URANGA PHYSICS EXAMINATION

Kenya Certificate of Secondary Education
JOINT EXAMINATIONS 2021
FORM 3

232/1 PHYSICS Paper 2

June 2021 – TIME 2 Hours

Name:…….…….. **Adm No**: ……..……

Candidate's Signature: ……..……... **Date**: ……/06/2021.

Instructions to candidates

a) Write you **name, admission number, school** and **date** in the spaces provided **above**. .
b) This paper consists of **two** sections; **A** and **B.**
c) Answer **all** the questions in section **A** and **B** in the spaces provided.
d) All working **must** be clearly shown.
e) **Silent non-programmable** electronic calculators may be used.
f) Candidates should answer the questions in **English**.

For Examiners use only

SECTION	QUESTIONS	MAX. SCORE	CANDIDATE'S SCORE
A	1-13	25	
B	14	11	
	15	09	
	16	15	
	17	12	
	18	08	
TOTAL SCORE		**80**	

This paper consists of 12 printed pages. Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A - 25MARKS

Attempt all questions in the spaces provided.

1. **Figure 1** shows an object placed in front of a concave mirror of focal length 10cm. C is the centre of curvature

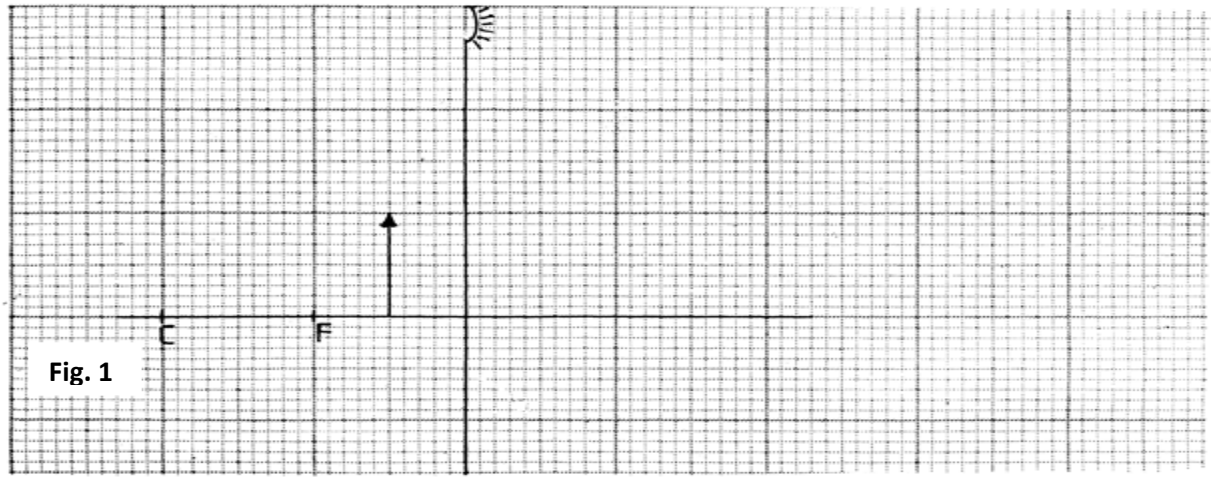

Fig. 1

On the same figure draw a ray diagram showing the location of the image. (2 marks)

2. State two factors that determine the resistance of a conductor. (2 marks)

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3. An uncharged metal rod brought closes but not touching the cap of a charged electroscope causes a decrease in the divergence of the leaf. Explain. (1 mark)

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4. Explain how polarization reduces current in a simple cell. (1 mark)

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5. **Figure 2** shows how the displacement varies with time for a certain wave.

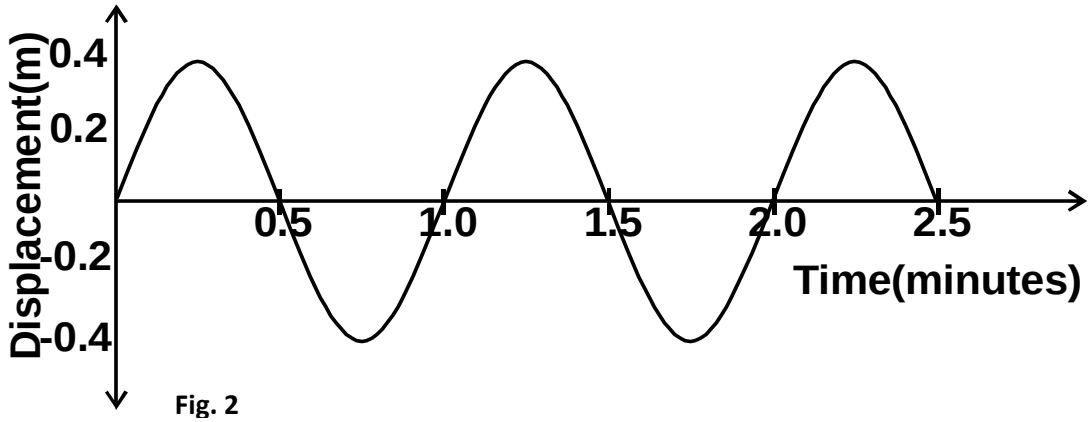

Fig. 2

Determine the frequency of the wave. (2 marks)

