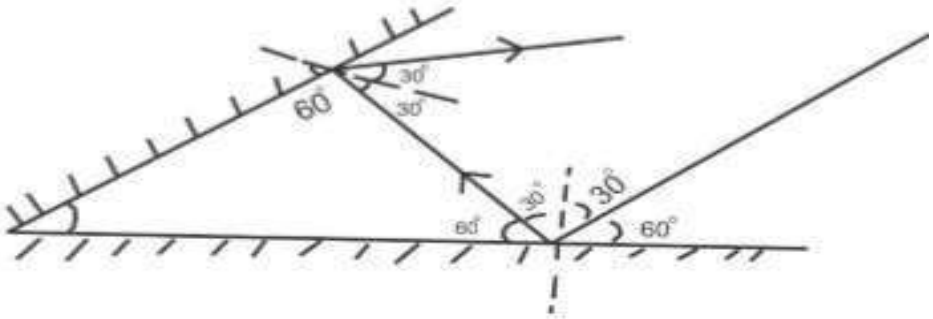
FORM FOUR CLUSTERKCSE MODEL 6

PHYSICS PAPER 2 ANSWERS

SECTION A (25 Marks)

Answer all questions

1.



2.

To identify conductors and insulators.

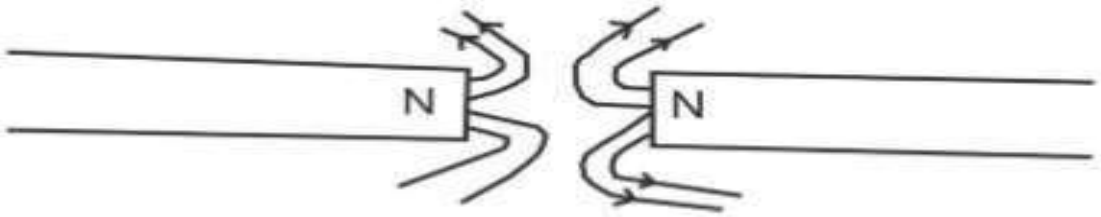
To detect charge.

To identify type of charge.

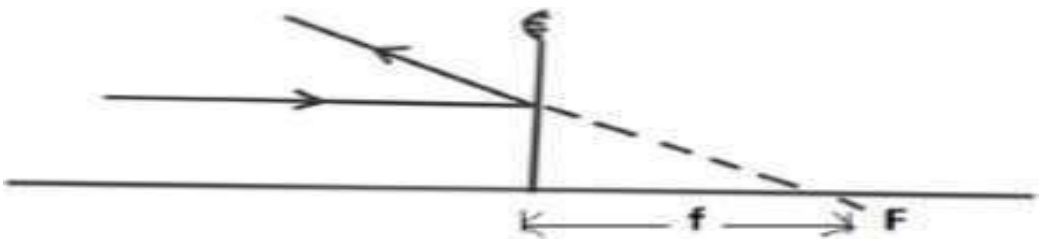
To determine quantity of charge.

3. The layer of hydrogen gas on the copper insulates it

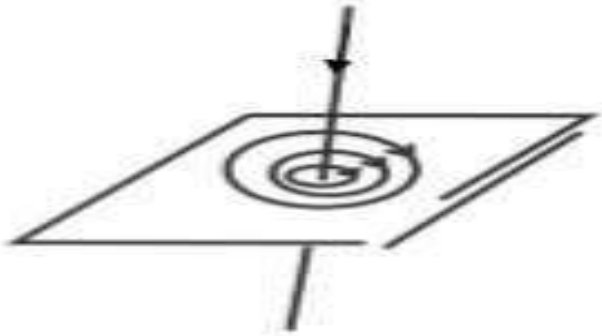
4.



5.



6.



$\lambda = 1{,}000m \qquad c = 3.0\times10^{8}$

7.

