

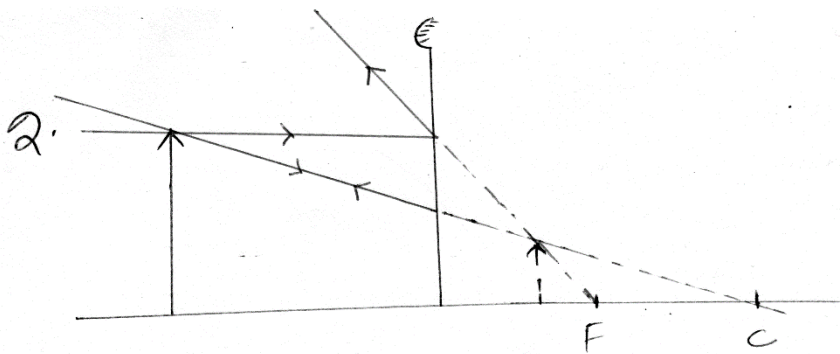
PHYSICS

PAPER 2

MARKING SCHEME

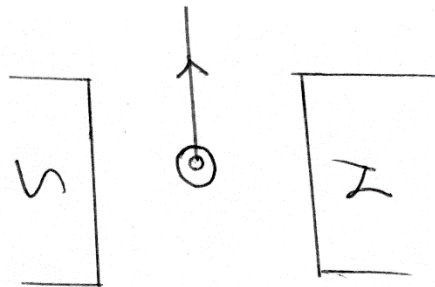
1. A - microwave ✓1
B - for vision ✓1

2.



Correct image; correct rays

3. (a)



must be from wire

- (b) moves on the opposite side. ✓1

$$4 \quad \frac{h_i}{h_o} = \frac{V}{U} \checkmark$$

$$h_o = \frac{0.025 \times 300}{0.2} \checkmark$$

$$= 37.5 \text{ m} \checkmark$$

$$5. \quad \frac{N_s}{N_p} = \frac{V_s}{V_p}$$

$$\frac{5}{10} = \frac{V_s}{12} \checkmark$$

$$V_s = 6 \text{ V} \checkmark$$

6 i) like poles repel, unlike poles attract ✓1

ii) Magnetic keepers become magnetized by induction; ✓1

keep dipoles aligned in a continuous loop of N-S poles pair ✓1

7. the ratio of sine of angle of incidence to the sine of the angle of refraction is the same/constant for a given pair of media. ✓1

λ

$$8. \quad \text{no. of cycles} = 2.75 \text{ or } 2\frac{3}{4}$$

$$\text{Frequency} = \frac{\text{no. of cycles}}{\text{time}} = \frac{2.75}{0.02} \checkmark$$

$$= 137.5 \text{ Hz} \checkmark$$

$$9. \quad f = V/\lambda \text{ and } f_1 = f_2 \quad \frac{v_1}{\lambda_1} = \frac{v_2}{\lambda_2}$$

$$2/1 = V_2/0.4 \checkmark$$

$$V_2 = 0.8 \text{ m/s} \checkmark$$

10. $90-35=55^\circ$ ✓1

11. White light is made up of seven colours; ✓1 which travel at different speed/ wavelength in the glass prism and hence dispersion ✓1

12. $2d = \text{speed} \times \text{time}$ ✓1

$$2d = 1600 \times 2.4 \text{ ✓1}$$

$$d = \frac{1600 \times 2.4}{2} = 1920 \text{ m ✓1}$$

13. positive charges ✓1

14.(a) (i) Argon – to initiate the discharge. ✓1

(ii) Quenching agent. Absorb energy of positive ions before they cause secondary electron emission. ✓1

iii). Using an amplifier ✓1

iv) $a = 226$ ✓1

$$b = 88 \text{ ✓1}$$

15. (a) (i) to provide heat for thermionic emission ✓1

(ii) to create high pd for the anode which acts as accelerating voltage for ejected

