

SCHOOL BASED FORM 4 EXAM JULY-AUGUST 2017

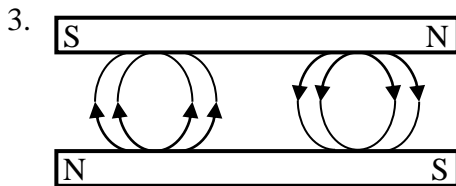
PAPER 2

MARKING SCHEME

SECTION A (25 marks)

1. Initial angle of incidence = $90^0 - 42^0 = 48^0$
Li = Lr = 48^0 – Initial angle of reflection.
- New angle of incidence = $48^0 + 10^0 \checkmark = 58^0$
Angle of incidence = Angle of reflection = $58^0 \checkmark$

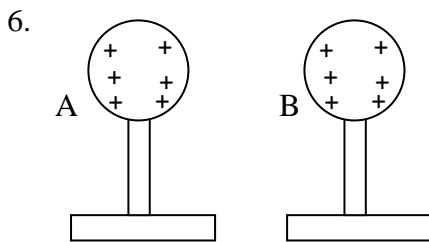
2. $2d = s \times t \checkmark$
 $d = \frac{330 \times 0.9}{2} \checkmark$
 $d = 148.5\text{m} \checkmark$



- Naming polarities \checkmark
- Field pattern with direction \checkmark

4. – Temperature
- Length of the conductor
- Type of the material Any \checkmark

5. The zinc plate reacts with dilute sulphuric acid and its ‘eaten’ away. \checkmark

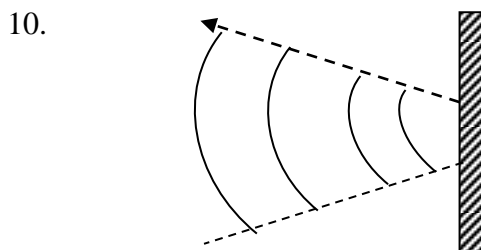


$\checkmark \checkmark$

7. $1.5 \times 4 = 6.0\text{s} \checkmark = T$
 $\frac{1}{f} = T$
 $T = \frac{1}{f} = \frac{1}{6} \checkmark = 0.167 \text{HZ} \checkmark$

8. – Nature of dielectric (Any two $\checkmark \checkmark$)
- Area of overlap of the plates
- Distance of separation of the plate

9. – As side mirrors of vehicles (As driving mirrors) \checkmark
- Use in supermarkets to cover a wider field of view \checkmark



Correct
Show diffraction $\checkmark \checkmark$

11. $P = vI$

From $v = IR$

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

$$P = vI = V \cdot \frac{V}{R} = \frac{V^2}{R} \checkmark = \frac{240 \times 240}{30} \checkmark$$

$$P = 1920W \checkmark$$

12. (i) – Alpha particles ✓

(ii) – Beta particles ✓

SECTION B (55 marks)

