FORM FOUR CLUSTER KCSE MODEL9

PHYSICS PAPER 2 QUESTIONS

SECTION A (25 Marks)

Answer ALL questions

1. State the purpose of the following lens as used in an astronomical Telescope.

   a) Objective lens

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   b) Eye piece

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2. Figure 1 shows a circuit consisting of an ammeter, dry cells, potentiometer, a switch all connecting wires.

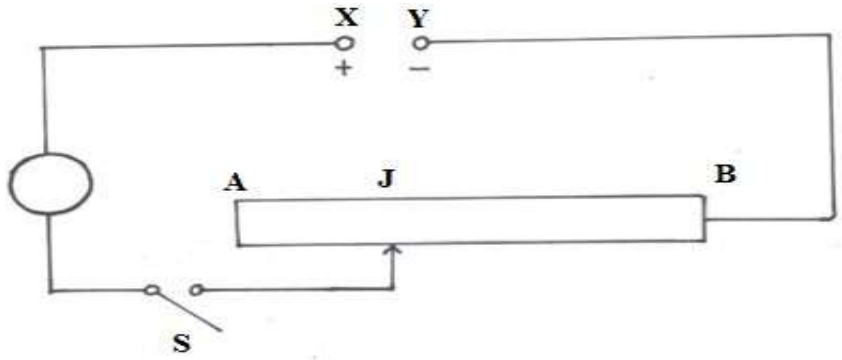

Figure 1

   State and explain the adjustment made on the circuit to make an ammeter read a lesser value.

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3. Figure 2 shows an arrangement of a lens, a screen and an illuminated object being an experiment that was set up by a physics student of Mambo Yote Secondary school.

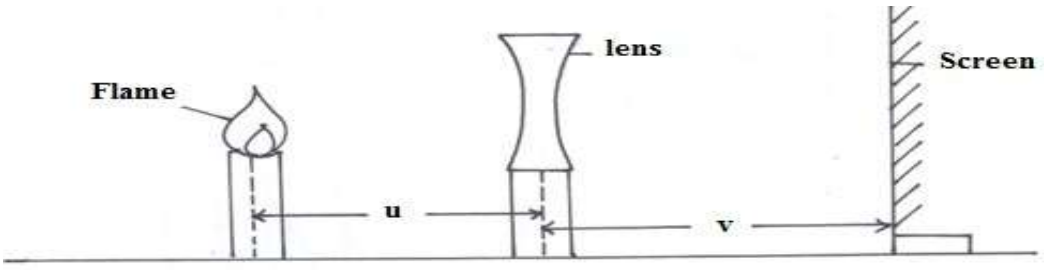

Figure 2

   The student moved the screen to and fro at different values of u and could not obtain the image on the screen.

a) State a reason why an image was not formed on the screen.

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b) What could the student do to obtain an image on the screen?

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4. Distinguish between magnetic and non- magnetic materials using domain theory
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5. Explain why an alkaline battery delivers a larger current than a lead acid accumulator.
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6. Define an Ohm.

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7. A ray of light is incident on a plane mirror M1 as shown in Fig 3. M1 and M2 two plane mirrors inclined at 600.

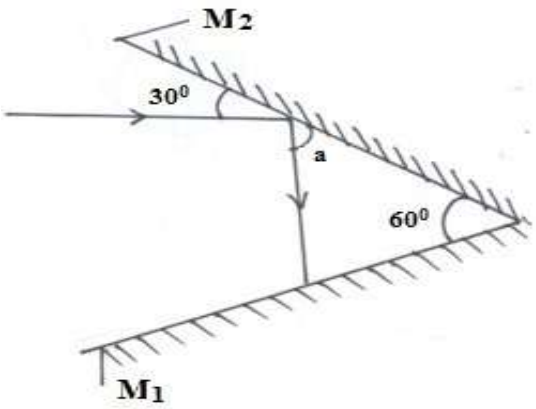

Figure 3

a) State the value of angle a.

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b) Complete the ray diagram to show how the ray reflects after striking mirror M1.

8. State a reason why light from a glass block is refracted away from the normal at the interface when it enters air. .....

