NAME \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ INDEX NO. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

SCHOOL \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SIGNATURE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**232/2**

**PHYSICS**

**PAPER 2**

**(THEORY)**

JULY / AUGUST 2015

**TIME: 2 HRS**

232/2

PHYSICS

PAPER 2

(THEORY)  
TIME: 2 HRS

**INSTRUCTIONS TO CANDIDATES**

1. Write your name, school and your index number in the spaces provided.
2. Sign and write the date of examination in the spaces provided above.
3. This paper consists of **two** sections, Section **A** and **B.** Answer **ALL** the questions in both sections in the spaces provided in this paper.
4. **ALL** working must be clearly shown.
5. KNEC mathematical tables and non-programmable silent electronic calculators **may be** used.

*Note: Take gravitational field strength, g = 10N/Kg*

FOR EXAMINER’S USE:

|  |  |  |  |
| --- | --- | --- | --- |
| SECTION | QUESTION | MAXIMUM SCORE | STUDENTS SCORE |
| A | 1-14 | 25 |  |
| B | 15 | 14 |  |
| 16 | 09 |  |
| 17 | 10 |  |
| 18 | 10 |  |
| 19 | 11 |  |
| TOTAL | 80 |  |

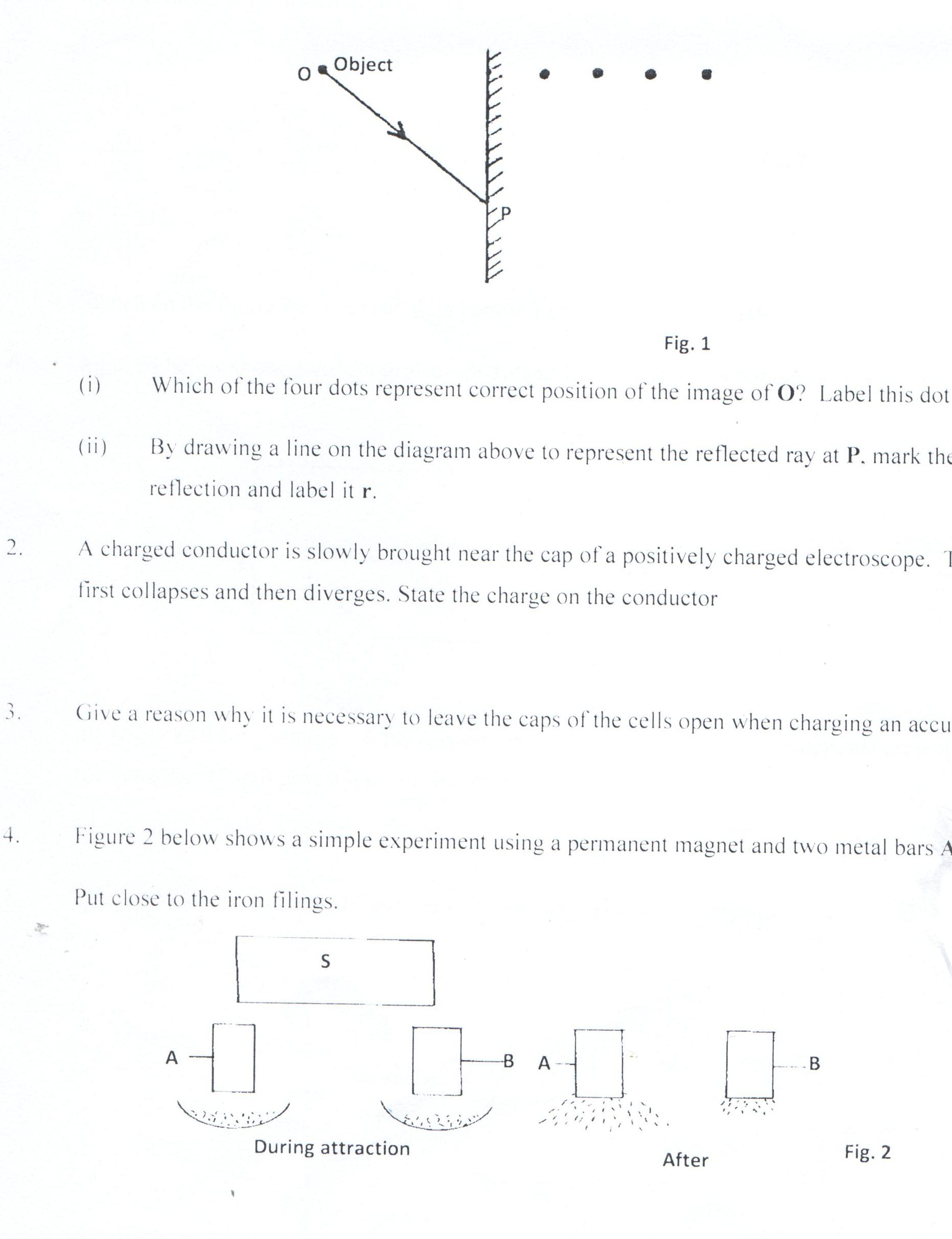
*This paper consists of 10 printed pages*

