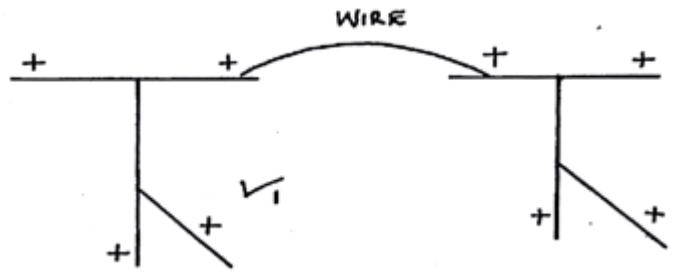
## KCSE CLUSTER TESTS 11

### *Physics Paper 2*

# SECTION A (25 Marks)

1.




1 marks

2.

**-Waves of the same amplitude frequency traveling along the same direction.√1 Or Waves from two coherent sources.**

1 marks

3.

**a) Cathode :Zinc √1 Anode :Copper √1**

**b) i) Polarization. ii) Local action.**

4 marks

4.

**90 – 28=62$^0$**

2 marks

5.

Let the angle be x

$$\frac{360}{x} - 1 = 7 \sqrt{1};$$

$$\frac{360^0}{x} = 8 \sqrt{1};$$

$$8 \times 360^0$$

$$X = 45^0 \sqrt{1};$$

2 marks

6.

$$R_T = \frac{2}{2} + 2 = 3\Omega;$$

$$I = \frac{V}{R} = \frac{3}{3};$$

$$= LA$$

2 marks

7.

Total power consumed $= 3kw + 75w \times 5$

$= 3000 + 375$

$= 3.375kw;$

1 day =24 hrs

Power used in 1 day $= 3.375 \times 24$

$= 81kwh;$

$1kwh = 80cts$

$81kwh = \frac{81 \times 80}{100}$

$Sh6480 := 64.80$

3 marks

8.

P.D across PQ=150v

$Q_T = 1.8 \times 10^{-4} C$

$C_T \quad \frac{Q_T}{V_T} = \frac{1.8 \times 10^{-4}}{150}$

$= 1.2\mu F;$

$\frac{1}{C_T} = \frac{1}{C_1} + \frac{1}{C_2} \Rightarrow C_T = \frac{C_1 C_2}{C_1 + C_2};$

$1.2 \times 10^{-6} = \frac{2 \times 10^{-6} \times C_2}{2 \times 10^{-6} + C_2};$

$1.2 \times 10^{-6}\left(2 \times 10^{-6} + C_2\right) = 2 \times 10^{-6} \times C_2$

$2.4 \times 10^{-12} + 1.2 \times 10^{-6} C_2 = 2 \times 10^{-6} C_2$

$2 \times 10^{-6} C_2 - 1.2 \times 10^{-6} C_2 = 2.4 \times 10^{-12}$

$0.8 C_2 \times 10^{-6} = 2.4 \times 10^{-12}$

$C_2 = \frac{2.4 \times 10^{-12}}{0.8 \times 10^{-6}}$

$C_2 = 3 \times 10^{-6} F$

$= 3\mu F;$

3 marks

9.

**-Biconvex lenses.**

**-Because the grandfather is having long sightedness eye defect.**

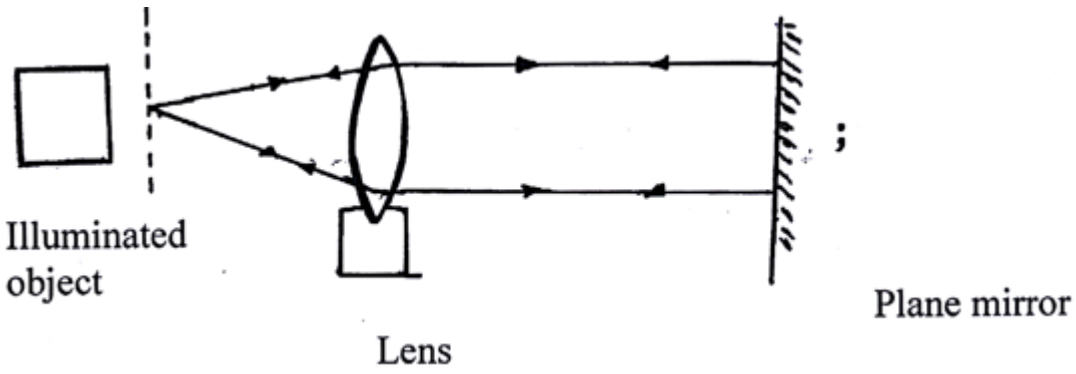
2 marks

10.

