

**NATIONAL
SENIOR CERTIFICATE**

GRADE 10

**PHYSICAL SCIENCES: TERM TEST 1
MEMORANDUM
14 MARCH 2016**

MARKS: 100

NAME OF SCHOOL:

This marking memorandum consists of 5 pages, including the cover page

QUESTION 1:

- 1.1 B ✓✓ (2)
- 1.2 A ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 C ✓✓ (2)
- 1.6 C ✓✓ (2)
- 1.7 B ✓✓ (2)

[14]

QUESTION 2

- 2.1. Transverse ✓ (1)
- 2.2. $A = 1.5 \text{ m}$ ✓ (1)
- 2.3.
The distance between two consecutive points ✓ in phase ✓
OR The distance between two consecutive crests or two consecutive troughs. (2)
- 2.4. $\lambda = \frac{6}{1.5}$ ✓ (2)
 $\lambda = 4 \text{ m}$ ✓ (2)
- 2.5. Any one of: **A** and **E**; **B** and **J**; **D** and **F** ✓ (1)
- 2.6.1 5 wave crests implies 4 waves
Time = 4×1.5 ✓
= 6 seconds ✓ (3)

2.6.2 $v = \frac{\Delta d}{\Delta t}$ ✓
 $v = \frac{4 \times 4}{6}$ ✓✓
 $v = 2.67 \text{ m} \cdot \text{s}^{-1}$ ✓

OR

$v = f\lambda$
$v = \frac{1}{T}\lambda$
$v = \frac{1}{1.5}(4)$
$v =$
$2.67 \text{ m} \cdot \text{s}^{-1}$

(4)

- 2.6.3 WITH THE SAME SPEED ✓, the speed of a wave depends only on the density of the medium ✓✓ / wave speed does not depend on frequency (3)

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QUESTION 3

- 3.1. A wave in which the particles of the medium vibrate ✓ parallel to the

direction of motion of the wave. ✓

(2)

3.2.1 Echo ✓

(1)

3.2.2 $v = \frac{\Delta d}{\Delta t}$ ✓

$$v = \frac{2\Delta x}{\Delta t}$$

$$343 = \frac{2(347)}{\Delta t}$$

$$\Delta t = 2.02 \text{ m} \cdot \text{s}^{-1}$$

(4)

3.3. GREATER✓, Water is more dense than air✓, sound move faster in water than in air✓

(3)

3.4. The ultrasound waves used to image babies and soft tissue organs have small amplitude so are low in energy✓. This makes it safer for the patient, as no damage is done to any living cells. ✓
The alternative is X-rays which are high in energy which is enough to damage or kill human cells. ✓

(3)

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QUESTION 4

4.1.1 Gamma rays ✓

(1)

4.1.2 High frequency / high energy/ low wavelength ✓

(1)

4.2.1 A photon is a packet of energy

(2)

4.2.2 $c = hf$ ✓

$$3 \times 10^8 = f(6.3 \times 10^{-10}) \checkmark$$

$$f = 4.76 \times 10^{17} \text{ Hz} \checkmark$$

(3)

4.2.3 $E = hf$ ✓

$$= 6.63 \times 10^{-34} (4.76 \times 10^{17}) \checkmark$$

$$= 3.16 \times 10^{-16} \text{ J} \checkmark$$

(3)

4.2.4 DECREASE ✓

(1)

4.3 Animals are able to sense the waves of the earthquake while they are still far off ✓and many of them try to escape as soon as possible✓

If man can study the behaviour of animals, it could save him from natural disaster✓.

(3)

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QUESTION 5

- 5.1.1 Brass/ pure air/ salt solution (*any one*) ✓ (1)
- 5.1.2 Oxygen air ✓ (1)
- 5.1.3 Copper ✓ (1)
- 5.2.1 Filtration ✓ (1)
- 5.2.2 Evaporation ✓ (1)
- 5.2.3 Sand ✓ (1)
- 5.2.4 Sugar and water/ sugar solution ✓ (1)
- [7]**

QUESTION 6

- 6.1.1 The temperature at which the solid substance melt to become a liquid at normal atmospheric pressure ✓ ✓ (2)
- 6.1.2. Substance B ✓ (1)
- 6.1.2. Substance C ✓ (1)
- 6.1.2. Substance D ✓ (1)
- 6.1.3 II ✓ (1)
- 6.1.4 INCREASE ✓ (1)
- [7]**

QUESTION 7

- 7.1 Atoms of the same element having the same atomic number ✓ but different mass numbers ✓ (2)
- 7.2 Chlorine atoms in the cylinders are isotopes, ✓ they have same number of protons but different masses ✓ (2)
- 7.3.1 35 ✓
- 7.3.2 Isotope B ✓ (1)
- 7.3.3 Pauli's Exclusion Principle states that an orbital can hold a maximum of two electrons ✓ provided they have opposite spins. ✓ (2)
- 7.3.4 $1s^2 2s^2 2p^6 3s^2 3p^5$ ✓ ✓ (2)

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QUESTION 8

- 8.1.1 The distance from the atomic nucleus to the outermost stable electron orbital at equilibrium ✓ ✓ (2)
- 8.1.2 The atomic radius decreases across the period ✓ ✓ (2)
- 8.1.3 As the number of protons increase across the period, the extra electron in the same shell gets pulled by nucleic forces towards the nucleus, this results with a decrease in atomic radius ✓ ✓ (2)
- 8.1.4 **Greater** ✓ (1)
- 8.1.5 Element 19 has one more energy shell than element 11, this increases the atomic radius ✓ ✓ (2)
- 8.2.1 Ionic bonding ✓. There is a transfer of electrons ✓ ✓ (3)
- 8.2.2 Sodium Chloride ✓ (1)
- 8.2.3 $2Na + Cl_2 \rightarrow 2NaCl$ ✓ (✓ bal) (3)
- 8.2.4 It is very reactive with oxygen in the air ✓ ✓ (2)

[18]