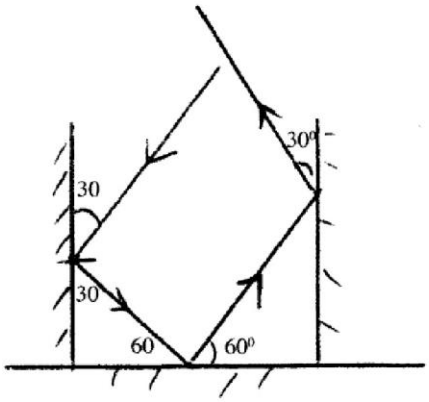
4.6.2 Physics Paper 2 (232/2)

1.



- Correct angle at every surface

Arrow on rays

(3 marks)

2. Positive charge (1 mark)

3. To maintain the relative density of the electrolyte. (1 mark)

4.
- The suspended magnet is repelled
- End B of the electromagnet attains a north pole when current flows.

(2 marks)

5. Has a wide field of view. (1 mark)

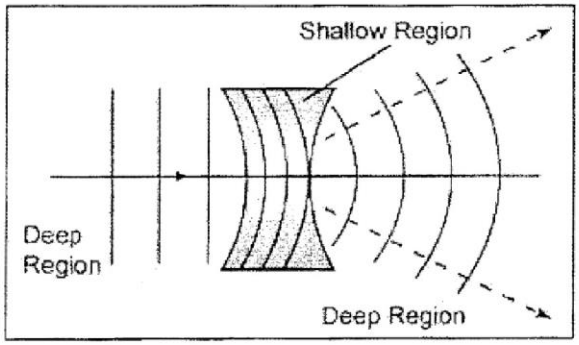
6.
- Increase the magnitude of current.
- Increase the number of turns per unit length.
- Increase cross sectional area.
- Use of soft iron core.

(2 marks)

7.
- Electromagnetic waves do not require a material medium while mechanical waves require a material medium for transmission.
- Electromagnetic waves travel at the speed of light while mechanical waves travel at slower speeds.

(2 marks)

8.



- decreased wavelength in shallow region
- diverging after refraction to the deep region.

(2 marks)

9. $V = \lambda f$

$V = \frac{7.5}{100} \times 20 \times 1000$

$\text{Depth} = \frac{7.5}{100} \times 20 \times 1000 \times \frac{3}{2}$

$= \quad 2250\text{m}$

(3 marks

10. $\eta = \frac{real\ depth}{apparent\ depth}$

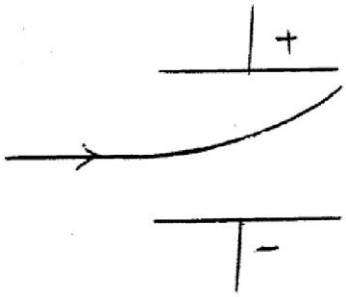
$1.47 = \frac{real\ depth}{6.8} = 9.996$

real depth = $\simeq$ 10 cm

(3 marks)

11. Production of cathode rays / x-rays. (1 mark)

12.



- deflection towards positive plate

(1 mark)

13. $V_p I_p = V_s I_s$

$200 = 24\ I_s$

$I_s = 8.33\text{A}$

(3 marks)

14. (a)
- Energy of incident radiation
- Work function of the metal
- Intensity of the radiation

Any 2 = 2 marks)

(b) (i)

$E = \frac{hc}{\lambda}$

$= \frac{6.63 \times 10^{-34} \times 3.0 \times 10^{8}}{4.3 \times 10^{-7}}$

$= 4.626 \times 10^{-19}\ J$

(3 marks)

(ii) - Potassium
- The work function of potassium is less than the energy of the incident radiation

(2 marks)