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9. Figure 4 shows two charged insulated spherical conductors

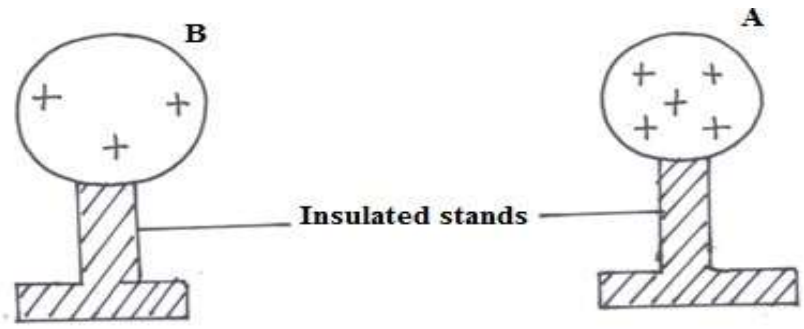
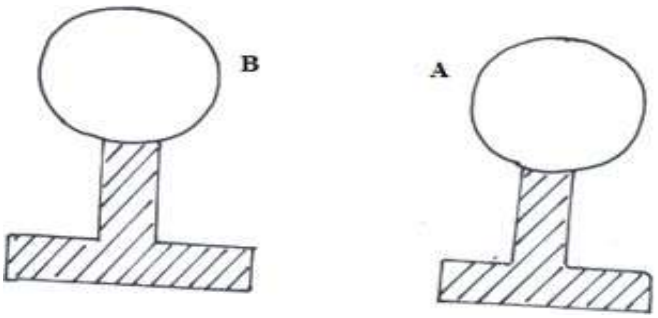


Fig. 4

Two conductors A and B are put in contact and then separated.

a) On the diagram below, indicate the arrangement of positive charges on each conductor after they have been separated.



b) Give a reason for your answer in 9 (a) above.

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10. State two conditions that must be met for a conductor to obey Ohm's law.

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11. The diagram in Fig 5 shows a slinky spring exhibiting longitudinal waves.

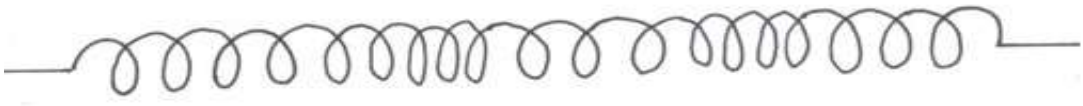

Fig.5

Indicate on the diagram the length that is equal to a wavelength.

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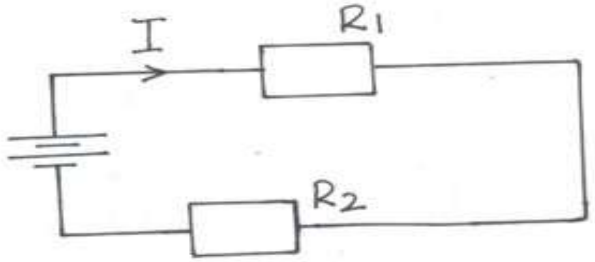
12. Two resistors R1 and R2 are arranged as shown in Fig 6. The e.m.f across the battery of internal resistance r is E.



Give an expression of E in terms of R1, R2, r and I.

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13. Figure 6 shows a beam of cathode rays incident to a magnetic field. Complete the cathode ray to show how it is deflected in the magnetic field.

