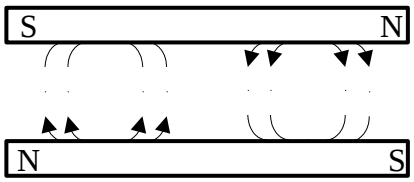
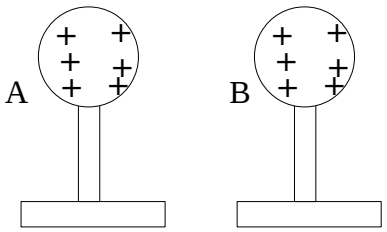
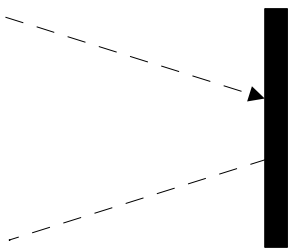
# SCHOOL BASED FORM 4 EXAM JULY-AUGUST 2017
# PAPER 2
# MARKING SCHEME

**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 = $48^0 + 10^0$ ✓= $58^0$
   Angle of incidence = Angle of reflection = $58^0$ ✓
2. 2d = s x t ✓
   d = $\frac{330 x 0.9}{2}$ ✓
   d = 148.5m ✓
3. 

   - Naming polarities ✓
   - Field pattern with direction ✓
4. – Temperature
   - Length of the conductor
   - Type of the material Any ✓
5. The zinc plate reacts with dilute sulphuric acid and its ‘eaten’ away. ✓
6. 

   ✓✓
7. 1.5 x 4 = 6.0s ✓ = T
   $\frac{1}{f}$ = T
   $T = \frac{1}{f} = \frac{1}{6} = 0.167\,HZ$ ✓
8. – Nature of dielectric (Any two ✓✓)
   - Area of overlap of the plates
   - Distance of separation of the plate
9. – As side mirrors of vehicles (As driving mirrors) ✓
   - Use in supermarkets to cover a wider field of view ✓
10. 
    Correct
    Show diffraction ✓✓

11. P = vI

From v = IR

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

P = vI = $V.\frac{V}{R}=\frac{V^2}{R}=\frac{240\,x\,240}{30}$ ✓

P = 1920W ✓

12. (i) – Alpha particles ✓

(ii) – Beta particles ✓

**SECTION B (55 marks)**

13. (i) C = fλ ✓

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

$\frac{3x10^8}{6x10^{-13}}$ = f

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

*C* = fλ

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

$\frac{3.0x10^8}{9x10^{-13}}$ = f

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

*f* = $0.3 \times 10^{21} = 3.3 \times 10^{20}$ Hz ✓

(ii) E = μf = $6.4 \times 10^{-34} \times 5.0 \times 10^{20}$ ✓

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

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

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

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

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

= 2.4V ✓

(ii) $\frac{Np}{Vs}=\frac{Is}{Ip}$ ✓

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

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

Is = 50A

15. (a) (i) - Too long eye ball ✓

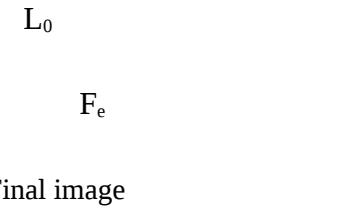
- Short focal length of the eye lens
- More refractions takes place at the cornea lens.

(ii)

✓

(iii) Short sight ✓

(b) (i)




I Final image
✓2

(ii) To give a 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) $W_o = hf_o = \frac{hC}{o}$

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

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

$\lambda o = 6.1875 \times 10^3 m$ ✓

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 $\frac{12}{6} = 2$ ✓

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

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

Resistance = Slope = 50Ω

(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

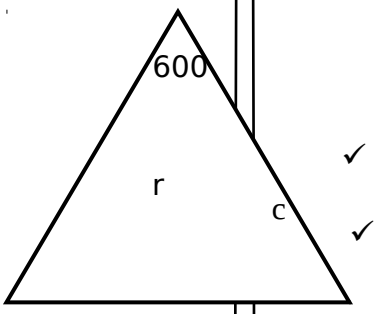
19. (a) (i) $n_1v_1 = n_2v_2$ ✓

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

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

$n_2 = 1.5$✓

(b) (i)




✓ ✓

(ii) $n = \frac{1}{\sin C}$ ✓

$\text{Sin C} = \frac{1}{n} = \frac{1}{1.5} = 0.6667$

$C = 41.8^0 \cong 42^0$ ✓

(c) $n_1 \text{ Sin } \theta_1 = n_2 \text{ Sin } \theta_2$ ✓

1 Sin θ = 1.5 Sin 320

Sin θ = 1.5 x 0.5299

Sin θ = 1.5 x 0.5299

Sin θ = 0.7949

$\theta = 52.6^0$ ✓

20. (a) X - Neutral ✓

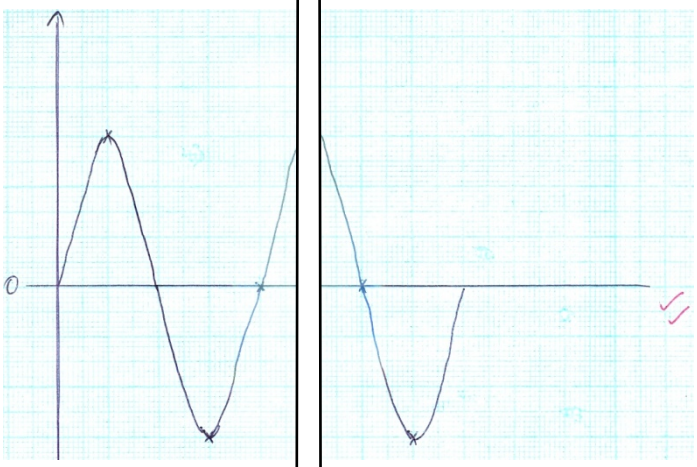
Y – Earth ✓

Z – Live ✓

(b) Red or blown ✓

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

21. (a)




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

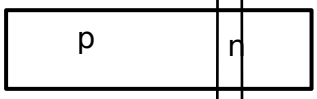
$T = \frac{1}{f} = \frac{1}{50} = 0.02\ s$

Time base divisions = $\frac{0.02}{5x10^{-3}} = 4$

(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. ✓