$\lambda = 1{,}000m \qquad c = 3.0\times10^{8}$

$c = \lambda f$ (1mk)

$f = \frac{c}{\lambda} = \frac{3\times10^{8}}{1{,}000}$ (1mk)

$f = 3.0\times10^{5}\ Hz$

8. $n = 1.6$

$n = \frac{\sin 90^{0}}{\sin\theta}$ (1mk)

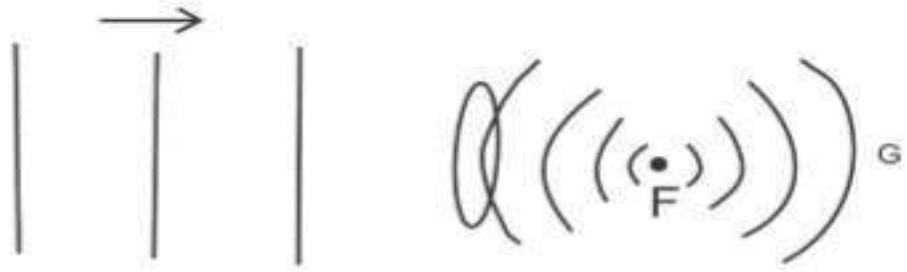
$n = \frac{1}{sion\,\theta}$ (1mk)

$\sin\theta = \frac{1}{n} = \frac{1}{1.6}$

$\sin\ \theta = 0.625$

$\theta = 38.7^{0} = critical\ \ angle$ (1mk)

9.



10.

. $P = V1$

$I = \frac{100}{240} = 0.4166\,A$ (1mk)

$p = v1$ (1mk)

$= 220 \times 0.4166$

$= 91.67W$ (1mk)

11. . Radio waves → microwaves → yellow light → Gamma rays. (1mk)

12.

. $R_1 = \frac{V^2}{P}$ $R_2 = \frac{\left(\frac{V}{2}\right)^2}{2P}$ (1mk)

$\frac{\left(\frac{V}{2}\right)^2}{2P} = \frac{\frac{V^2}{4}}{2P} = \frac{V^2}{8P}$ (1mk)

$\frac{R_1}{R_2} = \frac{\frac{V^2}{P}}{\frac{V^2}{8P}} = \frac{V^2}{P} \times \frac{8P}{V^2}$

$\frac{R_1}{R_2} = 8$ (1mk)

13. . Capacitance increase

SECTION B: (55 Marks)

Answer all questions

14. . (a) In longitudinal waves, particles of his transmitting medium vibrate in the direction of the wave while in transverse waves, the particles of the transmitting medium vibrate at right angles.

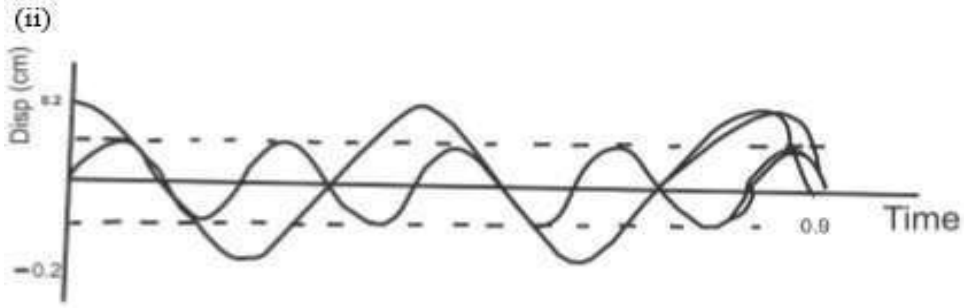
(b) (i) $T = 0.4\,s$ (1mk)

$f = \frac{1}{T}$ (1mk)

$f = \frac{1}{0.4}$ (1mk)

$= 2.5Hz$

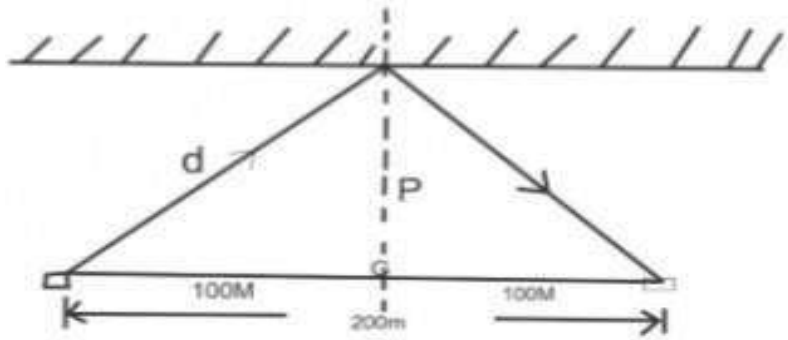
(ii)



(c) (i) Temperature of air

Humidity of the air any 2 2mks

Wind.