13. (i) $C = f\lambda$ ✓

$$3.0 \times 10^8 = f \times 6 \times 10^{-13}$$

$$\frac{3 \times 10^8}{6 \times 10^{-13}} = f$$

$$f = 0.5 \times 10^{21} = 5.0 \times 10^{20} \text{ HZ}$$

$$C = f\lambda$$

$$3.0 \times 10^8 = f \times 9.0 \times 10^{-13}$$

$$\frac{3.0 \times 10^8}{9 \times 10^{-13}} = f$$

Range $3.3 \times 10^{20} \text{ HZ}$ to $5.0 \times 10^{20} \text{ HZ}$

$$f = 0.3 \times 10^{21} = 3.3 \times 10^{20} \text{ Hz} \checkmark$$

(ii) $E = \mu f = 6.4 \times 10^{-34} \times 5.0 \times 10^{20} \checkmark$

$$= 32 \times 10^{-14}$$

$$= 3.2 \times 10^{-13} \text{ J}$$

14. (a)(i) $\frac{Np}{Ns} = \frac{Vp}{Vs} \checkmark$

$$\frac{10000}{100} = \frac{240}{Vs}$$

$$Vs = \frac{240 \times 100}{10000}$$

$$= 2.4V \checkmark$$

(ii) $\frac{Np}{Vs} = \frac{Is}{Ip} \checkmark$

$$\frac{10000}{100} = \frac{Is}{0.5}$$

$$Is = \frac{10000}{100} \times 0.5$$

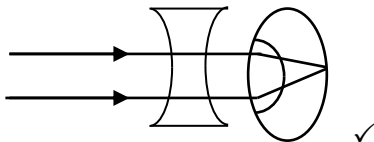
$$Is = 50A$$

15. (a) (i) - Too long eye ball ✓

- Short focal length of the eye lens

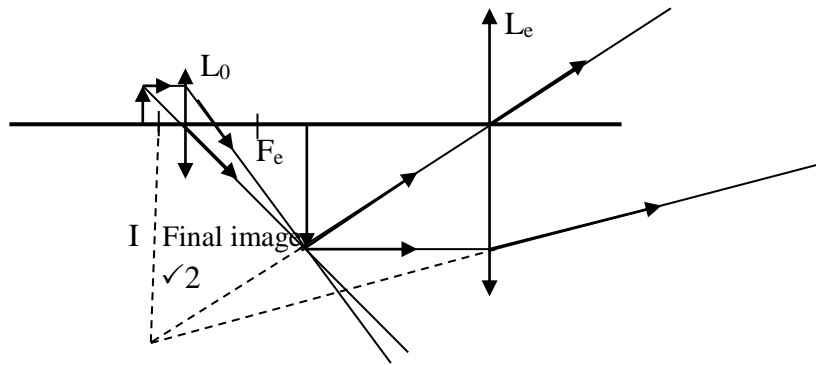
- More refractions takes place at the cornea lens.

(ii)



(iii) Short sight ✓

(b) (i)



(ii) To give a greater magnifying power. ✓

16. (a) (i) Galvanometer deflects. ✓

(ii) Electrons emitted from plate Y are attracted to plate X completing the circuit hence the photo current flows in the circuit. ✓

(b) $W_o = hf_o = \frac{hc}{\lambda_o}$ ✓

$$2 \times 1.6 \times 10^{-19} = \frac{6.6 \times 10^{-34} \times 3.0 \times 10^8}{\lambda_o}$$

$$\lambda = \frac{6.6 \times 10^{-34} \times 3.0 \times 10^8}{2 \times 1.6 \times 10^{-19}}$$

$$\lambda_o = 6.1875 \times 10^3 \text{m} \checkmark$$

17. (a) The current flowing through a current carrying conductor is directly proportional to the potential difference across it provided temperature and other physical conditions are kept constant. ✓

(b) $V = IR$ ✓

$$12 = 6R$$

$$R \frac{12}{6} = 2\Omega \checkmark$$

(c) Slope = $\frac{V}{I}$

$$= \frac{1-0.5}{0.02-0.01} \checkmark = \frac{0.5}{0.01} = \frac{50}{1} = 50V/A \checkmark$$

$$\text{Resistance} = \text{Slope} = 50\Omega$$

(d) It obeys Ohm's law. ✓ The graph is a straight line. ✓

18. (a) (i) A ✓

(ii) B ✓

(iii) A – Can be used to make cores of electromagnets, used in electric bells. ✓

B – Can be used to make permanent magnets used in loudspeakers. ✓

(b) Hard magnetic materials are hard to magnetise but retain magnetism for long once magnetized. ✓

Soft magnetic materials are easily magnetized and lose magnetism easily.

(c) – Directional property.