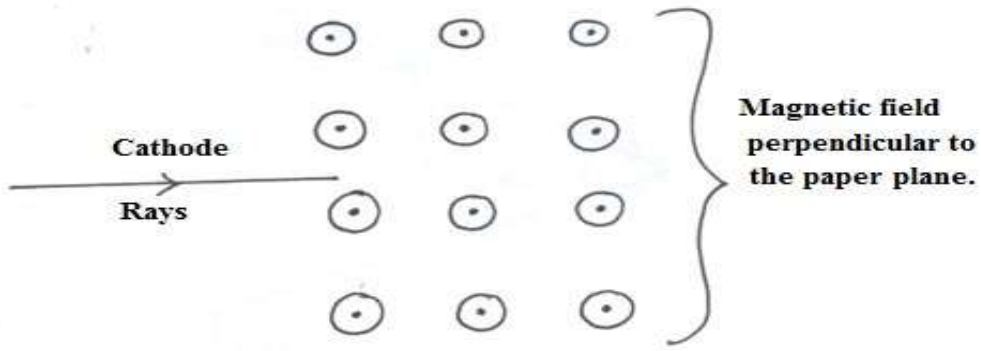

Fig.6

14. Figure 7 shows a ray of light incident on a concave mirror.

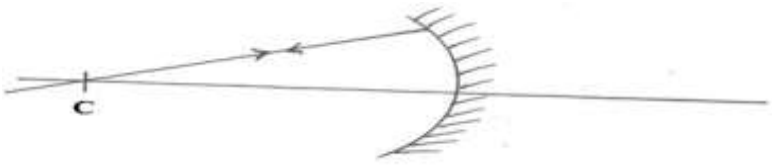

Fig.7

Explain why the ray of light passing through the centre of curvature is reflected along the same path. ……
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15. Figure 8 shows straight waves travelling from region towards region B of a ripple tank.

Compare the depth in A and that in B.

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16. Figure 9 shows a force acting on a wire carrying current placed in a magnetic field.

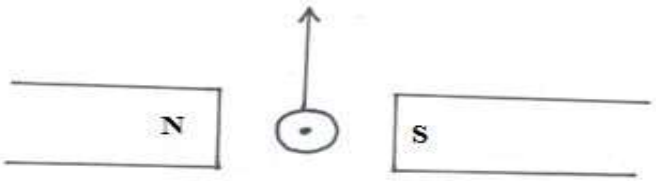

Fig.9

Explain why the wire experiences an upward force.

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17. $100\mu\ell$ of charge moves from point A to point B of a certain conductor in 25ms. Find the rate of change of this charge.

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SECTION B (55 Marks)

Answer ALL questions

18. a) A converging lens forms a virtual image A1B1 of an object AB placed at some distance XY from its optical centre. State any other two properties of the image A1B1.

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b) Figure 10 shows ray diagrams of a certain eye defect.

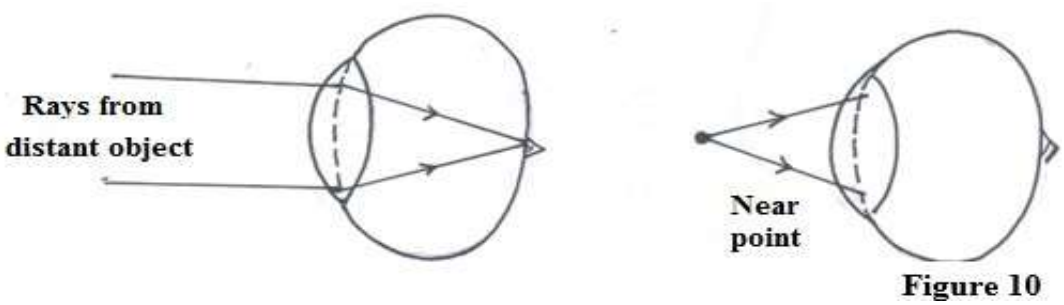

Figure 10

i) State the eye defect shown in Figure 10.

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ii) State the cause of the defect shown in figure 10.

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iii) Complete the ray diagram in Figure 10 (ii) to show how the rays are refracted by the eyes lens.

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iv) By using an appropriate lens and ray diagram in figure 10, show how this defect can be corrected. .....

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c) A concave lens forms an image 10cm away from its optical centre. The distance between the image and the object is 5cm. Determine; i) The distance between the object and the optical centre of the lens.

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ii) The focal length of the lens.

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iii) The power of the lens.

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19. Figure 11 shows a circuit consisting of three identical bulbs, a battery, four switches, two ammeters and two voltmeters. When S1 is closed, then V1 reads 3.0V and A2 reads 1.0A.