Electrons ✓1

(b) Increasing heater current to produce more electrons ✓1

(c) **air undergoes ionization** due collision with cathode rays ; ✓1 or
and resulting **electrons have less kinetic energy**✓1

(d) posses kinetic energy✓1
travel in straight lines

(e) X-rays-formed have no charge while cathode rays are negatively charged✓1

Any 1correct answer

X rays are faster than cathode rays

X-rays are waves while cathode rays are particulate/ particles

X-rays are more energetic than cathode rays

(f) can measure both ac and dc voltages✓1 (*any 1correct answer*)
can measure larger voltages

(g) (i) $T=5 \times 4=20\text{ms}$
 $f=1/T=1/0.02$ ✓1
 $f=50\text{Hz}$ ✓1

(ii) $V=10 \times 4$ ✓1 $=40\text{V}$ ✓1

16. (a) (i) electron emitted are repelled by the negative charges, so the leaf of
electroscope fall✓1
(ii) electron emitted are attracted by the positive charged✓1
(iii) its energy is lower than the energy need to dislodge an electron from
a metal surface/Work function✓1

(b) (i). increase in the number of emitted electrons✓1
(ii) speed /KE of electrons increases✓1

(c) (i) $E = hf = h \frac{c}{\lambda}$

$$(6.63 \times 10^{-34} \times 3.0 \times 10^8) / (4.3 \times 10^{-7}) \checkmark 1$$

$$= 4.6256 \times 10^{-19} \text{ J} \checkmark 1$$

(ii) Potassium, lower work function and also less energy than energy of radiation

(iii) $KE = \frac{1}{2}mv^2$

$$v^2 = (2 \times 0.9456 \times 10^{-19}) / (9.1 \times 10^{-31})$$

$$v = 4.559 \times 10^5 \text{ m/s}$$

17. a)

(i) A circuit which is not delivering current; $\checkmark 1$

(ii) A circuit which is delivering current; $\checkmark 1$

b(i) Total resistance =

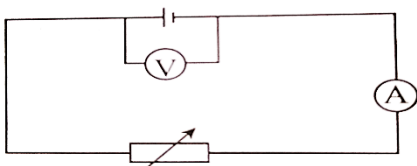
$$0.5 + 0.3 + \left(\frac{3 \times 6}{6 + 3} \right)$$

$$(0.3 + 0.5 + 2) = 2.8 \Omega, \checkmark 1$$

$$\therefore I = \frac{V}{R} = \left(\frac{6.6}{2.8} \right) = 2.357 \text{ A}; \checkmark 1$$

$$I_{3\Omega} = \frac{6}{9} \times 2.357 = 1.571 \text{ A} \checkmark 1$$

ii)