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6. State one difference between an image formed by a plane mirror and that observed through a pinhole camera. (1 mark)

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7. **Figure 3** shows an electromagnet. State the polarities at X and Y. (2 marks)

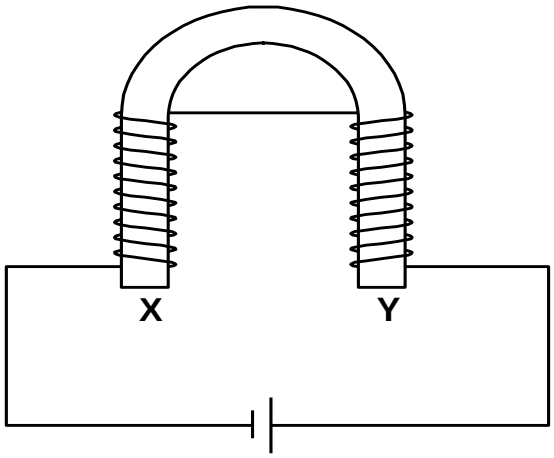

Fig. 3

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8. A student shouts and hears an echo after 0.6 seconds. If the velocity of sound is 330m/s, calculate the distance between student and reflecting surface. (3 marks)

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9. **Figure 4** shows two parallel mirrors M_1 and M_2 and a ray of light being incident on one of the mirrors as shown. Trace the ray of light through the mirrors.

(2 marks)

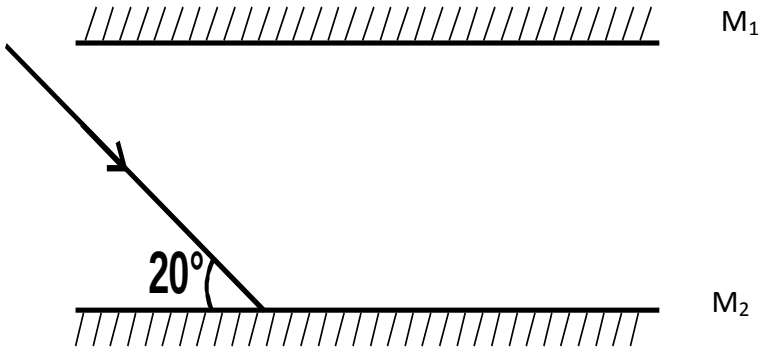

Fig. 4

10. An electromagnet is made by winding insulated copper wire on an iron core. State two changes that could be made to increase the strength of the electromagnet. (2 marks)

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11. State two distinctions between the way sound waves and electromagnetic waves are transmitted. (2 marks)

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12. **Figure 5** shows two parallel current-carrying conductors A and B through a piece of cardboard.

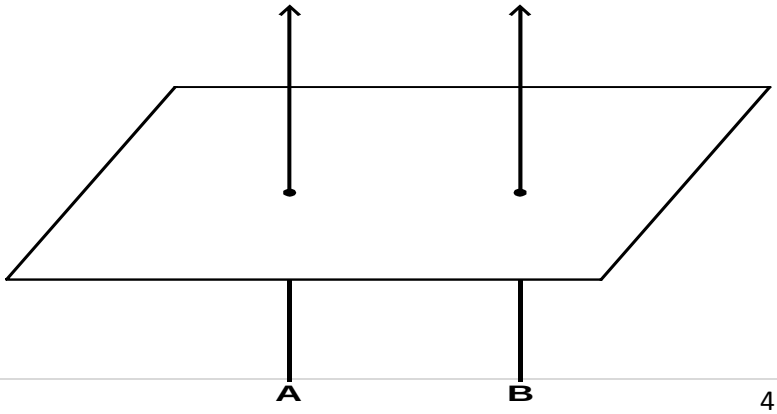

Fig. 5

i. Sketch the magnetic field pattern produced. (2 marks)

ii. Identify the nature of the force between them (1 mark)

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13. **Figure 6** shows a path of a ray of light through a rectangular block of Perspex placed in air.

