Memo 10 June 2019 PE

1.1 B 1.2 C 1.3 A 1.4 C 1.5 B

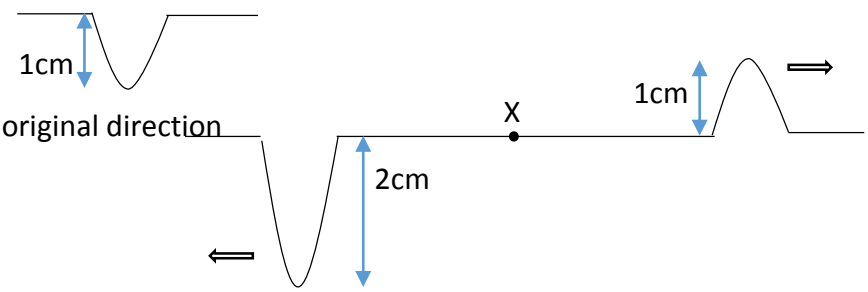
1.6 D 1.7 D 1.8 B 1.9 D 1.10 B

2.1 Wave length is the shortest distance between two consecutive points in phase. SEE P104

2.2.1 Destructive interference

2.2.2 at X amplitude -1cm

2.2.3 pulses continue to travel in original direction



2.3 vel = dist / time

∴ dist = vel x time✓

Cliff LHS there and back: dist = 3x340 = 1020m✓ ∴1 way only 510m✓

Cliff RHS there and back dist = 5x340= 1700m ∴1 way only 850✓✓∴ dist between = 1360m✓

3.1 Oscillating magnetic field✓ induces✓ an oscillating electric field at right angles✓ to itself. These fields are mutually inductive.

3.2 infrared, visible, x- ray, gamma ray ✓✓ (-1 if reverse order)

3.3 Light travels as a wave✓ but interacts / imparts its energy as quanta / photons✓ which are particle like packages of energy.

3.4.1 $c=f\lambda$ ∴ $f = c/\lambda$ ✓ = $3x10^{8}/ 2.5x10^{-7}$ ✓= $1.2x10^{15}$ Hz ✓

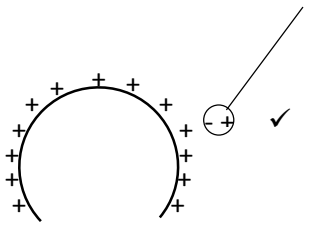
3.4.2 $E=hf$ ✓= $6,626x10^{-34}$ x $1,2x10^{15}$ ✓= $7,95x10^{-19}$ J✓

3.5 UV Ultra violet✓

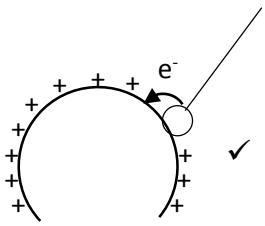
4.1.1 $Q_{final} = (Q_R + Q_s) /2 = (3-5)/2 = -1$ nC

4.1.2 $n=Q/q_e$ ✓ = $3x10^{-9}$ / $1,67x10^{-19}$ ✓ = $1,875x10^{-10}$ ✓

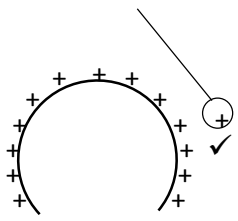
4.2



induced polarization ✓in polystyrene ball. Attraction more than repulsion



transfer of electrons ✓ from polystyrene ball to vdG G. Thus ball positive



positive charges repel ✓

4.3 Electroscope✓

4.4.1 The droplets of paint are electrostatically charged and thus repel ✓each other forming the fine mist.

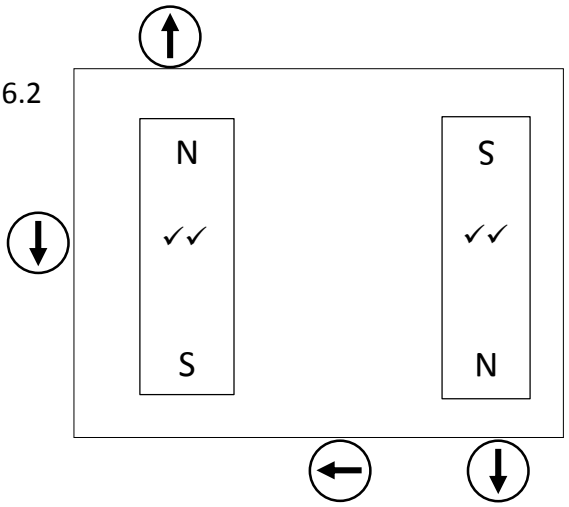
4.4.2 By having the car oppositely charged means the paint is attracted ✓to the car. [13]

