

PHYSICAL SCIENCES GRADE 10 P1 JUNE 2016 PRE-TEST MEMO

QUESTION 1

- 1.1 B✓✓
- 1.2 D✓✓
- 1.3 A✓✓
- 1.4 B✓✓
- 1.5 D✓✓
- 1.6 A✓✓
- 1.7 B✓✓
- 1.8 B✓✓
- 1.9 B✓✓
- 1.10 D✓✓

[20]

QUESTION 2

2.1.1 It is the **maximum displacement of the particles** ✓ of the medium from the **equilibrium(mean) position / state** ✓.

(2)

2.1.2 $A_A = 4 \times 0,5 \text{ m} = 2 \text{ cm}$ ✓

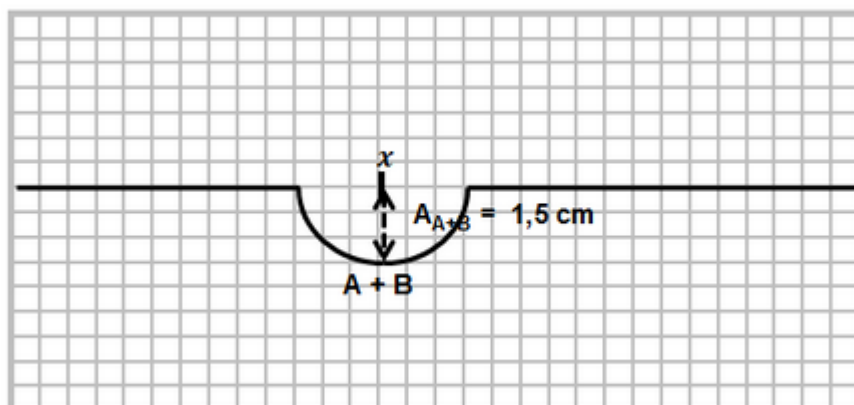
$A_B = 7 \times 0,5 \text{ cm} = 3,5 \text{ cm}$ ✓

(2)

2.1.3 $v_a = \frac{\Delta x}{\Delta t} = \frac{6 \times 0,5 \text{ cm}}{3 \text{ s}} \checkmark = 1 \text{ cm} \cdot \text{s}^{-1} \checkmark$

$v_B = \frac{\Delta x}{\Delta t} = \frac{9 \times 0,5 \text{ cm}}{3 \text{ s}} \checkmark = 1,5 \text{ cm} \cdot \text{s}^{-1} \checkmark$

(4)



2.1.4

Mark allocation: correct amplitude✓

joined amplitude in negative direction (underneath the line) ✓

(2)

- 2.1.5 Destructive interference ✓ (1)
- 2.2.1 Area 1 ✓ (1)
- 2.2.2 Area 2 ✓. The amount of waves per second (frequency) is more ✓ than those at area 1 (2)
- 2.3.1 $E = hf$ ✓
 $= 6.63 \times 10^{-34} \times 900 \times 10^6$ ✓
 $= 5.97 \times 10^{-25} \text{ J}$ ✓ (3)
- 2.3.2 Higher frequencies of electromagnetic radiation means higher penetration ability ✓ of electromagnetic waves and a higher probability that the radiation would affect a person (through destroying molecular compound in the body). The scientist allege that the frequency of electromagnetic radiation from cell phones are to low to to have a considerable penetration ability ✓. (2)

[21]

QUESTION 3

3.1

$$3.1.1 v = \frac{\Delta x}{\Delta t} = \frac{200}{0,08} = 2500 \text{ms}^{-1} \quad \checkmark \quad (3)$$

$$3.1.2 v = \frac{\Delta x}{\Delta t} \quad \checkmark$$

$$t = \frac{\Delta x}{v} = \frac{200}{340} = 0,59 \text{s} \quad \checkmark \quad (3)$$