**When there is a fault in an appliance, the earth wire provides a route for charges and large current flows hence the fuse blows. This prevents the metallic part of appliance from being live.**

1 marks

11.




**Apparatus is arranged as shown with distance between lens and the object being greater than focal length. Position of the lens is adjusted until a sharp image of the object is formed beside the object; Distance between the lens and the object is then measured and is the focal length of the lens;**

3 marks

12.

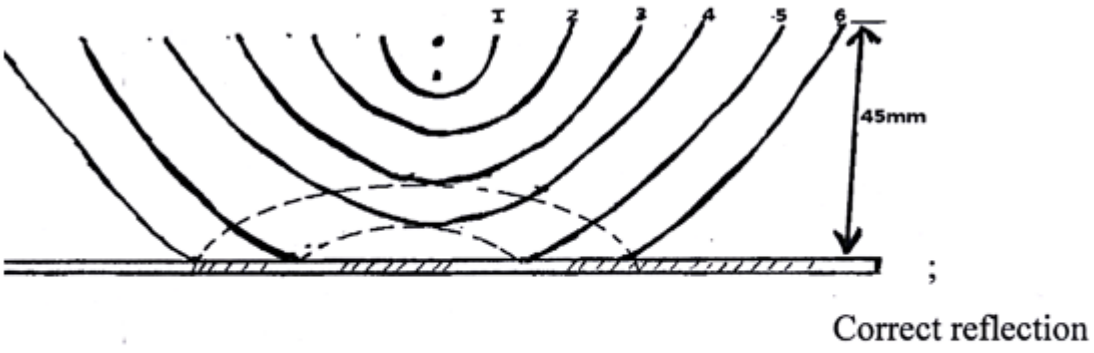
**For plane mirror same size as object for a concave mirror image is magnified**

1 marks

# SECTION B (55 Marks)

13.

a) i)




ii) $4\lambda = 45$

$\lambda = 11.25$ (1mark)

iii) $V = f\lambda$ (1mark)

$60 = f \times 11.25$ (1mark)

$f = 5.333Hz$ (1mark)

**i) Cornea-U; Retina – Q;**

**ii) I- Increases in size to accommodate more light;**

**II-Increases the amount of light entering the eye;**

iii)

| Part of eye | Description |
|---|---|
| Retina Q | Sensitive to light |
| Optical nerve R | Carries signal to brain |
| Cilliary muscle S | Alters the size of the pupil. |

**iv) Relaxation of the cilliary muscles. Enables the lens to increase its focal length, hence focus a distant object;**

**-Contraction on the other hand reduce the tension in the lens, making it have a shorter focal length, thus focusing near objects.**

13 marks

14.

**a) i) When the switch is closed current flows through the coil causing a magnet field; that repels the magnet towards the chime bar. The end of the coli adjacent to the sound pole of the bar magnet acquires a South Pole;**

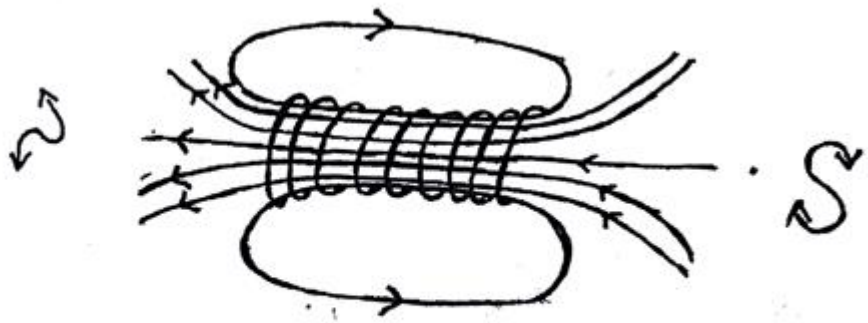
**ii) He should increase the number of turns in the coil;**

**-Use a dc source of higher voltage to increase current, -Introduce a soft iron core in the coil (any 2)**

**iii) Electrical energy - magnetic;**

**Potential energy - sound energy.**

b) i)



Field outside;

Field inside:

**ii) Resistance in the circuit increases;**

**iii) The current reduces;**

**iv) Becomes less stronger:**

**c)**

**i) There must be a change in the magnet flux of the primary coil linked to the secondary coil; with D-C voltage there will be change in the flux linked to the secondary coil hence No induced Emf in it;**

**ii) Step up the voltage to higher values for transmission which minimizes power loss;**

**-Step down the higher voltage required by the consumers;**

13 marks

15.