5.1.1 Domains

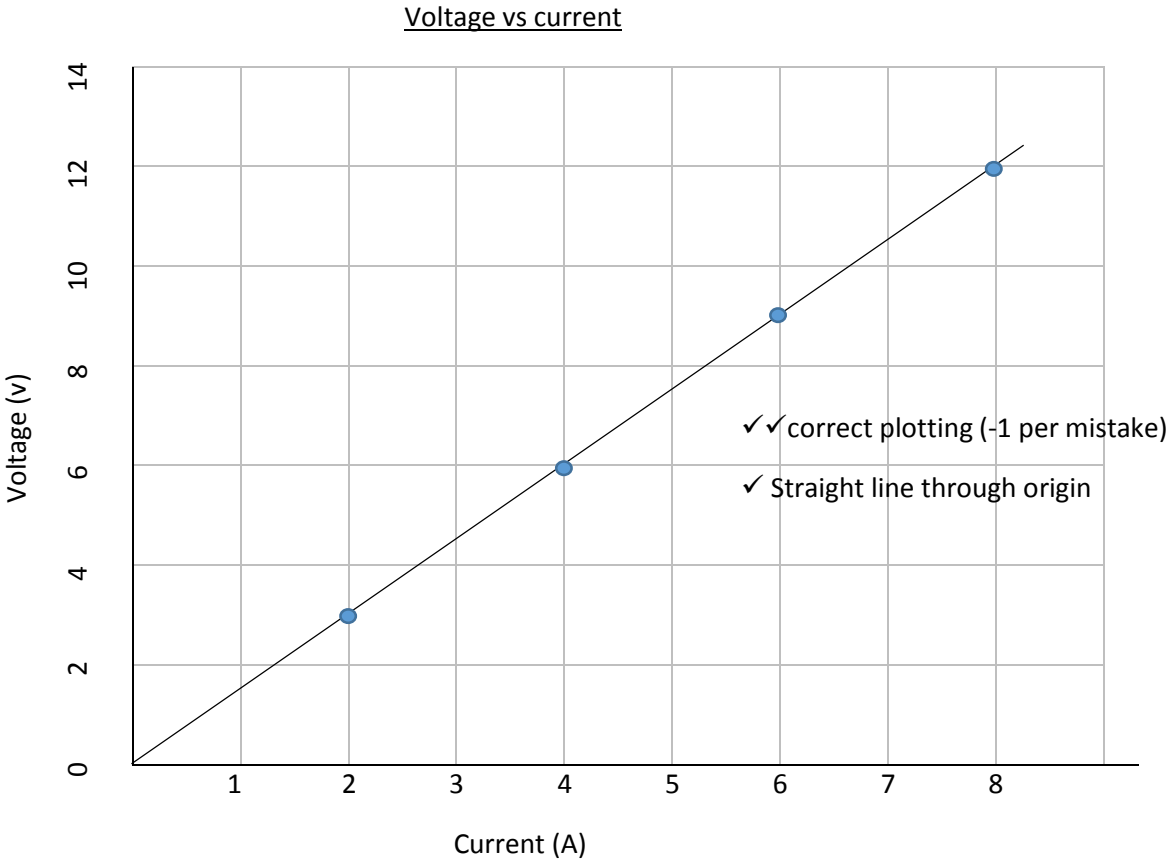
5.1.2 B

5.1.3 All arrows in the same direction. Nett resultant spin direction

6.2



6.1 Answers on Answer page



6.2 Dependent = voltage✓ Independent = current✓

6.3 Voltage is directly✓ proportional to the current✓ [7]

7.1.1 Potl Diff = energy per charge✓ difference between two points in a circuit✓

7.1.2 Current is the rate of flow✓ of charge✓

Q 7.1.3	Ammeter	Voltmeter
a) What it measures	Current strength✓	Potential difference or voltage✓
b) It's resistance	very low✓	Very high✓
c) How it's connected	In series✓	In parallel✓

7.2.1 6V✓

7.2.2 $\frac{1}{R_p} = \frac{1}{R1} + \frac{1}{R2} = \frac{1}{2} + \frac{1}{6} = \frac{3+1}{6} = \frac{4}{6} \quad \therefore R_p = \frac{6}{4} = 1{,}5\ \Omega$ ✓✓✓

7.2.3 R_T = 1 + 1,5 = 2,5 Ω✓

7.2.4 $I = \frac{V}{R} = \frac{6}{2{,}5} = 2{,}4A$ ✓✓✓

7.2.5 V=IR = 2,4x1,5 = 6,6V ✓✓✓

7.2.6 a) DEACREASES✓

b) the total resistance increases✓ (to 7Ω) thus causing the current to decrease✓.