*Candidates should check to ensure that all pages are printed as indicated and no questions are missing*

**SECTION A (25 MARKS)**

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

1. Figure 1 below shows an object **O** placed in front of a plane mirror. A ray of light is drawn coming object **O** and striking the mirror at P. After striking the mirror, the ray of light is reflected.



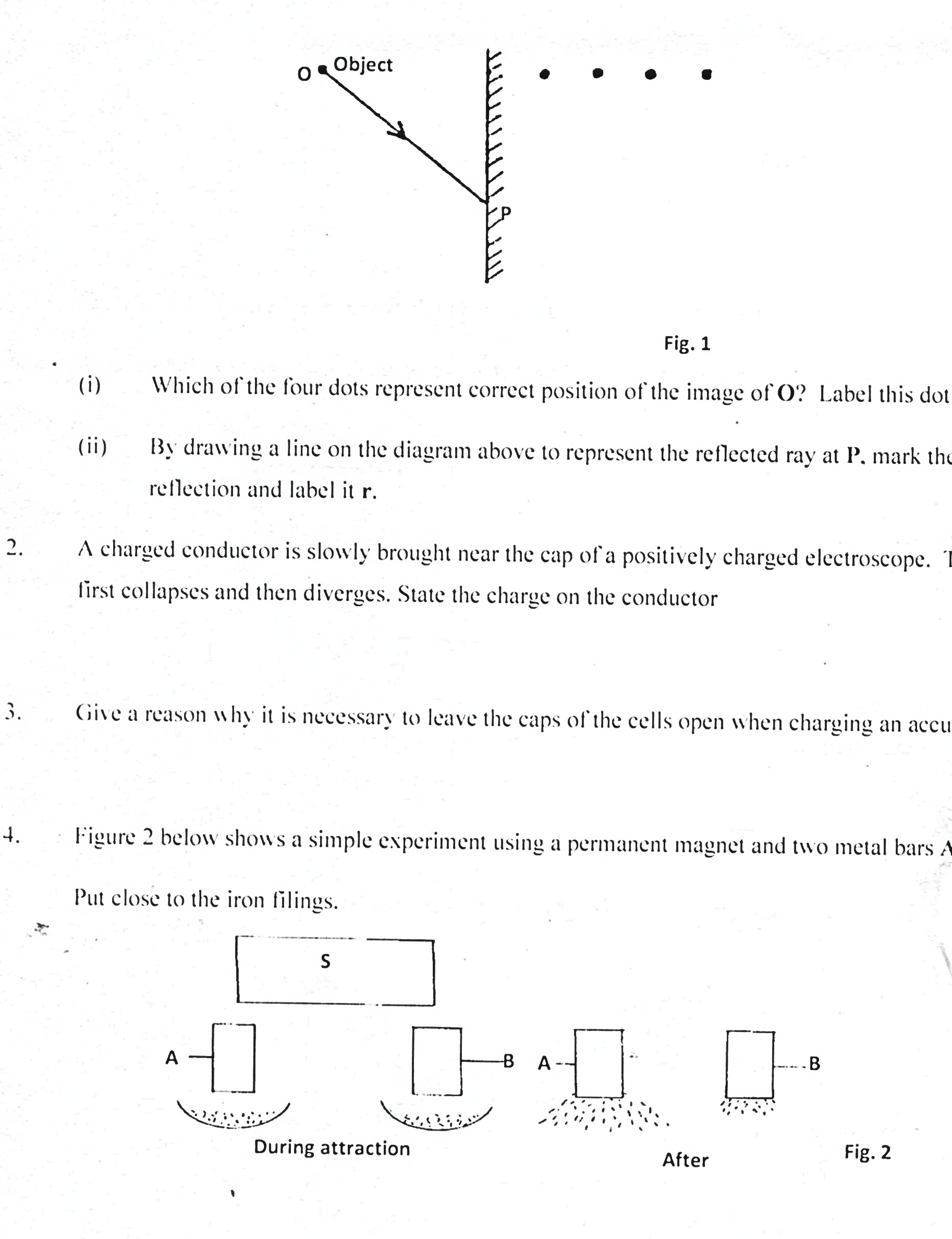
1. Which of the four dots represent correct position of the image of **O**? Label this dot **Q** (1 mark)
2. By drawing a line on the diagram above to represent the reflected rat at **P**, mark the angle of reflection and label it **r**. (1 mark)
3. A charged conductor is slowly brought near the cap of a positively charged electroscope. The leaf first collapses and then diverges. State the charge on the conductor. (1 mark)

