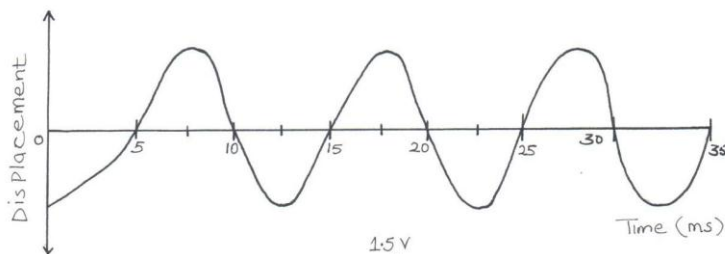


SECTION A: (25 MARKS)

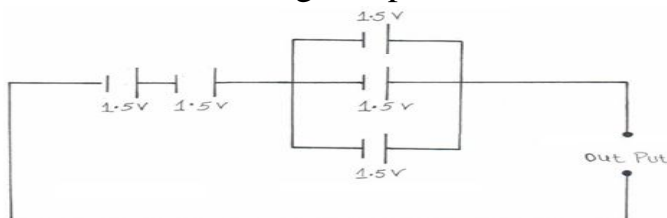
- When a negatively charged rod is brought near the cap of a leaf electroscope, the leaf rises. Explain this observation. (2 marks)
- Figure 1 below represents a displacement-time graph for a wave.



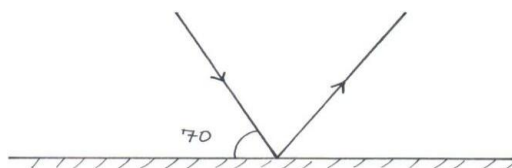
Determine the frequency of the wave.

(2 marks)

- A hair drier is rated 2000W, 240V. Determine its resistance. (2 marks)
- Why is repulsion the sure test for a magnet? (1 mark)
- What is the voltage output for the cell arrangement below? (2 marks)

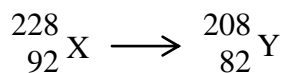


- A ray of light is incident on a plane mirror as shown.



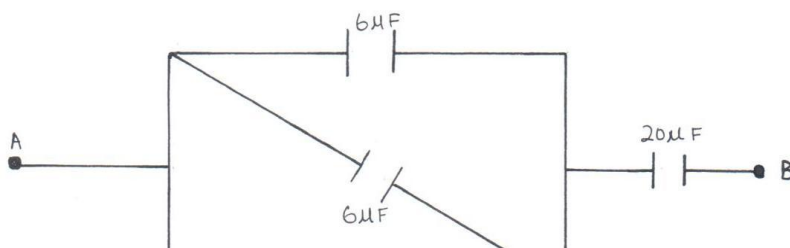
- What will be the angle through which the reflected ray rotates if the mirror is rotated anticlockwise through an angle of 35°? (2 marks)
- What would be the new angle of reflection?

- A radioactive substance decays as shown below.



How many alpha and beta particles are emitted?

- Four capacitor are connected as shown.



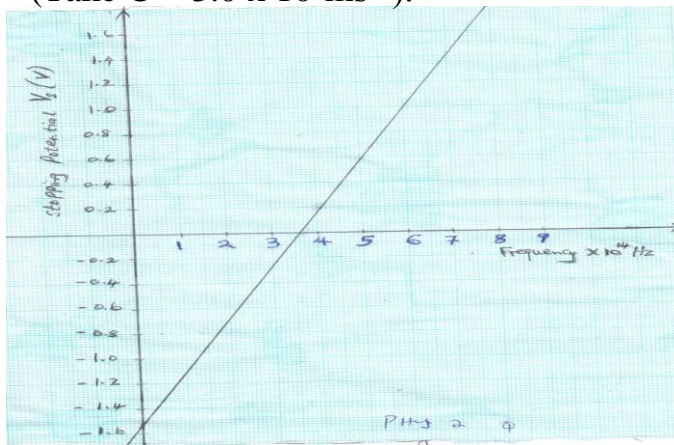
Calculate the effective capacitance between A and B.

