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 x 0.5 m = 2 cm ✓

A_B = 7 x 0.5 cm = 3.5 cm ✓

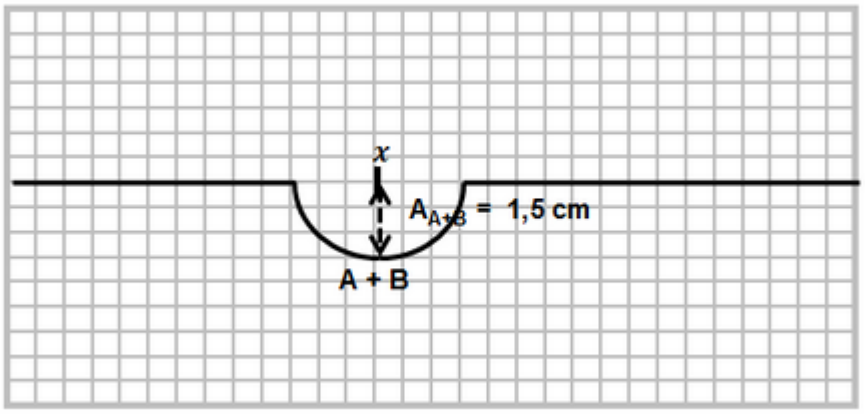
(2)

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

$v_B = \frac{\Delta x}{\Delta t} = \frac{9 \times 0{,}5\ cm}{3s}$ ✓ $= 1.5\ cm.s^{-1}$ ✓

(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 area1 (2)

2.3.1 E = hf✓

= 6.63 x 10^{-34} x 900 x 10^{6} ✓

= 5.97 x 10^{-25} 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 $v = \frac{\Delta x}{\Delta t} = \frac{200\ ✓}{0,08✓} = 2500ms^{-1}$ ✓ (3)

3.1.2 $v = \frac{\Delta x}{\Delta t}$ ✓

$t = \frac{\Delta x}{v} = \frac{200}{340}✓ = 0,59s$ ✓ (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) = 4cm or 0.04m ✓✓ (2)

3.2.6 $v = f \times \lambda$ ✓

$f = \frac{v}{\lambda} = \frac{343}{0,04}$ ✓ = 8575Hz ✓ (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 ($light\ 3 \times 10^{8} ms^{-1}$) or about 340 ms^{-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 wavelenght of blue light is smaller than the wavelength of red light (2)

4.1.4 f = $\frac{1}{p}$ $or\ f = \frac{1}{T}$✓
T = $\frac{1}{4\times10^{12}}$✓= 2,5 x 10^{-13} s✓ (3)

4.1.5 v = fλ✓
= 4 x 10^{12} ✓x 0,7 x 10^{-6}✓
= 2,8 x 10^{6} $m{\cdot}s^{-1}$✓ (4)

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)

5.5 $Q = \frac{Q_1 + Q_2}{2}$ ✓

$= \frac{+6,4 \times \times 10^{-19} + 0}{2}$ ✓✓ (1 for Nr and 1 for Dr)

$= 3,2 \times 10^{-19} C$ ✓ (4)

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

5.7 $n = \frac{\Delta Q}{Qe}$

$= \frac{-3,2 \times 10^{-19}}{-1,6 \times 10^{-19}}$ ✓✓ (1 for Nr and 1 for Dr) OR $\frac{3,2 \times 10^{-19}}{1,6 \times 10^{-19}}$

$= 2$ ✓ (3)

[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)

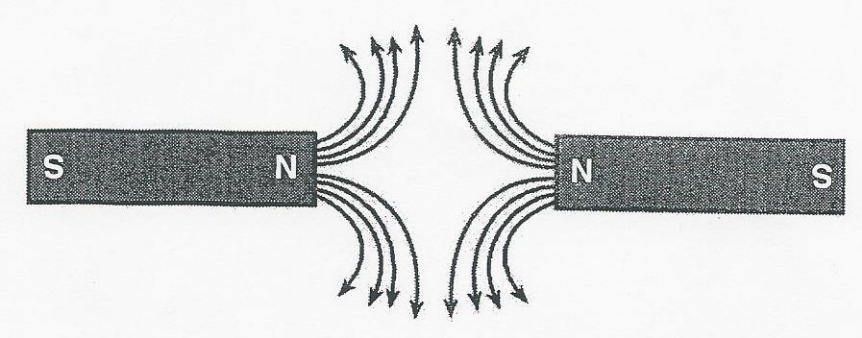
6.1.3 A compass consist of a magnet ✓ and the earth is a magnet. ✓ The N-pole of the compass is attracted to the S-pole of the Earth and will point towards it.✓ (3)

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 n 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.

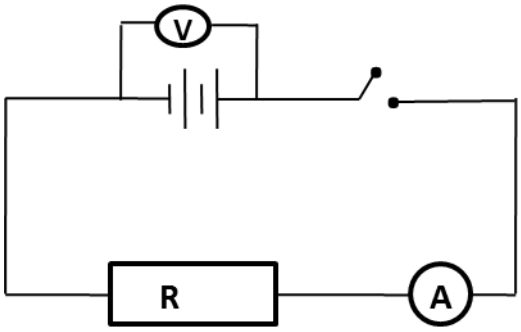
(Any TWO = 4 marks)

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

$= \frac{1}{4}$ ✓ $+ \frac{1}{12}$ ✓

$\therefore R_p = 3\ \Omega$ ✓ (4)

OR $R_p = (R_1R_2) \div (R_1 + R_2) = (12 \times 4) \div (12 + 4) = 3\ \Omega$

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

8.3 Ammeter✓✓ (2)

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

8.5 $Q = I\Delta t$ ✓ $= 2 \times 10$ ✓ $= 20$ C ✓ (3)

8.6 Decrease ✓✓ (2)

[16]

Total = 150