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1. Give a reason why it is necessary to leave the caps of the cells open when charging an accumulator. (1 mark)

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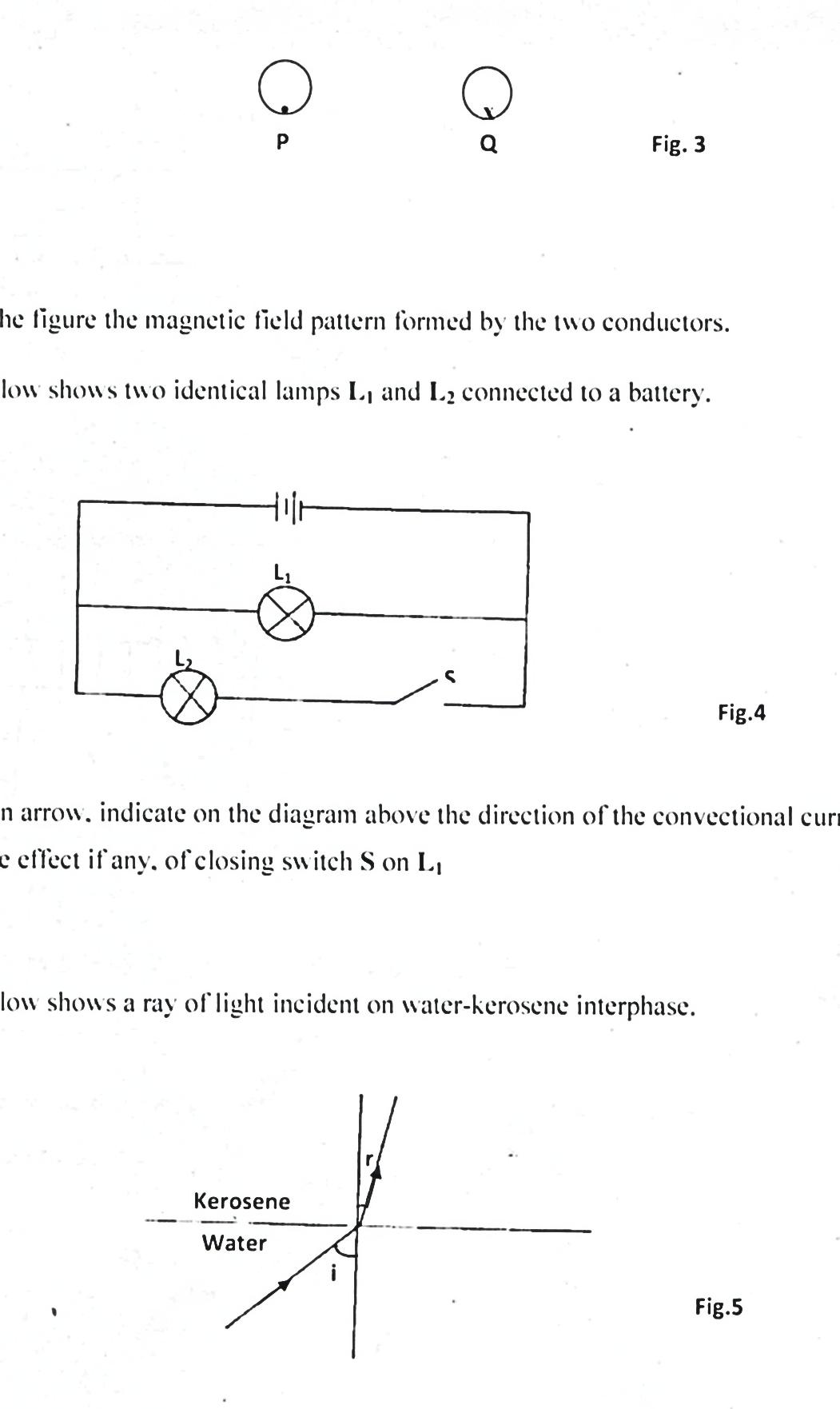
1. Figure 2 below shows a simple experiment using a permanent magnet and two metal bars **A** and **B** put close to the iron filings.



