KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

PHYSICAL SCIENCES

PROVINCIAL STANDARDISED ASSESSMENT

MARKING MEMORANDUM MARCH 2026

MARKS: 100

DURATION: 2 hours

QUESTION 1

1.1 C ✓✓ (2)
1.2 C ✓✓ (2)
1.3 B ✓✓ (2)
1.4 D ✓✓ (2)
1.5 D ✓✓ (2)
1.6 A ✓✓ (2)
1.7 B ✓✓ (2)
[14]

QUESTION 2

2.1 Maximum displacement of particles from the rest/equilibrium position ✓✓ (2)
(2 or 0)

2.2 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)

x + 5 = 3 ✓
2.3 x = -2 cm
Amplitude of **B** = (-)2cm ✓ (2)
2.4.1 Left ✓ (1)
2.4.2 Remains the same ✓ (1)
[9]

QUESTION 3

3.1 The number of (full)waves/cycles (passing a fixed point) per second.✓ ✓ (2)

3.2.1 B and D ✓ (1)
3.2.2 Trough ✓ (1)

3.3.1 Amplitude $= \frac{0,4}{2}$ ✓
= 0.2 m ✓
NOTE: Award full marks for correct answer (2)

3.3.2 Wavelength $= \frac{0,12}{2}$ ✓
= 0.06 m✓
Accept: 6cm ✓✓
NOTE: Award full marks for correct answer (2)

3.4.1

POSITIVE MARKING FROM 3.3.2

$v = f \times \lambda$ ✓
$3 = f \times 0.06$ ✓
$f = 50$ Hz ✓

(3)

3.4.2

POSITIVE MARKING FROM 3.4.1

OPTION 1

$T = \frac{1}{f}$
$= \frac{1}{50}$ ✓
$= 0.02$ s ✓

OPTION 2

50 waves in 1s ✓
1 wave in T s
T = 0.02 s ✓

(2)

OPTION 3

Speed $= \frac{distance}{time}$
$3 = \frac{0,06}{time}$ ✓
time = 0,02s ✓

[13]

QUESTION 4

4.1 A wave in which the particles of the medium vibrate parallel to the direction of motion of the wave. ✓✓ (2)

4.2 Period ✓ (1)

4.3.1 Rarefaction ✓ (1)

4.3.2 Compression ✓ (1)

4.4 Wavelength = 1×2 ✓
= 2m ✓

NOTE: Award full marks for correct answer

(2)

POSITIVE MARKING FROM 4.4

4.5 **OPTION 1**

$f = \frac{1}{0,5}$ ✓
$= 2$ Hz
$v = f \times \lambda$ ✓
$= 2 \times 2$ ✓
$= 4$ m.s^{-1} ✓

(4)

Speed = $\frac{distance}{time}$ ✓ **OPTION 2**

= $\frac{2✓}{0,5✓}$

= 4ms^{-1} ✓

4.6 **POSITIVE MARKING FROM 4.5** (3)

Speed = $\frac{distance}{time}$ ✓

4 = $\frac{20}{time}$ ✓

time = 5s ✓

4.7.1 Remains the same ✓ (1)

4.7.2 Frequency depends only on the source of the wave ✓✓ (2)

4.7.3 Increases ✓ (3)
Because v = f × λ and if v increases while f is constant ✓, λ increases✓

[20]

QUESTION 5

5.1 Reflection of/reflected sound waves✓ (1)

5.2 Decreases ✓ (1)

5.3 Sounds travels faster when temperature of the medium increases/the higher the temperature of the medium, the faster sound travels✓✓ (2)

5.4

MARKING CRITERIA

Use of correct equation	✓
Correct substitution (for building A)	✓
Correct substitution (for building B)	✓
Subtraction of times/calculation of total time for B or time for A	✓
Answer within the correct range(1,69m-1,70m)	✓

(5)

OPTION 1

Time for sound to reach building B :

Speed $= \frac{distance}{time}$ ✓

Accept v= $\frac{\Delta x}{\Delta t}$

340 $= \frac{X}{time\ B}$ ✓

$time\ B = \frac{X}{340}$

Time for sound to reach building A :

340 $= \frac{265-X}{time\ A}$ ✓

$time\ A = \frac{265-X}{340}$

time B – time A = 0,22

$\frac{X}{340} - \frac{265-X}{340} = 0{,}22$✓

X = 169,9 m ✓

OPTION 2

Distance to building B:

Speed $= \frac{distance}{time}$ ✓

Accept v= $\frac{\Delta x}{\Delta t}$

340 $= \frac{X}{t+0{,}22}$ ✓

X = 340t +74,8……(i)

Distance to building A:

340 $= \frac{265-X}{t}$ ✓

X = 265 -340t ……(ii)

340t +74,8=265 -340t✓

t =0,28s

X =169,8m✓

OPTION 3

Let the distance from A to P be Y:

