

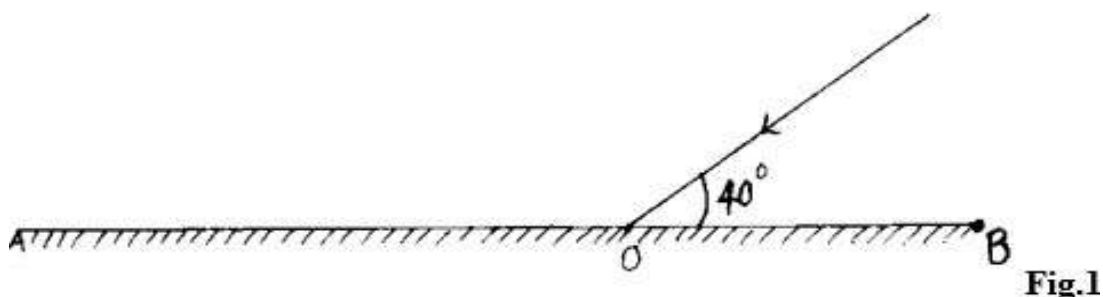
FORM FOUR CLUSTER KCSE MODEL 7

PHYSICS PAPER 2 QUESTIONS

SECTION A (25 Marks)

Answer ALL the questions in this section in the spaces provided.

1. Figure 1 shows a ray of light incident on a plane mirror AOB at O. The mirror is rotated through an angle of 15° in a clockwise direction about O.



- (a) Determine the final angle of reflection.

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- (b) State the assumption made in 1 (a) above.

2. Figure 2 shows an incomplete circuit of an electromagnet. Complete the circuit between X and Y by drawing the winding on the two arms of the core such that A and B are both South poles when switch S is closed. Indicate the direction of the conventional current on the windings drawn

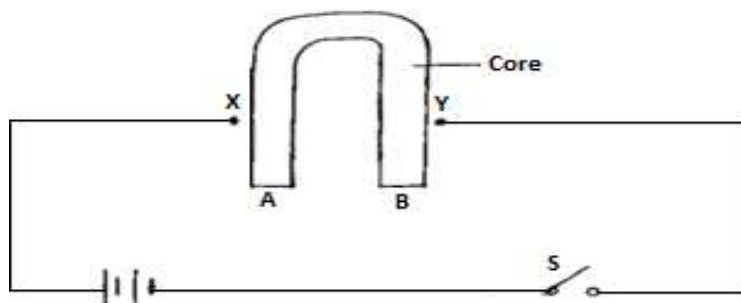
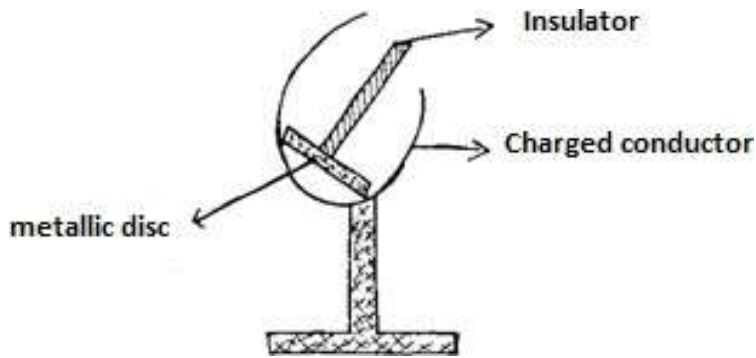


Figure 2.

3. Figure 3 shows a hollow negatively charged sphere with a metal disc attached to all insulators placed inside



State what would happen to the leaf of an uncharged electroscope if the metal disc were brought near the cap of the electroscope. Give a reason for your answer

4. For a given source of X - rays, how would the following be controlled;

(i) Intensity of X- rays produced.

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(ii) The penetrating power of X - rays.

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(iii) The exposure to patients.

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5. When a sound wave travels from a dense to a less dense gas, its velocity changes. What wave property does this observation show?