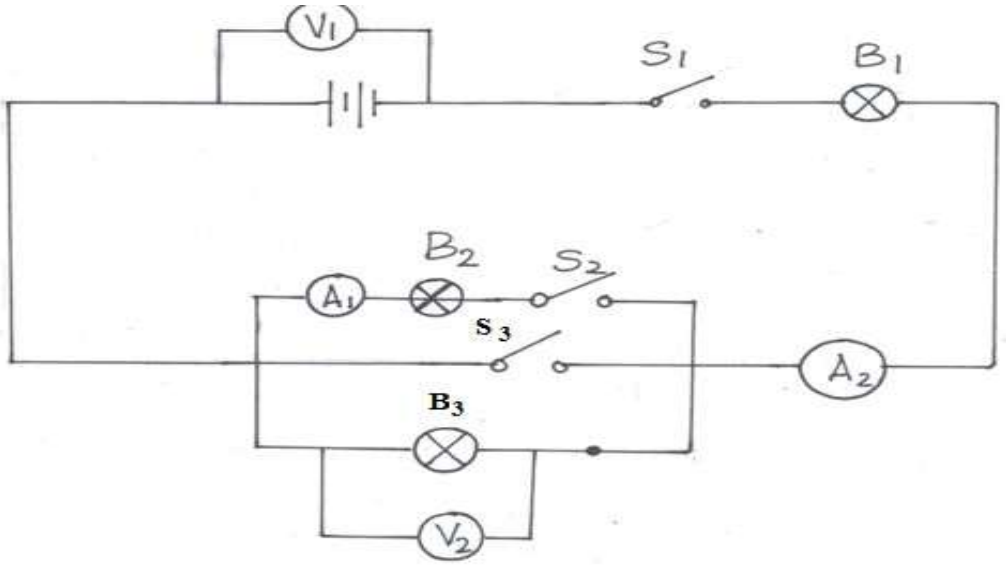

Fig. 11

a) State and explain the observations made on B1,B2 and B3 when; i) S1 and S3 are closed while S2 is open. .....
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ii) S1,S2 and S3 are all closed.

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b) S1 and S2 are closed while S3 is open for some time. B2 blows during this time. State and explain the observations made on B1,B2 and B3 after B2 has blown.

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c) When S1 and S2 are closed while S3 is open, determine the reading on;

V2=.....

20. a)

i) Distinguish between transverse and longitudinal waves.

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ii) Give one example of transverse wave and one example of a longitudinal wave.
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b) Water waves are observed as they pass a fixed point at a rate of 30 crests per minute. A particular wave crest takes 2 seconds to travel between two fixed points 6m apart. Determine for the wave;

i) the frequency.

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ii) The wavelength

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c) Figure 12 shows two identical loud speakers L1 and L2 connected to a signal generator. O is the mid-point of L1 and L2. One observer walks along 001 and another along AA1 for some distance. Describe observations made by each observer and give reasons for your answer.