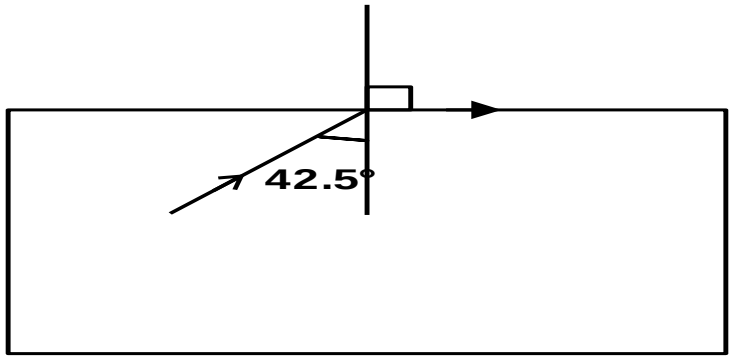

Fig. 6

Calculate the refractive index of Perspex. (2 marks)

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SECTION B – 55 MARKS.

14.

a. State Ohms law. (1 mark)

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b. **Figure 7** below shows three resistors as shown.

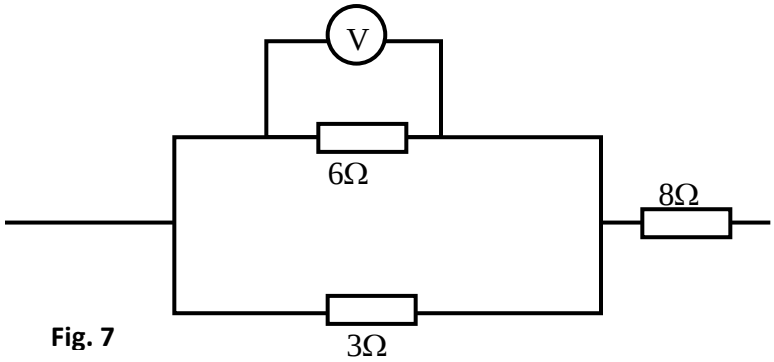

Fig. 7

If the voltmeter reads 4V, find the

(i) Effective Resistance. (2 marks)

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(ii) Current through the 3Ω resistor (2 marks)

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(iii) Potential difference across the 8Ω resistor. (2 marks)

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c.

(i) What is meant by the term "internal resistance"? (1 mark)

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(ii) A cell supplies a current of 0.5A when connected to a 2Ω resistor, find the internal resistance of the cell, if its electromotive force is 1.5V. (3 marks)

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15. **Figure 8** shows an electromagnetic relay being used to switch an electric motor on and off. The electromagnet consists of a coil of wire wrapped around a core. The motor in figure is switched off.

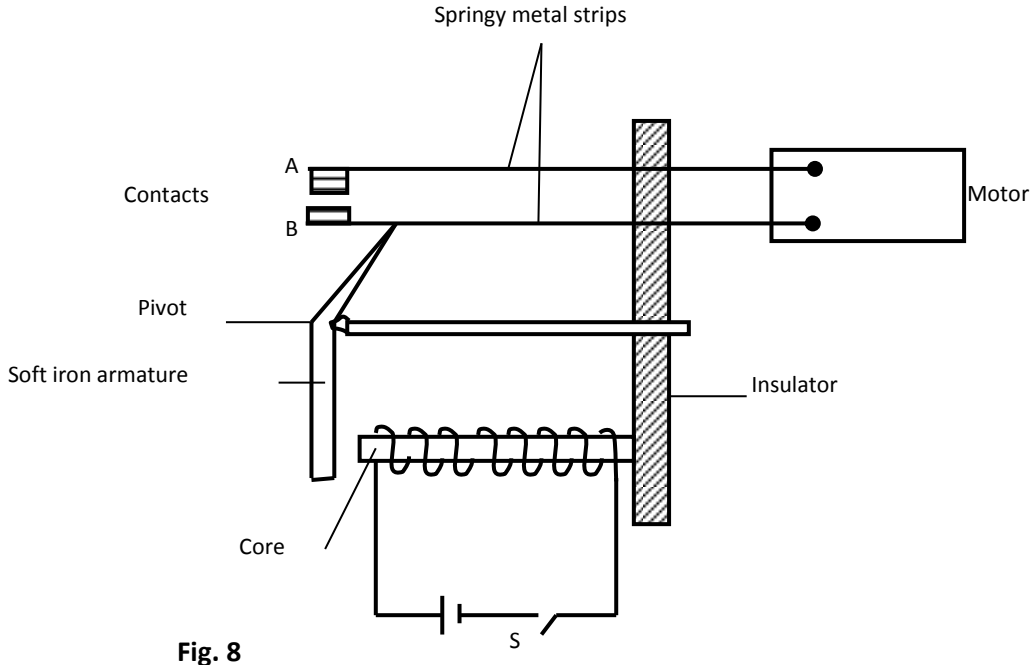

Fig. 8

(a) Suggest suitable material for the core. (1 mark)