3.1.3 Longer ✓ (1)

3.2

3.2.1 Longitudinal ✓✓ (2)

3.2.2 A, C or E (any one) ✓✓ (2)

3.2.3 Rare fraction ✓✓ (2)

3.2.4 A and C or C and E or B and D or D and F ✓✓ (2)

3.2.5 $(6-2) = 4 \text{cm}$ or 0.04m ✓✓ (2)

3.2.6 $v = f \times \lambda$ ✓

$$f = \frac{v}{\lambda} = \frac{343}{0,04} = 8575 \text{Hz} \quad \checkmark \quad (3)$$

3.3

3.3.1 **Acceleration of charged particles.** ✓✓ (2)

3.3.2 (a) Gamma rays✓ (1)

(b) Microwaves✓ (1)

3.3.3 Any one ✓✓ (2)

- That have different speeds (*light* $3 \times 10^8 \text{ms}^{-1}$) or about 340ms^{-1} sound in air
- Travel through vacuum but not sound.
- Transverse waves but sound is longitudinal.

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QUESTION 4

4.1.1 A transverse wave as a succession of transverse pulses ✓✓
or
A transverse wave is a wave where the movement of the particles of the medium is perpendicular✓ (at a right angle) to the direction of propagation of the wave.✓ (2)

4.1.2 They have the same amplitude. ✓ (1)

4.1.3 They have different frequencies✓ The blue light has a higher frequency than the red light. ✓ or the wavelength of blue light is smaller than the wavelength of red light (2)

4.1.4 $f = \frac{1}{p}$ or $f = \frac{1}{T}$ ✓ (3)
 $T = \frac{1}{4 \times 10^{12}}$ ✓ = $2,5 \times 10^{-13} \text{ s}$ ✓

4.1.5 $v = f\lambda$ ✓ (4)
 $= 4 \times 10^{12} \checkmark \times 0,7 \times 10^{-6} \checkmark$
 $= 2,8 \times 10^6 \text{ m}\cdot\text{s}^{-1} \checkmark$

4.2.1 when a wave encounters a boundary between two media, ✓part of the wave is reflected, part is absorbed and part is transmitted✓ (2)

4.2.2 If is safe – cannot harm an unborn child ✓
It is not an intrusive procedure that leaves a wound afterwards (You do not have to cut a person open to “see” inside.✓ (2)

[16]

QUESTION 5

5.1 Charge can neither be created nor destroyed but merely transferred from one body to another. ✓✓ OR

The total charge in a closed system remains constant.

OR

The total charge in an isolated system is conserved. (2)

5.2 X has a deficiency of electrons. ✓✓ (2)

5.3 Neutral means having equal number of electrons and protons. ✓✓ (2)

5.4 Y to X ✓ (1)

$$\begin{aligned} 5.5 Q &= \frac{Q_1 + Q_2}{2} \quad \checkmark \\ &= \frac{+6,4 \times 10^{-19} + 0}{2} \quad \checkmark \checkmark \quad (1 \text{ for Nr and } 1 \text{ for Dr}) \\ &= 3,2 \times 10^{-19} \text{ C} \quad \checkmark \quad (4) \end{aligned}$$

5.6 Every charge in this universe is an integral multiples of the electron charge. ✓✓(2)

$$\begin{aligned} 5.7 n &= \frac{\Delta Q}{Q_e} \\ &= \frac{-3,2 \times 10^{-19}}{-1,6 \times 10^{-19}} \quad \checkmark \checkmark \quad (1 \text{ for Nr and } 1 \text{ for Dr}) \quad \text{OR} \quad \frac{3,2 \times 10^{-19}}{1,6 \times 10^{-19}} \\ &= 2 \quad \checkmark \quad (3) \end{aligned}$$

[16]