State with a reason which bar is made from a soft magnetic material. (2 marks)

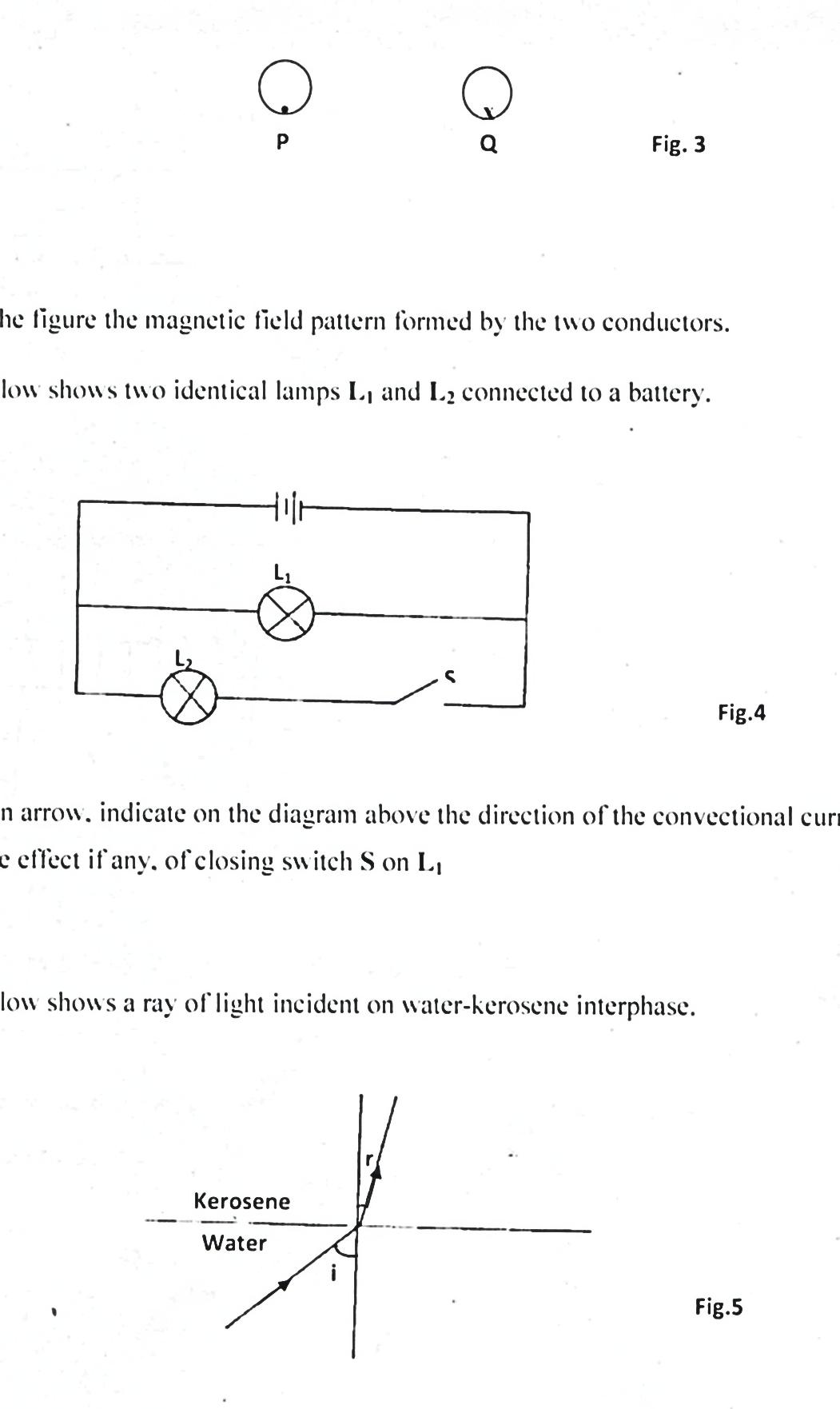
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Figure 3 below shows two parallel current carrying conductors **P** and **Q** placed close to one another. Current flows in the opposite directions.