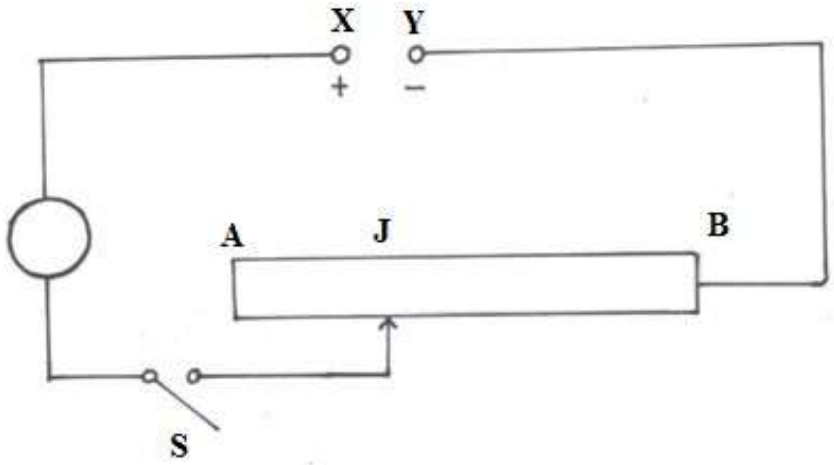

Figure 1

i) 00^1

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ii) AA^1

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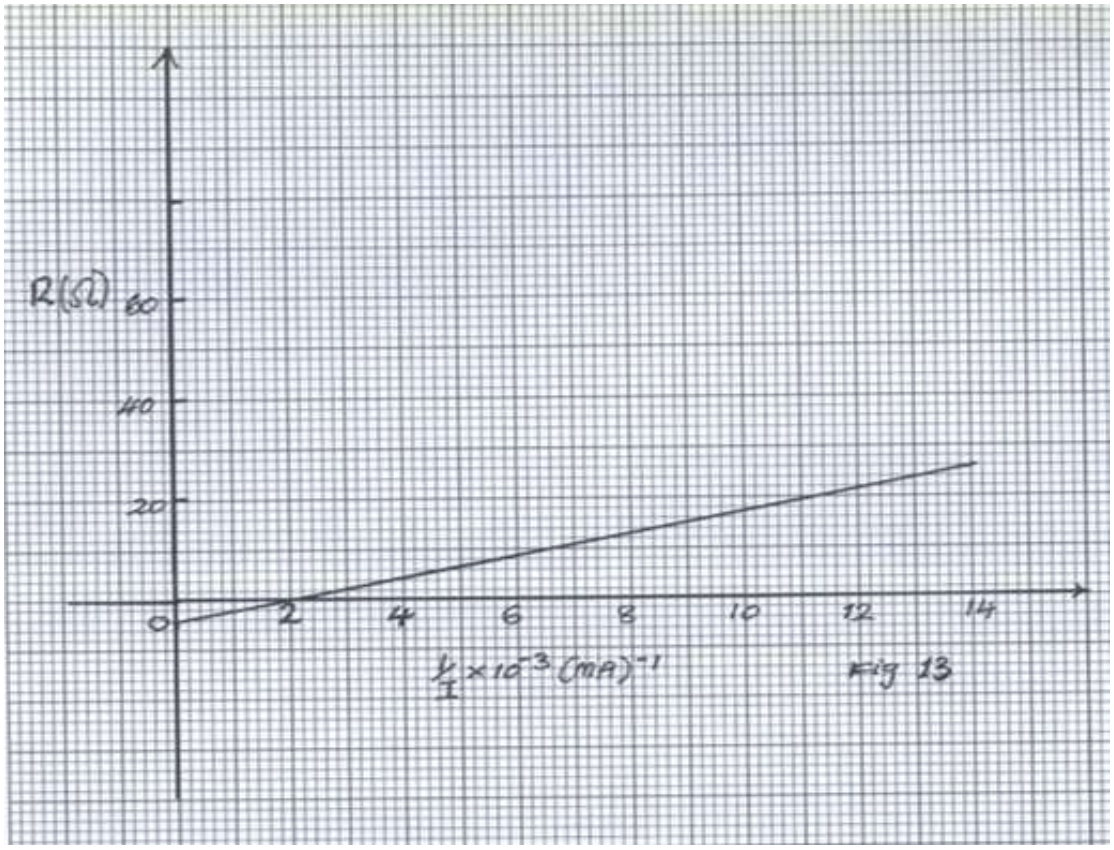
21. In an experiment to determine the e.m.f, E, internal resistance, r of a dry cell the following graph was obtained.



R is the external resistance while I is the total current that flows in the circuit. a) In the space below, draw the circuit that can be used to obtain the results in Fig 13.

b) The equation of the graph in Fig 13 is E= Ir+IR. Use the graph to determine; i) The emf, E of the dry cell. .....

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ii) The internal resistance, r of the dry cell.

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22. a) i) Define capacitance

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ii) Describe how the type of charge on a charged metal rod can be determined.

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b) Figure 14 shows a hollow negatively charged sphere with a metal disc attached to an insulator placed inside.