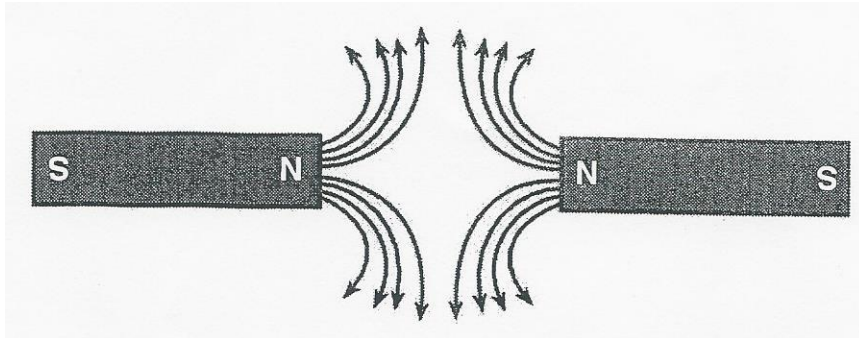
QUESTION 6

- 6.1.1 a magnetic field is a region in space where another magnet or ferromagnetic material ✓will experience a force (noncontact)✓ (2)
- 6.1.2 They are all non-contact forces. / are all field forces ✓✓ (2)
- 6.1.3 A compass consist of a magnet ✓ and the earth is a magnet. ✓ The N-pole of the compass is attracted to the S-pole of the Earth and will point towards it.✓ (3)
- 6.1.4 Aurora Borealis or Northern Lights or magnetic storms ✓✓ (2)

6.1.5 A display of (different) colours in the sky ✓ which you are most likely to see in the north pole region. ✓ (2)

6.1.6 Geographical north and South is determined as the points through which the axis of the Earth spin. ✓ Magnetic north is determined by the direction in which a compass needle will point. ✓ (2)

6.2.1



Guidelines for marking the diagram:

Direction of field lines on both magnets ✓

A region of no field in between ✓

Correct shape of field lines ✓ (3)

6.2.2 Further apart ✓✓ (2)

6.2.3 A magnetic compass. ✓✓ (2)

QUESTION 7

7.1.1 The Voltmeter ✓✓ (2)

7.1.2 Electrical current is the **amount of charge per second** ✓✓ that flows past a specific point. OR

Electrical current is the **rate of flow of charge** ✓.

(2)

7.1.3 **Type of material** used. ✓✓

· **Length** of the conductor. ✓✓

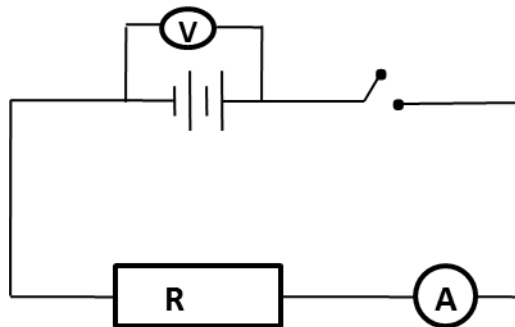
· **Thickness** of the conductor

· The **temperature** of the conductor.

(Any TWO = 4 marks)

(4)

- 7.2.1 Ammeter connected in parallel to the resistor ✓ and
Voltmeter connected in series ✓ in the circuit (2)
- 7.2.2



Guidelines for marking the circuit diagram:

- Switch shown ✓
 Two cells in series ✓
 Voltmeter across battery ✓
Ammeter in series with the resistor ✓ (4)

[14]

QUESTION 8

8.1 $\frac{1}{R_p} = \frac{1}{r_1} + \frac{1}{r_2}$ ✓

$= \frac{1}{4} \checkmark + \frac{1}{12} \checkmark$

$\therefore R_p = 3 \Omega \checkmark$ (4)

OR $R_p = (R_1 R_2) \div (R_1 + R_2) = (12 \times 4) \div (12 + 4) = 3 \Omega$

8.2 S_1 ✓ S_1 controls (stops) the flow of current in the entire circuit while S_2 controls (stops) the current to 12Ω resistor. ✓✓ (3)

8.3 Ammeter ✓✓ (2)

8.4 Smaller than, Resistors in series are potential dividers. ✓✓ (2)

8.5 $Q = I \Delta t \checkmark = 2 \times 10 \checkmark = 20 \text{ C} \checkmark$ (3)

8.6 Decrease ✓✓ (2)

[16]

Total = 150