(iii)

$$E = Wo + K.E$$

$$4.626 \times 10^{-19} J = 3.68 \times 10^{-19} J + K.E$$

$$K.E = 9.4558 \times 10^{-20} J$$

$$\frac{1}{2} MV^2 = 9.4558 \times 10^{-20}$$

$$V^2 = \frac{9.4558 \times 10^{-20} \times 2}{9.1 \times 10^{-31}}$$

$$V = \sqrt{\frac{9.4558 \times 10^{-20} \times 2}{9.1 \times 10^{-31}}}$$

$$= 4.56 \times 10^5 \, ms^{-1}$$

(3 marks)

15. (a)
- length of conductor
- area of cross-section
- temperature
- resistivity of conductor

(Any 2 = 2 marks)

(b) When excessive currents flow through the circuit, the wire gets heated and melts hence breaking the circuit.

(2 marks)

(c) (i)

$$I = \frac{P}{V}$$

$$= \frac{2500}{240}$$

$$= 10.42 \, A$$

Fuse not suitable since current through the appliance is higher than the fuse rating.

(3 marks)

(ii) Cost = 0.8 x 3 x 2.5

= Ksh. 6.00

16. (a) Alpha particles are heavier and move at lower speeds hence less penetrating power than Beta particles which are lighter and move faster (2 marks)

(b) $100\% \xrightarrow{12} 50\% \xrightarrow{12} 25\% \xrightarrow{12} 12.5\%$

= 3 half-lifes
= 36 years (2 marks)

(c) (i) allows the radiations into the tube (1 mark)

(ii) absorbs kinetic energy of positive ions so that they do not cause secondary ionization in the tube (1 mark)

(d) (i)
- Short - They ionize heavily loosing most of the energy hence cannot travel far.
- Straight - They are massive compared to air molecules hence collision with air molecules cannot change their path.

(ii)
- GM is easily portable than a cloud chamber. (1 mark)
- GM is more sensitive.
- GM tube detects radiation at very low intensity and cloud chamber cannot detect radiation at very low intensity. (1 mark)

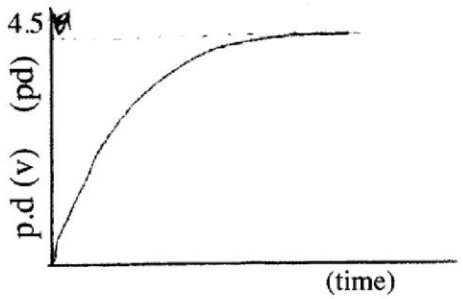
17. (a)
- distance of separation between plates
- area of overlap of plates
- type of dielectric between plates (3 marks)

(b) (i) (I) Current rises to maximum and then drops to zero (1 mark)
(II) Potential difference between the plates increases to a maximum (1 mark)

(ii) Negative charges flow from the negative terminal of the battery to one plate (√) of the capacitor. Negative charges flow from the other plate (√) of the capacitor to the positive terminal of the cell hence equal positive and negative charges gather on the plates, opposing further flow of electrons when fully charged (√) (3 marks)

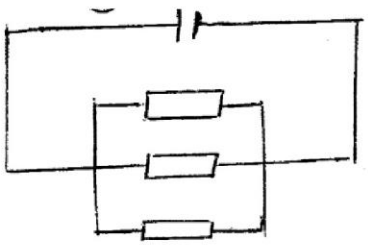
(iii) Resistor - to slow down the charging process so that current and voltage are is observed. (1 mark)

(iv)



- Parallel arrangement
- Circuit symbols

18. (a) (i)



(ii)

$$\frac{1}{R}=\frac{1}{2}+\frac{1}{3}+\frac{1}{4}$$

$$R=\frac{12}{13}$$

$$=0.923\Omega$$

(b) (i) (I)

$$\frac{1}{u}+\frac{1}{v}=\frac{1}{f}$$

$$v=-100\,mm$$

$$\frac{1}{50}-\frac{1}{100}=\frac{1}{f}$$

$$\frac{1}{f}=\frac{1}{100} \qquad f=100\,mm$$

(II)

$$m=\frac{v}{u}=\frac{100}{50}$$

$$=2$$

(ii)