6. Figure 4 shows a circuit containing a battery of two cells, a 3 A fuse, a switch S and two identical lamps L1 and L2 . A current of 2 A flows through lamps L2 when S is open

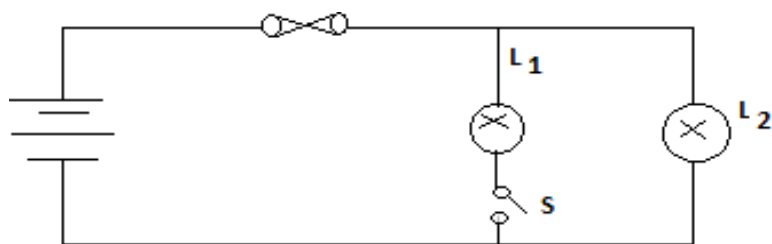
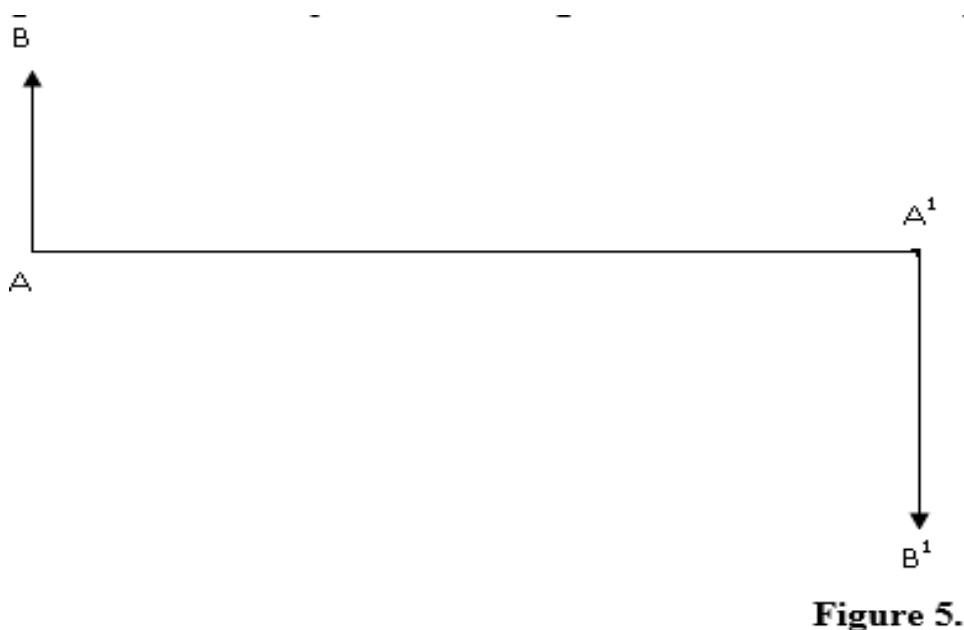


Fig 4

Explain why the fuse may blow when the switch S is closed.

7. Figure 5 shows an object and its image formed on the screen by a thin lens.



By using appropriate rays complete the diagram to show the position of:

- (i) The lens
- (ii) The two principal foci

8. State the basic law of magnetism.

9. Figure 6 shows two parallel current - carrying conductors A and B placed close to each other. The direction of the current is into the plane of the paper. On the same figure;



- (i) Sketch the magnet field pattern.
- (ii) Indicate the force F due to the current on each conductor.

10. What causes electromagnetic damping in a moving coil galvanometer?

11. An image is formed 30cm away from an object placed 20cm in front of a convex mirror. By calculations, determine the focal length of the mirror

12. Figure 7 shows three identical light bulbs connected to a 12 volt battery whose internal resistance is negligible

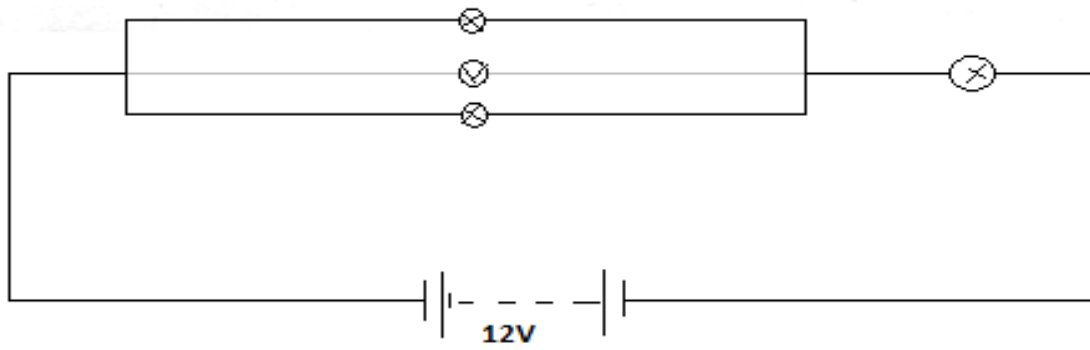


Fig.7

Determine the reading of the voltmeter V.