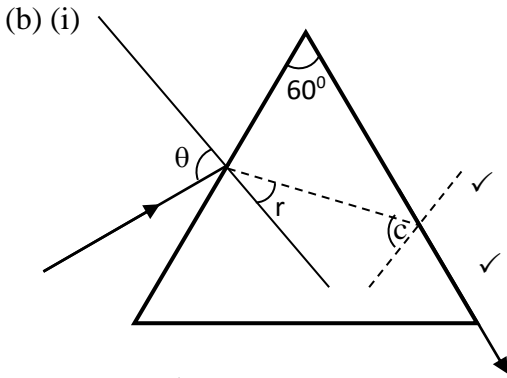
- Magnetic poles

19. (a) (i) $n_1v_1 = n_2v_2$ ✓

$$1 \times 3.0 \times 10^8 = n_2 \times 2.0 \times 10^8$$

$$n_2 = \frac{3.0 \times 10^8}{2.0 \times 10^8}$$

$$n_2 = 1.5 \checkmark$$



(ii) $n = \frac{1}{\sin C}$ ✓

$$\sin C = \frac{1}{n} = \frac{1}{1.5} = 0.6667$$

$$C = 41.8^\circ \cong 42^\circ \checkmark$$

(c) $n_1 \sin \theta_1 = n_2 \sin \theta_2$ ✓

$$1 \sin \theta = 1.5 \sin 32^\circ$$

$$\sin \theta = 1.5 \times 0.5299$$

$$\sin \theta = 1.5 \times 0.5299$$

$$\sin \theta = 0.7949$$

$$\theta = 52.6^\circ \checkmark$$

20. (a) X - Neutral ✓

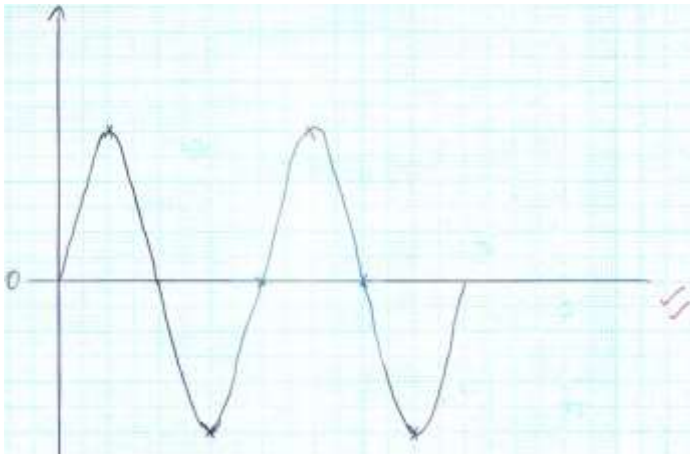
Y - Earth ✓

Z - Live ✓

(b) Red or blown ✓

(c) To help in opening the holes for the live and neutral pins. ✓

21. (a)



$$y - \text{gain divisions} = \frac{60}{20} = 3$$

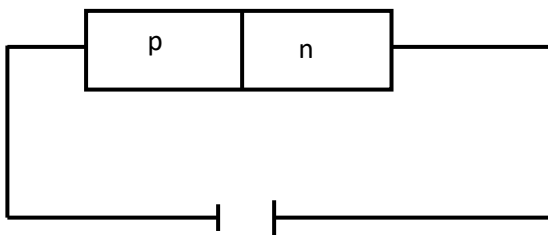
$$T = \frac{1}{f} = \frac{1}{50} = 0.02\text{s}$$

$$\text{Time base divisions} = \frac{0.02}{5 \times 10^{-3}} = 4$$

(b) Grid - It controls the intensity of electron beam and hence the brightness of the spot on the screen. ✓

Anode - It accelerates and focus electrons. ✓

22. (a)



(b) It is the process of adding some impurities to an intrinsic semi-conductor in order to make it an extrinsic semi-conductor. ✓

(c) L_2 lights while L_1 does not light this is because D_2 ✓ is forward while D_1 is reversed biased hence it

does not conduct. ✓