**a) i) The energy of the election is despated at the lamp wire due to its resistance as heat; - Which the wire get red hot and the white hot it gives out light and heat energy;**

$E = I^2Rt$;
$E = Vt$;
$= 12 \times 3 \times 20$;
$= 720J$;

**b) i) The resistance of the wire increase in current and hence the potential difference across it;**
**-The wire becomes hotter increasing the opposition to the flow of current;**
**-The wire is a non ohmic conductor (doesn't obey ohms law)**
**ii) I: Resistance doubles; since Resistance α length;**
**II –The resistance reduces to¼ the original value**

$$\text{Resistance} = \frac{\rho L}{A}$$

$$\text{But } A = \pi\left(\frac{D}{2}\right)^2$$

10 marks

16.

$$16.a)\ \frac{1}{R_T} = \frac{1}{2} + \frac{1}{2} + \frac{1}{4} = \frac{2+2+1}{4} = \frac{5}{4}$$

$i)\ R_T = {}^{4}\!/_{5} = 0.8\Omega$

$R_{T12} = RT_1 + R_2$

$= 0.8 + 3$

$= 3.8\Omega$

$RT_3 = \frac{1}{1} + \frac{1}{5} = \frac{5+1}{5} = \frac{6}{5}$

$R_{T3} = {}^{5}\!/_{6} = 0.83\,\Omega$

$R_T = RII_2 + R_{13}$

$= 3.8 + 0.83$

$= 4.63\,\Omega$

$ii)\ I = {}^{V}\!/_{R} = {}^{10}\!/_{4.63} = 2.1A$ *Ratio* 1 : 5

$I$ *thro* $5\Omega = {}^{1}\!/_{6} \times 2.16$ $5\Omega$ *takes the smallest ratio*

$0.36\,A$

$b)\ i)\ I = {}^{V}\!/_{R} = \frac{20}{50} = 0.4A$

$ii)\ Q = 1t \quad n = \frac{Q}{R}$

$= 0.4 \times 1 \quad = \frac{0.4}{1.6 \times 10^{-9}}$

$= 0.4c \quad = 2.5 \times 10^{18}$ *electrons*

10 marks

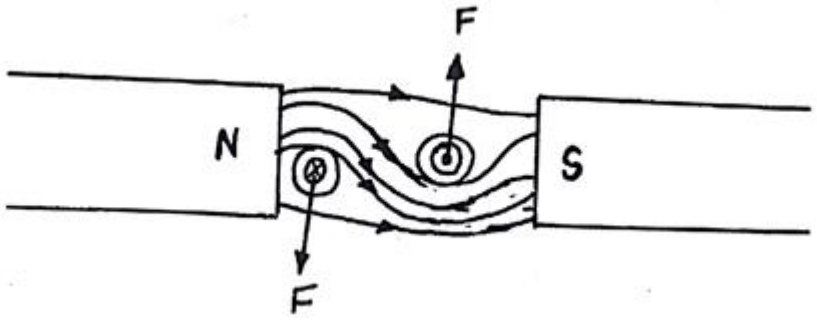
17.

**a) Fleming left hand rule; If the thumb ,first and second fingers of the left hand are held at right angles to each other, then if the first finger represents the direction of the magnetic field and the second finger the direction of current, thumb represents the direction of motion;**

**b) Pattern of field;**

**Direction of field;**

**Direction of force;**




**c) i) When the push button switch is pushed on, current flow; the soft iron core is Soft iron core (magnetized) attract, the soft iron armature and the hammer hits the gong; Meanwhile the contact is broken stopping current flow. The core demagnetized releases the armature and the hammer goes back; The process is repeated again;**

**ii) If the armature is made of steel; the hammer hits the gong and remains there/the bell rings once; this is because steel acquires permanent magnetism;**

**iii) The soft iron core should be U –shaped;**

9 marks