(3 marks)

9. Use the domain theory to explain how an unmagnetized piece of iron becomes magnetized when it is heated and then allowed to cool in a magnetic field. (2 marks)
10. A girl observes her face in a concave mirror of focal length 10cm. If the mirror is 8cm away. State **one** characteristic of the image observed. (1 mark)
11. The coil in an electric motor is usually wound on a soft iron armature. State **two** purposes of this armature. (2 marks)

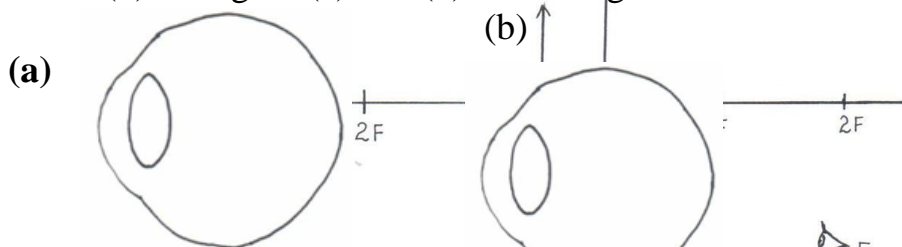
SECTION: (55 MARKS)

12. (a) Define the term work function. (2 marks)
- (b) The work function of a clean metal surface is 7.5eV. Calculate.
 (i) The minimum frequency of radiation that will cause the emission of electrons from the surface. (Planck's constant $h = 6.63 \times 10^{-34} \text{Js}$, electronic charge $e = 1.6 \times 10^{-19} \text{C}$). (3 marks)
 (ii) The maximum energy of the electrons emitted when the surface is illuminated with a radiation of frequency $2.0 \times 10^{15} \text{Hz}$. (3 marks)
- (c) The graph below show stopping potential V_s against frequency f . (Take $C = 3.0 \times 10^8 \text{ms}^{-1}$).



Use the graph to determine:-

- (i) the threshold wavelength. (2 marks)
- (ii) Planck's constant. (2 marks)
- (iii) the work function of the metal. (2 marks)
13. (a) The figure below shows an object in front of lens.
 (i) Using rays locate the image as seen by observer, E. (2 marks)
 (ii) Give **one** application of such a lens as used above. (1 mark)
 (iii) Write **three** similarities between an eye and a camera. (3 marks)
- (b) Figure (a) and (b) show diagrams of the human eye.



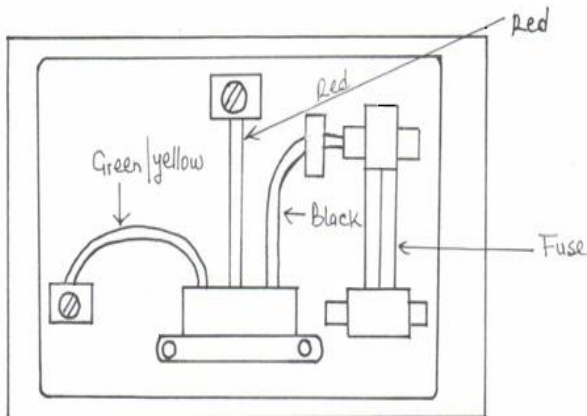
- (i) In figure (a), sketch a ray diagram showing long sightedness. (1 mark)

ii) In figure (b), sketch a ray diagram showing how lens is used to correct long sightedness. (2 marks)

(d) An object of height 10.5cm stands before a diverging lens of focal length 20cm and a distance of 10cm from the lens. Determine;

- (i) image distance. (2 marks)
- (ii) height of the image. (1 mark)
- (iii) magnification. (1 mark)

14. (a) A heater rated 2000W is used to heat water for 5 hours. Calculate the cost of electricity at Ksh.6.70 per unit. (3 marks)
- (b) Give a reason why transmission of electricity is done at very high voltage. (1 mark)
- (d) Figure below shows a connection of a three pin plug.



- (i) Identify any two mistakes in these wires. (2 marks)
- (ii) Suggest what would happen if this plug was connected to the mains of the socket. (1 mark)