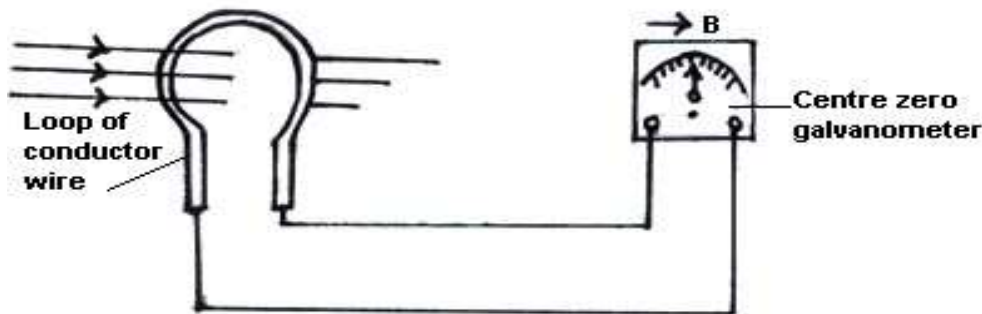
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13. Figure 8 shows a loop of conductor wire moving parallel to a uniform magnetic field B

Figure 8.



(i) Sketch on the galvanometer the pointer showing reading

(ii) Give an explanation of the reading in 13 (i) above

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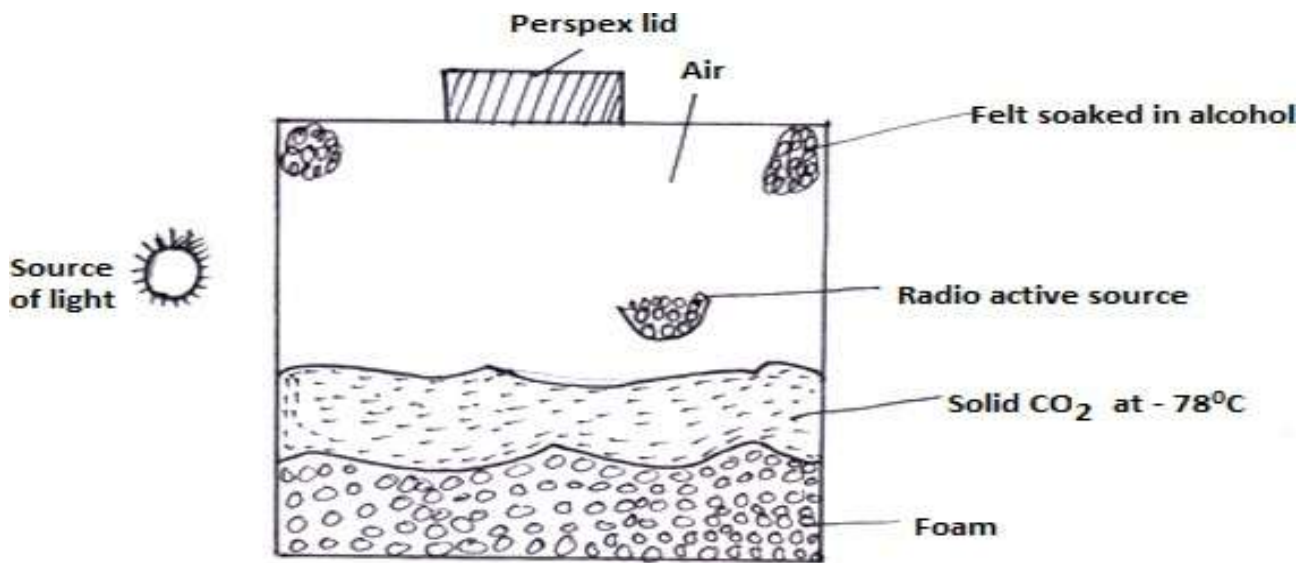
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SECTION B (55 Marks)

Answer ALL the question in this section in the spaces provided.

14. .(a) Figure 9 shows a cross section of a diffusion chamber used to detect radioactive sources.



(i) State one function of each of the following;

Alcohol -

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Solid CO₂ -

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(ii) State the function of Perspex lid.

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(iii) When radiation from the source enters the chamber, some white traces are observed. Explain how these traces are formed.

