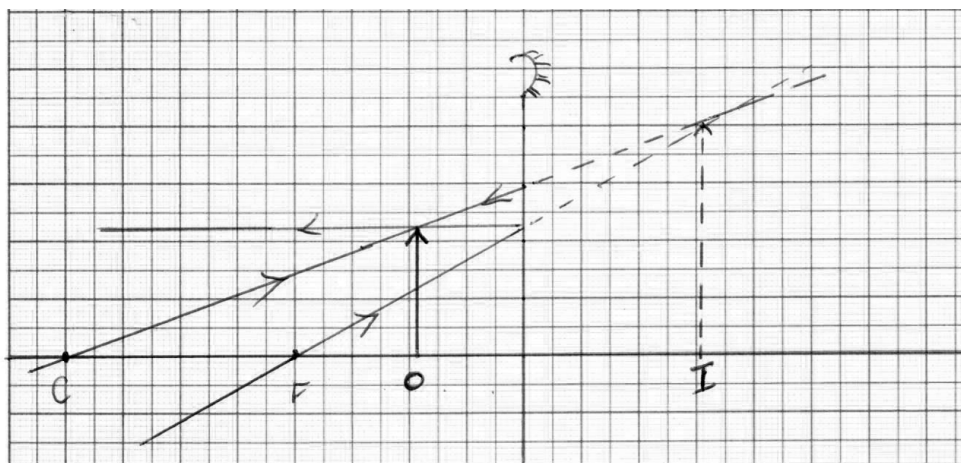**4.5.2 Physics Paper 2 (232/2)**

SECTION A

1. angle of incidence = angle of reflection = 0   (1 mark)

2. larger hole acts as many small holes (1 mark)
    ∴ many overlapping images of same object (1 mark)

3. Within the magnet, N and S poles of the dipoles cancel out but at the end of the poles they don't. (1 mark)

4. (a)   2V   (1 mark)

    (b)   1.6V   (1 mark)

5.

Object at the intersection of incident ray;   (1 mark)
Incident rays;   (2 marks)

6. Ray totally reflected by face AC (1 mark)
    $i = 60°$ hence $r = 60°$ (1 mark)

7. $a = 1$ and $b = 0$ (1 mark)

    x = neutron   (1 mark)

8. $\dfrac{Ns}{Np} = \dfrac{Vs}{Vp}$ (1 mark)

    $\dfrac{5}{10} = \dfrac{Vs}{12}$ (1 mark)
    $Vs = 6V$ (1 mark)

9. Each lamp on full voltage   (1 mark)
    Failure of one lamp does not affect the others (1 mark)

10. X rays ionise air molecules between plates (1 mark)
    Ions move to plates of opposite sign (1 mark)

11. Sun being hotter produces short wavelength infrared waves which penetrate glass;
    burning wood produces long wavelength infrared waves which do not penetrate glass.

    (1 mark)

12. $K = E - T$ (1 mark)

13. Arsenic shares 4 of its 5 electrons with germanium. (1 mark)
    the extra electron is free for conduction. (1 mark)

SECTION B

14. (a) $f_A = 10cm$ (1 mark)

    (b) (i) to produce a magnified real image (1 mark)

        (ii) to produce a magnified virtual image of the 1st image. (1 mark)

    (c) (i) move A so that the object is slightly outside f_A (1 mark)

        (ii) move B so that the real image is within f_B. (1 mark)

    (d) (i) $m = \dfrac{24}{16}$

           $= \dfrac{3}{2}$ (2 marks)

        (ii) $m = \dfrac{28}{4}$

            $= 7$ (2 marks)

15. (a) – Negative charges flow from earth to cap. (1 mark)

        – Negative charge neutralizes the positive. (1 mark)

    (b) (i) $\dfrac{1}{c} = \dfrac{1}{c_1} + \dfrac{1}{c_2}$ (1 mark)

            $= \dfrac{1}{3} + \dfrac{1}{6}$ (1 mark)

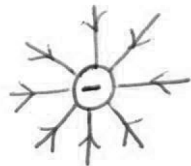 $= \dfrac{1}{2}$

            $C = 2\mu F$ (1 mark)

(ii)   Q = cV   (1 mark)

= 2 x 4

= $8\mu C$ (1 mark)

(iii)   Q = $8\mu C$ (1 mark)

(c)

- radical field;
- Correct dirrection;   (2 marks)

16.   (a)   (i)   Energy = QV (1 mark)