Sketch on the figure the magnetic field pattern formed by the two conductors. (1 mark)

1. Figure 4 below shows two identical lamps **L1** and **L2** connected to a battery.

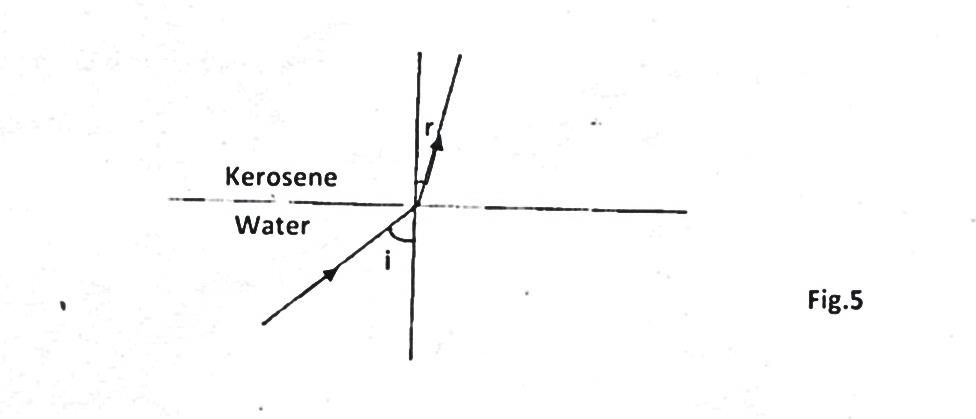


S

1. Using an arrow, indicate on the diagram above the direction of the convectional current. (1 mark)
2. State the effect if any, of closing switch **S** on **L1**. (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Figure 5 below shows a ray of light incident on water-kerosene interphase.



State which one of the two liquids has a higher absolute refractive index. (1 mark)

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1. The table in figure 6 below shows part of the electromagnetic spectrum in order of decreasing wavelength.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| A | B | Infrared radiation | Visible light | C | D |

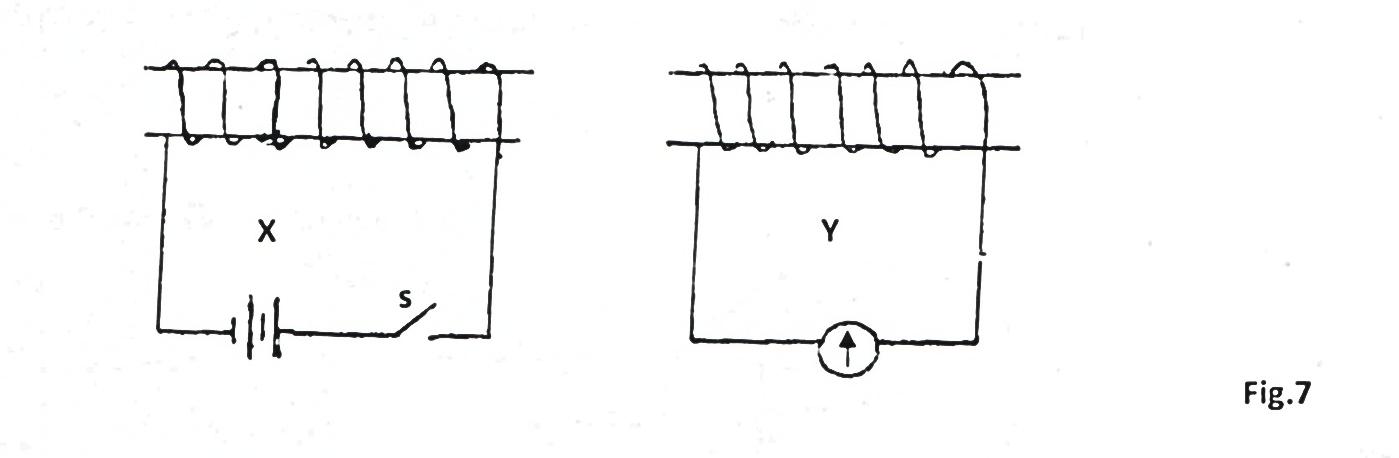
1. How are waves C produced? (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State **one** use of the wave D. (1 mark)