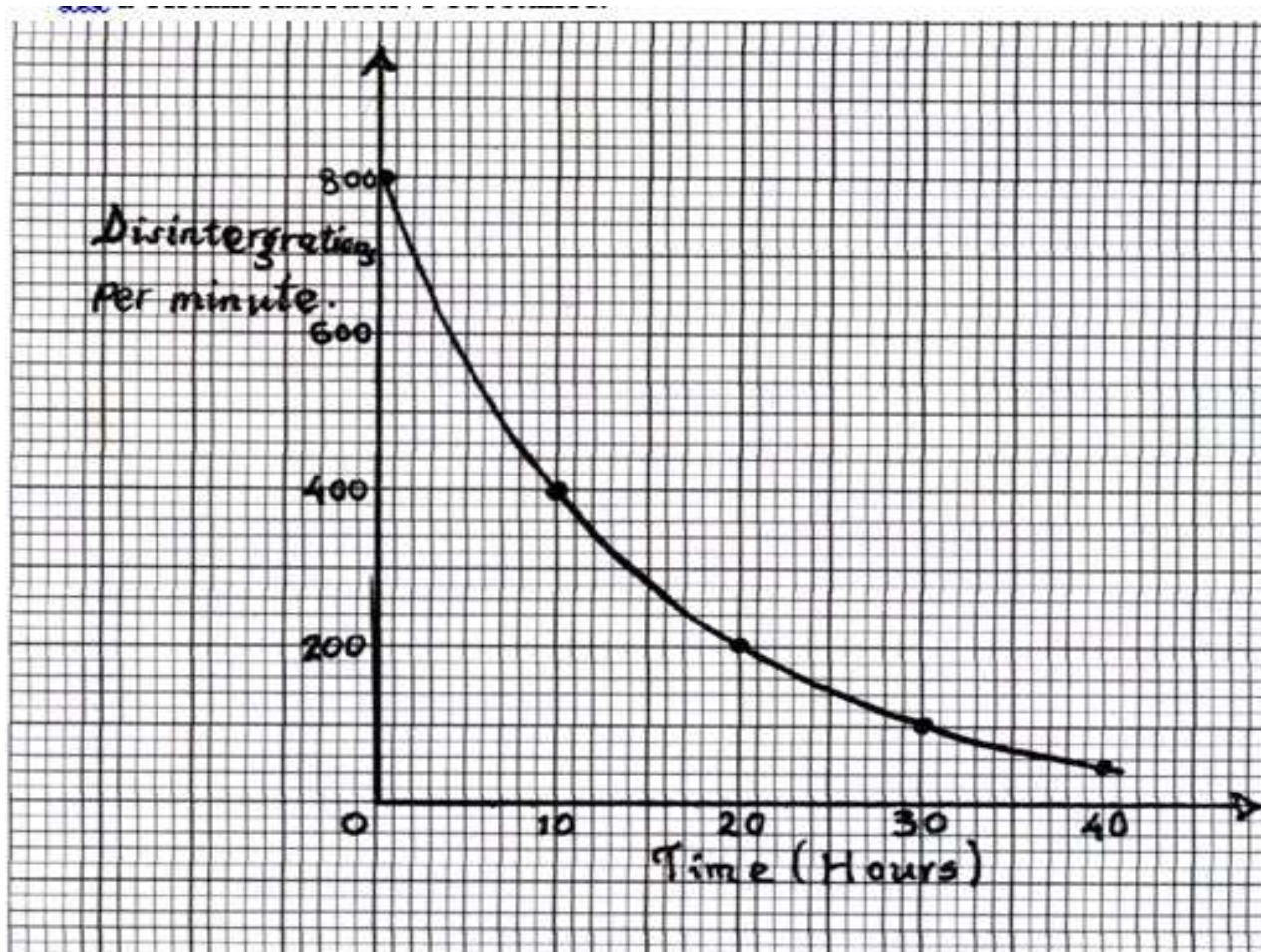
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(iv) State one advantage of the cloud chamber over a charged leaf electroscope when used as detectors of radiations.

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The graph below shows activity in disintegrations per minutes against time in hours for a certain radioactive substance



Determine the half-life of the radioactive substance.

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15. (a) Figure 10 shows a circuit that is used to charge a capacitor C.

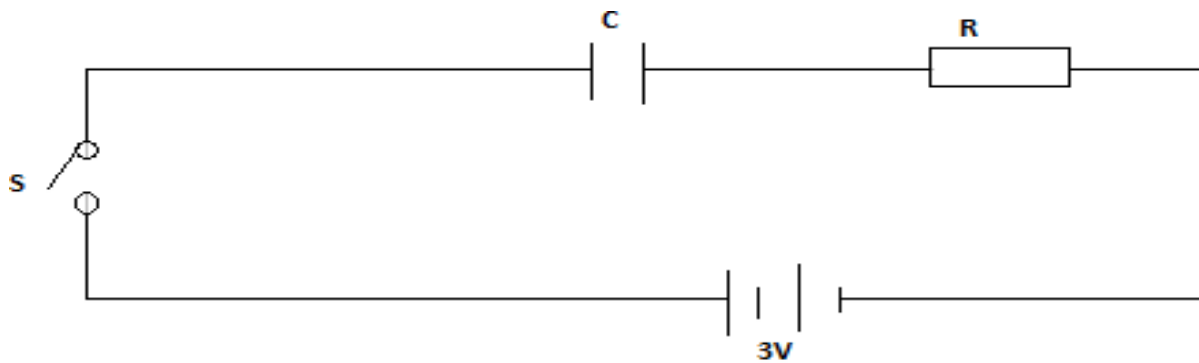


Fig. 10

Quantity of charge, Q stored across C is $0c$ at $t= 0s$ (Initially).