First sound –direct from source to observer.
Second sound –echo from the wall. (1mk)

$$v = \frac{s}{t} = \frac{200}{0.6} = 333.33\ ms^{-1}$$

$$2d = vt$$

$$d = \frac{vt}{2} = \frac{333.33 \times 0.85}{2}$$

$$d = 141.37m.$$

$$p = \sqrt{d^2 - 100^2}$$

$$p = \sqrt{141.67^2 - 100^2}$$

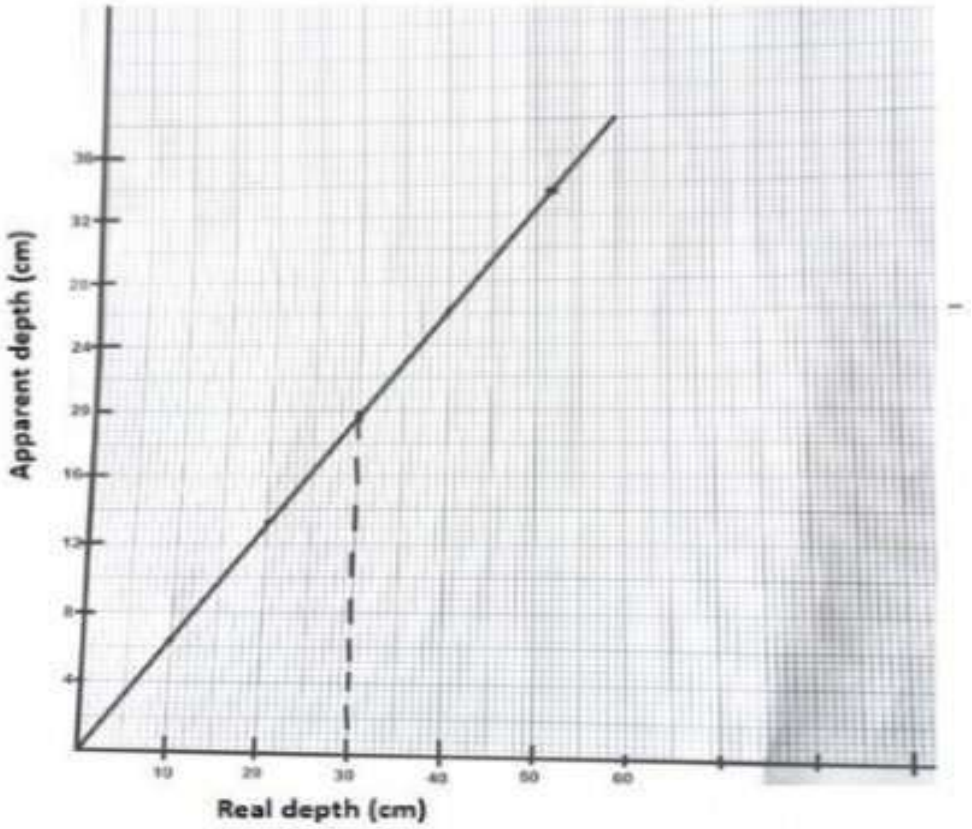
$$= \sqrt{20{,}070.39 - 10{,}000}$$

$$p = \sqrt{10070.39}$$

$$= 100.35m.$$

15.

(a) (i) On graph paper.



(ii) Grand $= \frac{20-0}{30-0} = \frac{2}{3}$ (2mks)

Grand=0.6667 (1mk)

(iii) The reciprocal of the refractive –index. (1mk)

16. . (a) For a metallic conductor, the current flowing through it, is directly proportional to the potential difference across it, temperature being constant.

(b) Length of the conductor. Cross sectional area of the conductor.

Let E =e.m.f of cell.

r = internal resistance of cell.