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1. Figure 7 below shows two solenoids, X and Y close to each other.



1. Name the process by which current is caused in Y by closing the switch S. (1 mark)

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1. Show on the diagram above the direction of current in Y as switch S closes. Use an arrow. (1 mark)
2. A house has a lighting circuit operated from a 240V mains supply. Four bulbs rated 40W 240V and six bulbs rated 100W 240V are switched on for 5 hours a day. Determine the monthly bill for the consumer given that the cost of electricity is at shs.5.50 per unit.

(Take 1 month = 30 days and the standing charge is sh.150) (3 marks)

1. State **two** properties of X-rays similar to those of visible light. (2 marks)

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1. Explain why the tube of a cathode ray oscilloscope is made of thick glass walls. (2 marks)

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1. a) Define the term work function. (1 mark)

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b) Explain how the intensity of radiation affects the photo-electric effect. (1 mark)

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1. Figure 8 below shows an eye defect.

 Fig 8

Use a ray diagram to show how the defect above could be corrected. (2 marks)

**SECTION B (55 MARKS)**

***Answer ALL the questions***

1. a) The figure 9 below shows two wave fronts of TV and radio waves transmitted above mountain.

 Fig 9

i) Draw the wave fronts to show their behavioral as they pass over the mountain. (2 marks)

ii) Identify waves **A** and **B**. (2 marks)

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iii) Explain why reception of TV is poor in hilly places than that of radio. (2 marks)

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1. The diagram below shows a monochromatic source of light passing through a single slit then through double narrow slots.



1. What property of light is investigated in the set up above? (1 mark)

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1. State the observation made on the screen. (2 marks)

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1. What would be observed on the screen if:
2. The screen is pushed far from doubly slit. (1 mark)

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1. Increasing the slit separation S1 and S2 comes closer. (1 mark)

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c) In Young’s double slit experiment, mercury green light of wavelength 5.4 M was used with a pair of parallel slits of separation of 0.60mm. The fringes were observed at a distance of 40.0 cm from the slits. Calculate the fringe separation. (3 marks)

1. a) State faradays law of electromagnetic induction. (1 mark)

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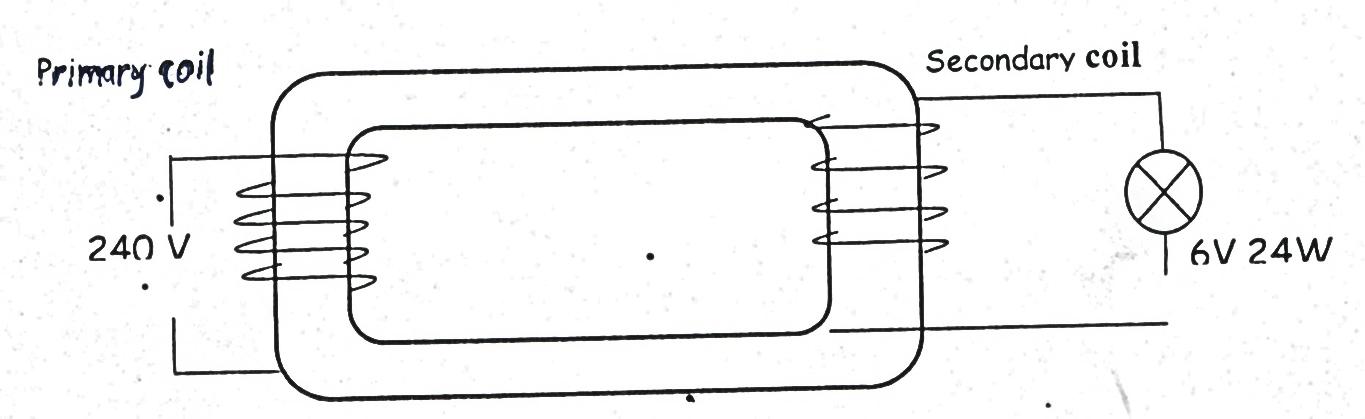
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) State **three** ways in which energy is lost in a transformer and how it can be minimized in each case. (3 marks)