Speed $= \frac{distance}{time}$✓

340 $= \frac{Y}{t}$ ✓

Y= 340t
Let the distance from P to B be X:
340 $= \frac{X}{t+0,22}$ ✓

X= 340(t+0,22)
X+Y= 265m✓

340(t+0,22) + 340t= 265m
t= 0,28s
X= 340(0,28+0,22)
= 170m✓

5.5

OPTION 1	OPTION 2
Speed $= \frac{dist}{time}$✓	Speed $= \frac{dist}{time}$✓
1500 $= \frac{dist}{5}$ ✓	1500 $= \frac{dist}{10}$
Distance = 7500 m✓	Distance = 15000m/2✓ =7500m✓
Accept: Speed $= \frac{dist}{time}$✓	**Accept:** Speed $= \frac{dist}{time}$✓
Half-way dist. $= \frac{7500}{2}$ ✓ = 3750m✓	Half-way dist. $= \frac{7500}{2}$ ✓ = 3750m✓

(3)

5.6 It does not damage the soft tissues of human organs (which could be a danger in X-rays) ✓✓ (2)
OR : Ultrasound has less energy than Gamma Rays or X Rays✓✓

[14]

QUESTION 6

6.1 A packet of energy found in light. Or A particle of light that contains energy.✓✓ **(2 or 0)** (2)

6.2.1 Ultraviolet/UV (radiation)✓ (1)

6.2.2 Infrared/IR (light) ✓ (1)

6.3 Gamma rays ✓ (2)
It has the highest frequency/energy ✓

6.4.1 $c = f \times \lambda$ ✓
$3 \times 10^8 = 2{,}42 \times 10^9 \times \lambda$ ✓
$\lambda = 0.12\text{m}$

Accept $v = f \times \lambda$

Final answer of 0.12 m must be shown, otherwise MAX (1) (2)

6.4.2 Microwaves ✓ (1)

6.5
$E = \frac{hc}{\lambda}$ ✓
$= \frac{6{,}63 \times 10^{-34} \times 3 \times 10^8}{0.3 \times 10^{-9}}$ ✓ ✓
$E = 6{,}63 \times 10^{-16}$ J ✓ (4)

OR: $v = f\lambda$ ✓ : $3 \times 10^8 = f \times 0{,}3X\ 10^{-9}$
$f = 1\text{x}\ 10^{18}$ Hz✓
E=hf ✓
$E = 6{,}63 \times 10^{-34} \text{ x } 1\text{x } 10^{18}$
$E = 6{,}63 \times 10^{-16}$ J ✓

6.6 Increases ✓✓ (2)
[15]

QUESTION 7

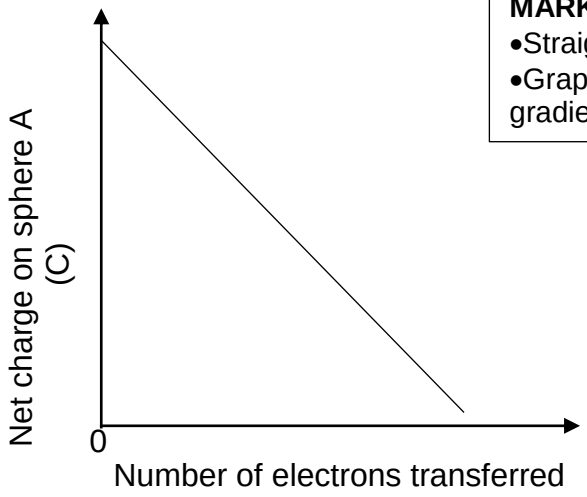
7.1 The net charge of an isolated system remains constant during any physical process. ✓✓ **(2 or 0)** (2)

7.2 To prevent the loss of electrons or charges. ✓
OR To prevent leakage of charges. ✓
OR To prevent transfer of charges✓ (1)

7.3 $Q = n \times q_e$ ✓
$Q = 1{,}25 \times 10^{13} \times -1{,}6 \times 10^{-19}$ ✓
$Q = -2 \times 10^{-6}$ C✓ (3)

7.4. It has a deficiency of electrons/it is more positively charged (than sphere B) ✓
OR Charges are transferred from a negatively charged sphere to a positively charged sphere✓ (1)

7.5



MARKING CRITERIA
- Straight line ✓
- Graph slopes downwards/has negative gradient✓

(2)

POSITIVE MARKING FROM QUESTION 7.3

7.6.1

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

$$Q = \frac{3\times10^{-6} + (-2\times10^{-6})}{2} \checkmark$$

$$= +5 \times 10^{-7} \text{ C} \checkmark \quad (3)$$

POSITIVE MARKING FROM QUESTION 7.3

7.6.2

$$n = \frac{\Delta Q}{q_e}$$

$$= \frac{5\times10^{-7} - (-2\times10^{-6})\checkmark}{+1{,}6\times10^{-19}\checkmark}$$

$$= 1{,}56 \times 10^{13} \text{ electrons} \checkmark$$

OR

$$= \frac{5\times10^{-7} - 3\times10^{-6}\checkmark}{-1{,}6\times10^{-19}\checkmark}$$

$$= 1{,}56 \times 10^{13} \text{ electrons} \checkmark \quad (3)$$

[15]

TOTAL: 100