$E = I(R + r)$

$E = 0.6(2 + r)$ ----- (i)

$E = 0.2(7 + r)$ ---- (ii)

$\therefore 0.6(2 + r) = 0.2(7 + r)$

$1.2 + 0.6r = 1.4 + 0.2r$

$0.6r - 0.2r = 1.4 - 1.2r$

$0.6r - 02r = 1.4 - 1.2$

$0.4r = 0.2$

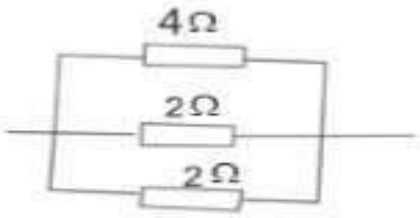
$r = 0.5\Omega$ (1mk)

$E = 0.6(2 + 0.5)$

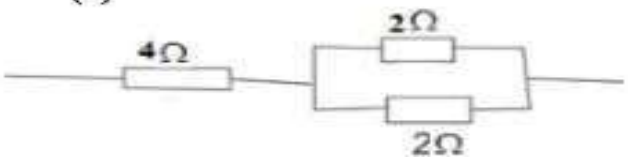
$E = 0.6 \times 2.5$

$E = 1.5V$ $(1mk)$

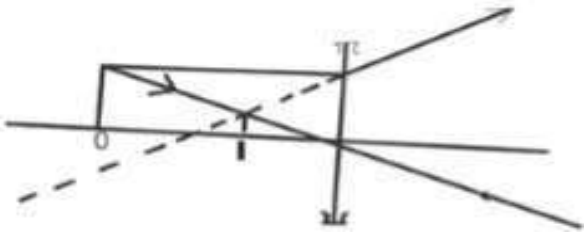
(d) (i)



(ii)



17. (a)



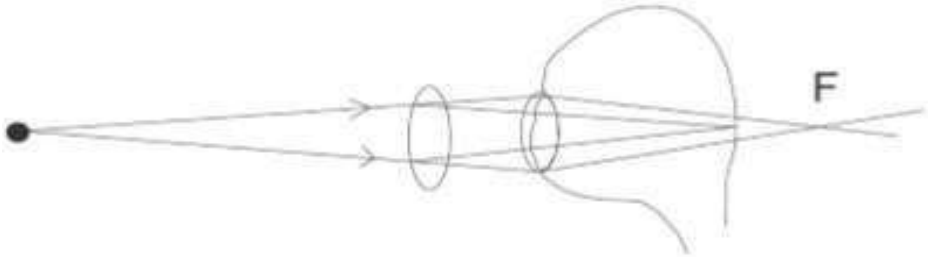
Each correct ray 1 mk total 2 Correct image

(b

(i) Long-sightedness/Hypematropia.

(ii) Focal length of lens toolong.

Eye ball too short.



Correct lens and position 1 mk
Correct rays. 1mk

(c) (i) $\frac{1}{f} = \frac{1}{u} + \frac{1}{u}$

$\frac{1}{v} = \frac{1}{5} - \frac{1}{20}$

$\frac{1}{v} = \frac{4-1}{20}$

$\frac{1}{v} = \frac{3}{20}$

$v = 6.67cm$

(ii) $m = \frac{v}{u}$

$= \frac{6.67}{20}$

$= 0.3335$

(iii) Real.
Inverted.
Diminished.
Formed beyond I

18. . (a) The direction of the induced e.m.f is such that the induced current which it causes to flow produces a magnetic field that opposes the change producing it.

(b) When the magnetic is moving into the coil there is change in magnetic field flux hence an e.m.f is induced causing the galvanometer to deflect.

When the magnet stops inside the coil there is no change in magnetic field flux hence no e.m.f is induced causing the pointer to go back to zero.

(c) (i) $T_R = \frac{N_S}{N_P}$

$= \frac{60}{1{,}200} = 0.05$

(ii) $\frac{V_P}{V_S} = \frac{N_P}{N_S}$

$\Rightarrow V_S = \frac{N_S V_P}{N_P}$

$= \frac{60 \times 240}{1{,}200}$

$= 12V$

(iii) Power output = power input.

$I_P V_P = I_S V_S$

$I_S = \frac{I_P V_P}{V_S}$

$= \frac{0.5 \times 240}{12}$

$= 10\ A$