in light. Or A particle of light that contains energy.✓✓ (2)

6.3.2 Inversely proportional ✓ (1)

6.3.3

E= $\frac{hc}{\lambda}$ ✓

2.6×10^{-14} ✓ = $\frac{6,63 \times 10^{-34} \times 3 \times 10^{8}}{\lambda}$ ✓

λ = 7,65 x 10^{-12} m ✓ (4)

6.3.4

OPTION 1	**OPTION 2**
E = h x f ✓	c = f x λ ✓
1,59 x 10^{-14} = 6,63 x 10^{-34} x f ✓	3 x 10^{8} = f x 12,5 x 10^{-12} ✓
f = 2,4 x 10^{19} Hz ✓	f = 2,4 x 10^{19} Hz ✓

(3)

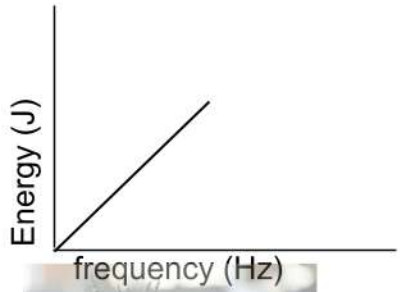
6.3.5 (Point) A ✓
The energy of a photon at point A is higher than point B ✓
Photons with higher energy have a greater penetrating ability. ✓ (3)

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6.3.6 Criteria:

Shape: Straight line ✓

Line starts from the origin ✓ (2)



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QUESTION 7

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

7.2 $Q = n \times q_e$ ✓

$Q = 4{,}375\times10^{10}$ ✓ x $-1{,}6\times10^{-19}$ ✓

$Q = -7\times10^{-9}$ C✓ (4)

POSITIVE MARKING FROM QUESTION 7.2

7.3

$$Q = \frac{Q_1 + Q_2}{2}$$ ✓

$$Q = \frac{3\times10^{-9} + (-7\times10^{-9})}{2}$$ ✓

$= -2 \times 10^{-9}$ C ✓ (3)

POSITIVE MARKING FROM QUESTION 7.3

7.4

$$Q = \frac{Q_1 + Q_2}{2}$$

-3×10^{-9} ✓ $= \frac{Q_B + 0}{2}$ ✓

$Q_B = -6 \times 10^{-9}$ C

$$n = \frac{\Delta Q}{q_e}$$ ✓

$$= \frac{-6\times10^{-9} - (-2\times10^{-9})}{-1{,}6\times10^{-19}}$$ ✓

$= 2{,}5 \times 10^{10}$ electrons ✓ (6)

[15]

TOTAL: 100

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