iii) E.m.f=voltage intercept =9.6V; ✓

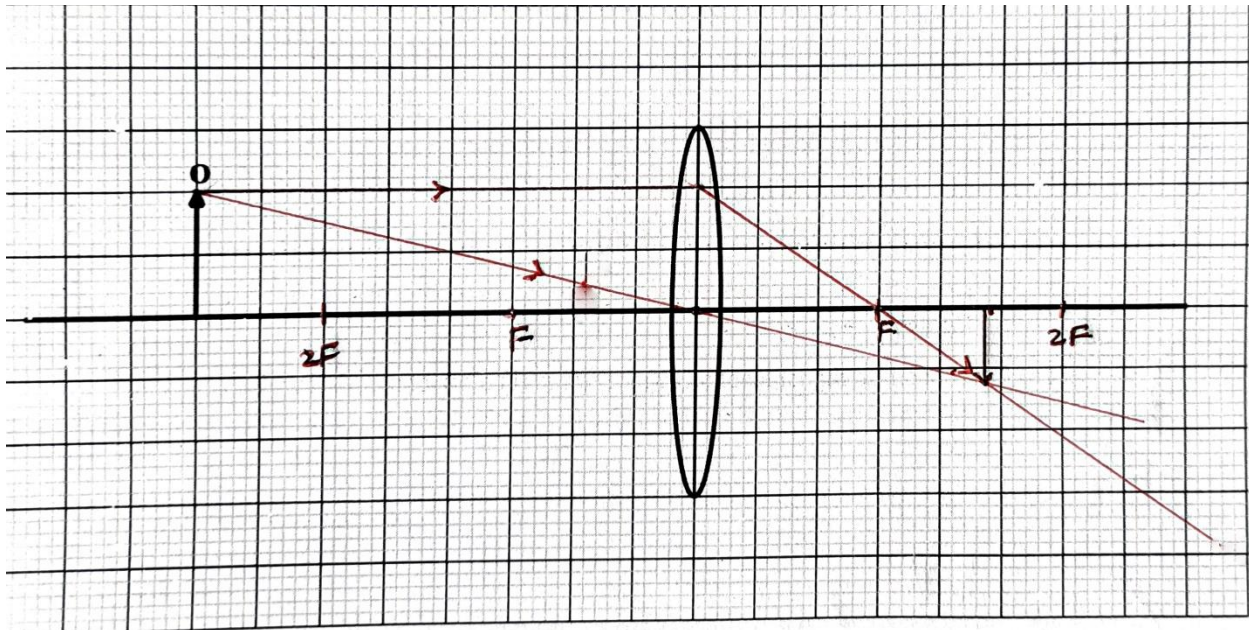
iv) Internal resistance = slope;

$$-r = \text{slope} \checkmark$$

$$-r = \frac{6-0}{2-5.4} = \frac{6}{-3.4} = -1.778 \Omega \checkmark$$

$$r = 1.778 \Omega \checkmark$$

18 a) correct rays ✓ correct image ✓



b) $u = 8 \text{ cm}$ $v = 4.7 \pm 0.1 \text{ cm}$

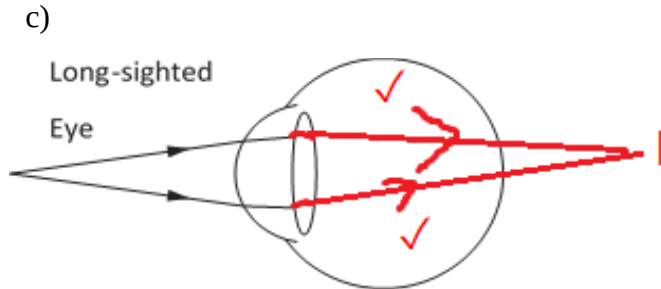
$$m = \frac{4.7}{8} = 0.5875 \checkmark \checkmark$$

OR

$$m = \frac{4.6}{8} = 0.575 \checkmark \checkmark$$

OR

$$m = \frac{4.8}{8} = 0.6 \checkmark \checkmark \quad m = 0.5875 \text{ to } 0.6$$



19. a) i) **Step - down transformer; the power is to be stepped-down for domestic use**✓

$$\text{ii) Water heater} = 2kW \times 2 \times 30 \times 9.50 \\ = 1140 \quad \checkmark$$

$$\text{Electric bulb} = 0.075 \times 10 \times 30 \times 9.5 \\ = 213.75$$

$$\text{Iron box} = 1.5 \times 1 \times 30 \times 9.5 \\ = 427.5 \quad \checkmark$$

$$\text{Total cost} = 1140 + 213.75 + 427.5 = \text{Kshs. } 1781.25 \quad \checkmark$$

b) i) **B-live wire /plug**✓

ii) **To open both the neutral and the live hole**✓
or

To earth the appliance before the user uses it just in case there is a current leak✓

c)) i) **The ring mains circuit**✓¹

ii) **X – Neutral** ✓¹

Y – Live ✓¹

iii) **Disconnecting the circuit**✓¹ **or breaking the circuit**✓¹ **or opening the circuit**✓¹
(any one)

END