(i) State the values of voltage across C_1 , V_C and that across R_1 , V_R when S is just put on ($t=0s$).

$V_C = \dots\dots\dots$

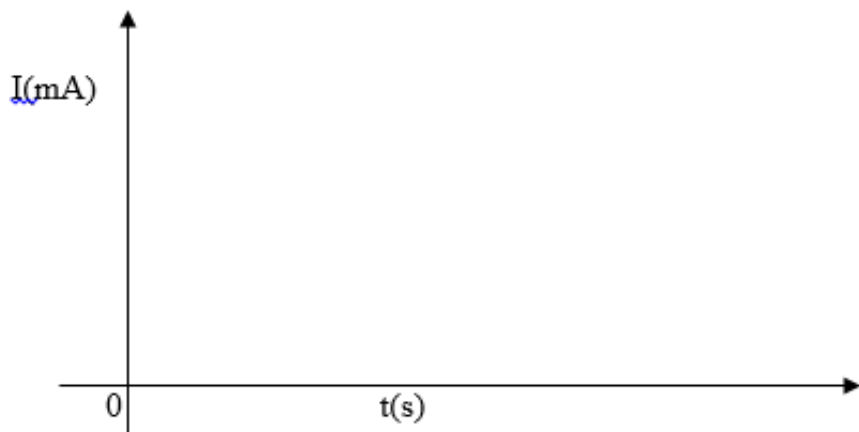
$V_R = \dots\dots\dots$

(ii) State the value of V_2 when the capacitor is at full charge.

$V_R = \dots\dots\dots$

(iii) On the grid provided below, sketch a graph of charging current, I against time, t for this

Process

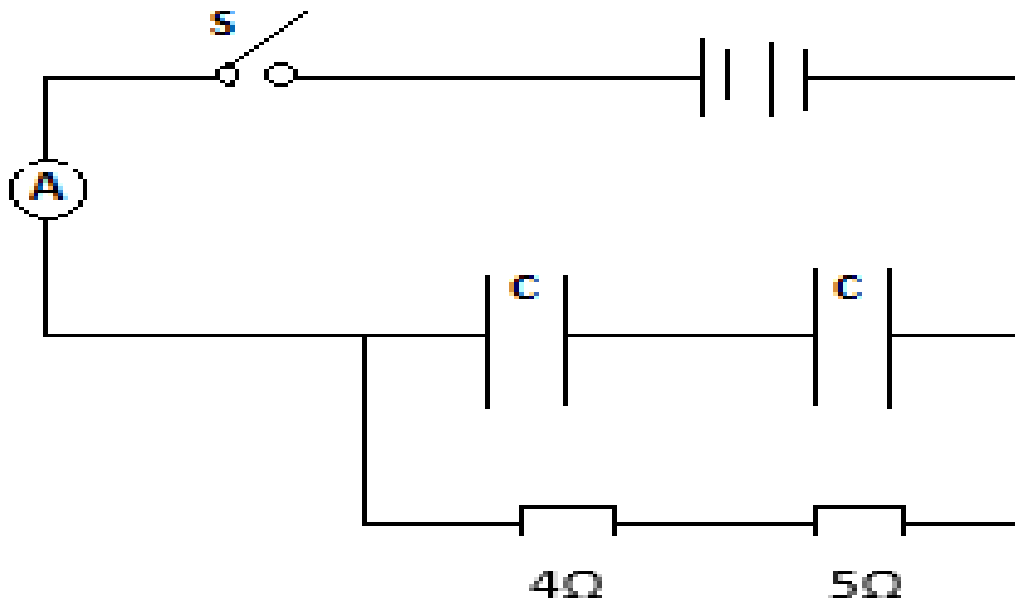


(iv) What is the physical significance of the area under graph drawn in (iii) above?

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(b) In the circuit diagram in figure 11, each cell has an e.m.f of 1.5 V and internal resistance of

0.5Ω . The capacitance of each capacitor is $2.0 \mu f$



When the switch S is closed, determine; (i) the ammeter reading

(ii) Charge on each capacitor.