(ii)   Power = $\dfrac{E}{t} = \dfrac{Qv}{t}$ (1 mark)

(iii) $I = \dfrac{Q}{t}$ (rate of flow of charge) (1 mark)

$\therefore P = \dfrac{Q}{t}.V$

$P = I.V$ (1 mark)

(b)   Power = VI = 20 x 60 (1 mark)

240 x I = 1200 W   (1 mark)

$I = \dfrac{1200}{240}$

= 5A   (1 mark)

$4A < 5A$ hence fuse will blow. (1 mark)

17.   (a) (i) Thermionically by cathode   (1 mark)

(ii) causing fluorescence on screen (1 mark)

(iii) (i)   control brightness of fluorescence   (1 mark)

(ii)   to focus the electron beam   (1 mark)

(b)   1 *wavelength* = 2 *cm*   (1 mark)

$period = 2 \times 2 \times 10^{-3}s$ (1 mark)
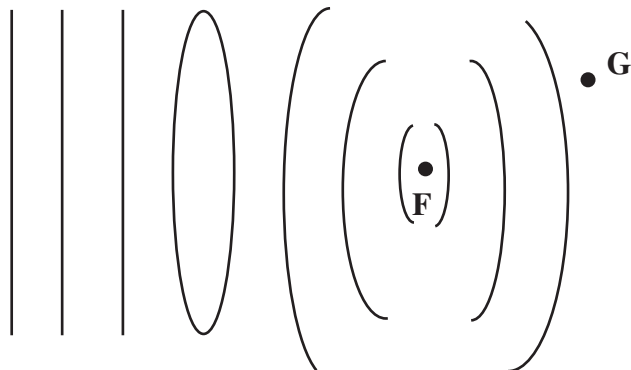
$= 4 \times 10^{-3}s$ (1 mark)

$f = \dfrac{1}{T}$ (1 mark)

$= \dfrac{1}{4 \times 10^{-3}}$ (1 mark)

$= 250\ HZ$ (1 mark)

18.   (a)

- curved waves - converging before focus   (1 mark)
- diverging after focus.   (1 mark)

(b)   (i)   O cm - trough and crest interference (2 marks)

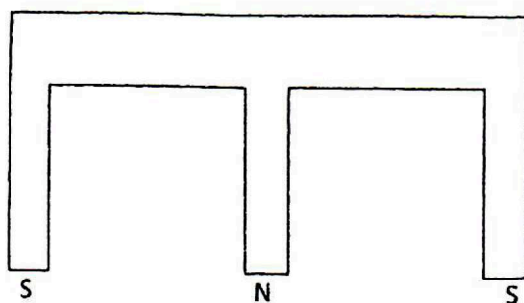(ii)   +10 - crest and crest interference (2 marks)

(c)   (i)   Waves produced are reflected at the fixed ends. (1 mark)
Incident and reflected waves interfer constructively at antinodes. (1 mark)
and destructively at nodes.   (1 mark)
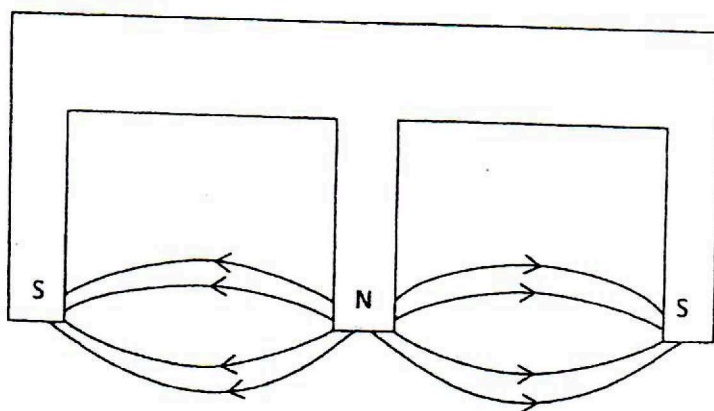
(ii) $\lambda = \dfrac{2}{3} \times 1.5$

$= 1m$ (1 mark)

19.　(a)　(i)

(ii)

(b)　coil moves to and fro (1 mark)
　　　force on coil varies direction as current varies in direction.　(1 mark)

(c)　(i)　dilute sulphuric acid　　　　　　　(1 mark)
　　　(ii)　(I) Zinc ions go into acid leaving electrons on the plate (1 mark)

　　　　　(II) Give up electrons to discharge hydrogen Ions. (1 mark)

　　　(iii)　Electrons flow from zinc plate to the copper plate.　(1 mark)