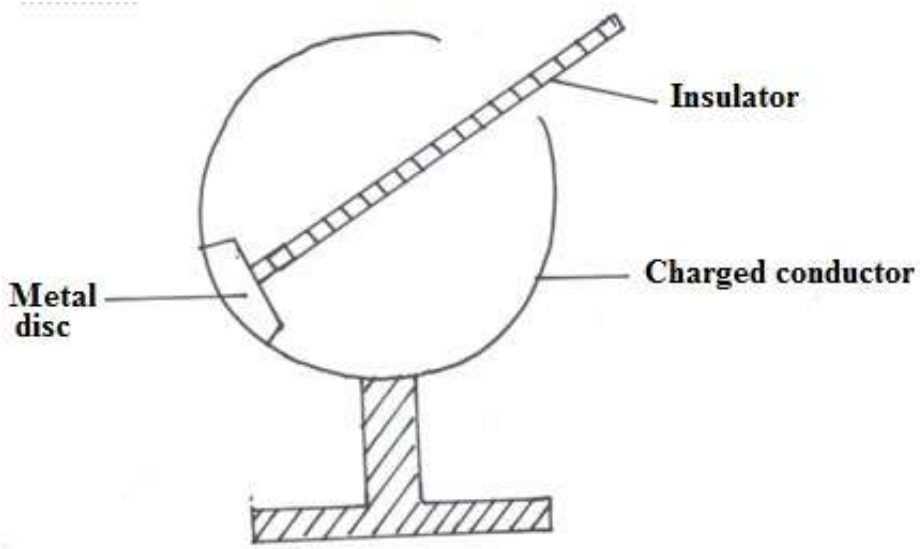

Fig. 14

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.

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c) Figure 15 shows an arrangement of capacitors connected to a 10v d.c supply.

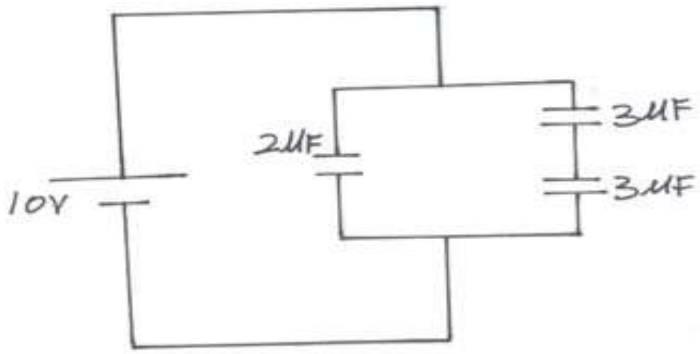

Figure 15

Determine

i) The charge stored in the $2\mu F$ capacitor.

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ii) The combined capacitance of the arrangement.

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23. a) State Faraday's law of electromagnetic induction.

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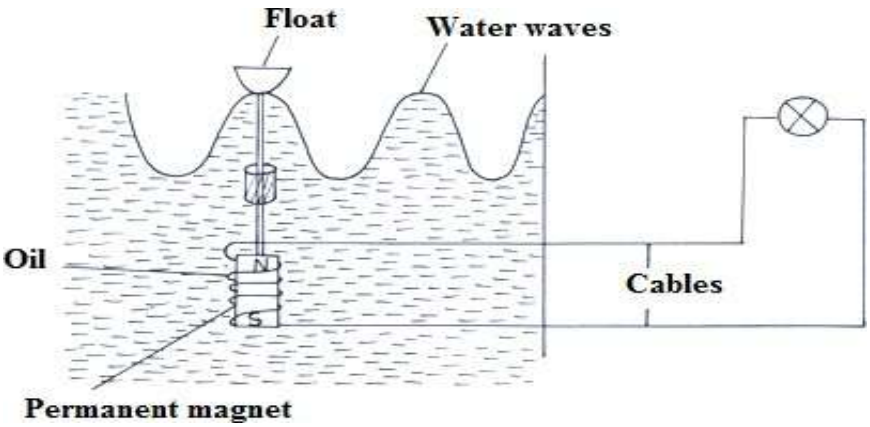
b) Figure 16 represents a simple energy generator



i) It is observed that the bulb lights. Explain this observation.

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ii) State the energy transformations that take place during the process.

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iii) State two changes that can be made on the generator to reduce the light intensity produced by the bulb. .....

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