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c) The diagram shows a transformer with 960 turns in the primary coil and N turn in the secondary coil connected to a 240V supply. Given that the transformer is 100% efficient and it will operate a 6V, 24W bulb. Fig. 11

Primary coil

Find:

1. The number of turns in the secondary coil. (3 marks)
2. The current flowing in the primary coil. (3 marks)
3. The Figure 12 below shows the main components of a cathode ray tube. Use it to answer the questions that follow.



1. Name the parts labelled P, R, and M. (3 marks)

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1. Explain how the electrons are produced in the tube. (2 marks)

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1. State and explain the function of the grid. (2 marks)

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1. State and explain what would be observed on the screen if an a.c voltage is connected across the

y-plate. (2 marks)

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1. State how the deflection system of a television differs from that of a C.R.O. (1 mark)

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1. a) Define Radioactivity. (1 mark)

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b) An element R decays by giving off an alpha particle. Complete the equation below showing the values of a and b. (1 mark)

a = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Figure 13 below shows the features of a diffusion cloud chamber used for detecting radiations from radioactive sources.

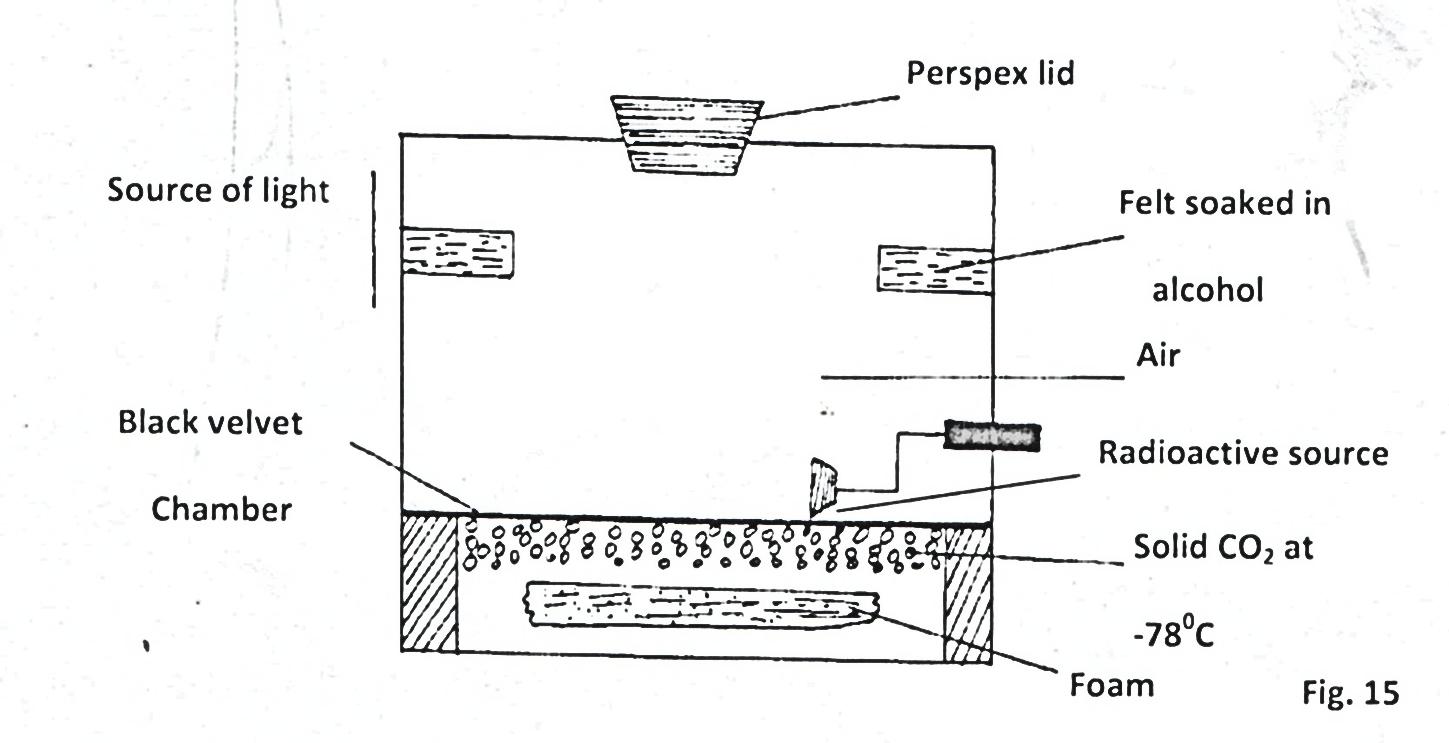


Fig 13

1. State the property of alcohol that makes it suitable for use in the chamber. (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State the function of the perspex lid. (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain why the base velvet chamber is painted black. (2 marks)

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1. Explain how the radiation from the radioactive source is detected in the chamber. (4 marks)

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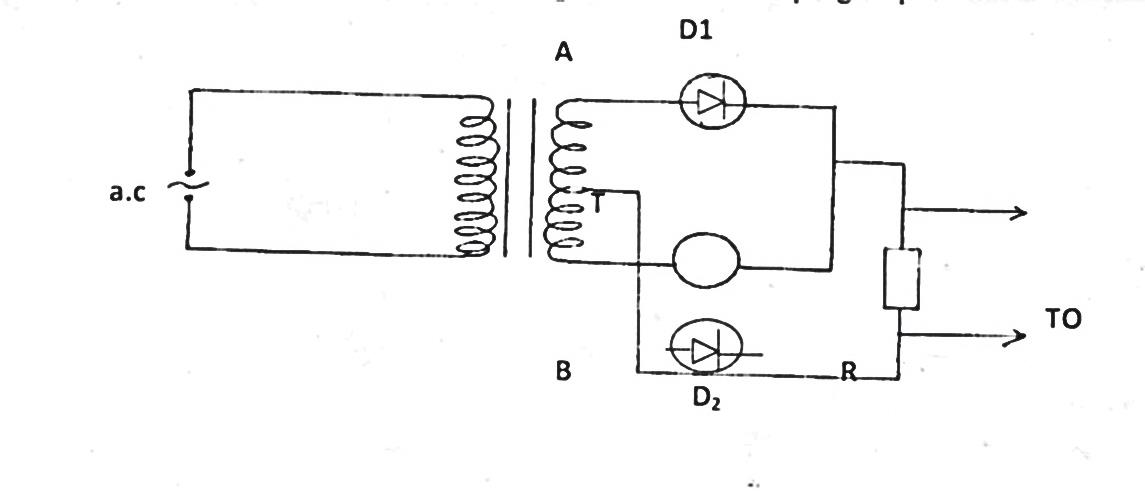
1. State **one** advantage of the cloud chamber over a charged leaf electroscope when used as detectors of

radiations. (1 mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. A student connected a circuit as shown in figure 14 below hoping to produce a rectified output.



CRO

Fig 14

D

1. Sketch the graph of the output on the CRO screen. (1 mark)
2. Explain how the output above is produced. (2 marks)

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1. Name other **two** uses of a junction diode. (2 marks)

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1. Graph in figure 17 below shows a forward bias characteristic of a P-N junction.

 Fig 15

The depletion layer decreases from O to A. Explain what is meant by depletion layer. (2 marks)

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1. i) Define the term doping. (1 mark)

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ii) Explain how doping produces a P – type semi-conductor. (3 marks)

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