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(b) What happens to the core when switch S is closed? (1 mark)

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(c) Why do the contacts A and B close when the switch S is closed. (2 marks)

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(d) When the switch S is opened, what will happen to;

(i) The core (1 mark)

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(ii) Soft iron armature. (1 mark)

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(e) Give **one** other application of an electromagnet. (1 mark)

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(f) State **two** ways in which an electromagnet could be made more powerful. (2 marks)

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16.

a. State Snell's law. (1 mark)

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b. Plane water waves produced in a ripple tank are passed from a region of deep water into a region of shallow water. **Figure 9** shows the top view of the tank.

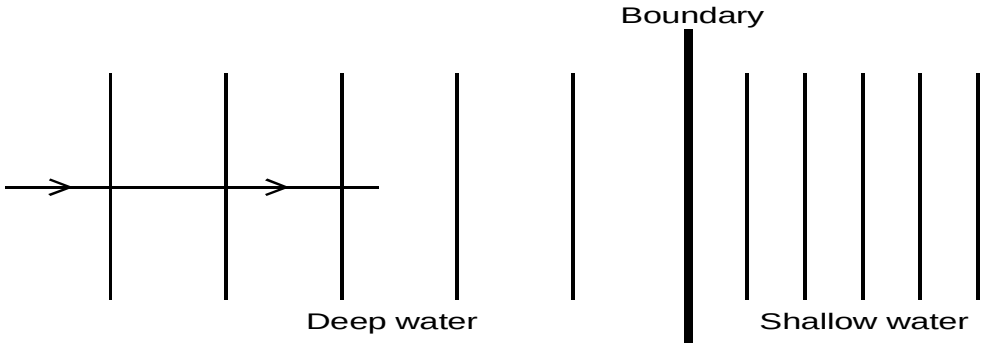

Fig. 8

State what happens at the boundary to:

i. The frequency of the waves. (1 mark)

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ii. The speed of the waves. (1 mark)

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iii. The wavelength of the waves. (1 mark)

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c. **Figure 9** shows a ray of light incident on a water-air interface from a source 8m deep.

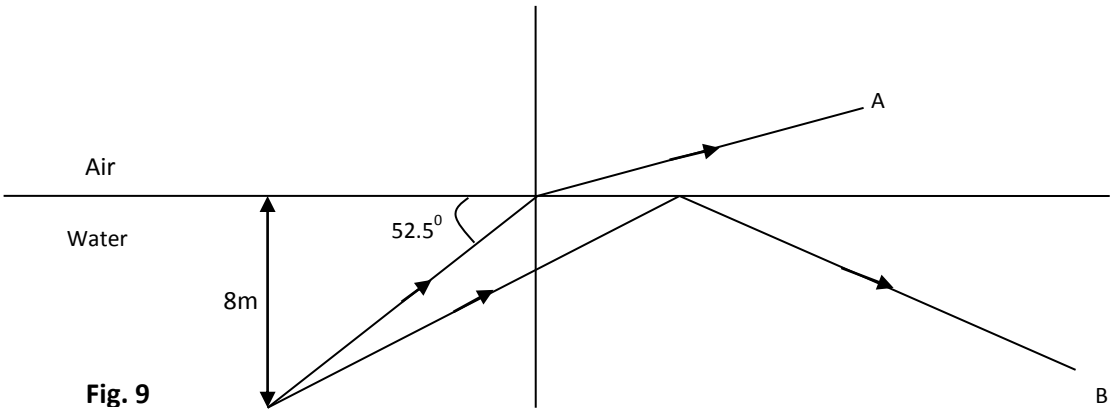

Fig. 9

(i) Ray A is observed to bend as it enters the air. Give a reason why this occurs. (1 mark)

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(ii) If the refractive index of water is 1.35, calculate the angle of refraction of ray A.

(3 marks)

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(iii)Find the critical angle of water. (3 marks)

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(iv)Give a reason why ray B is not travelling out of water. (1 mark)

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d. In an experiment to determine the refractive index of a material using real and apparent depth method, a graph of real depth against apparent depth was draw as shown in **figure 10.**

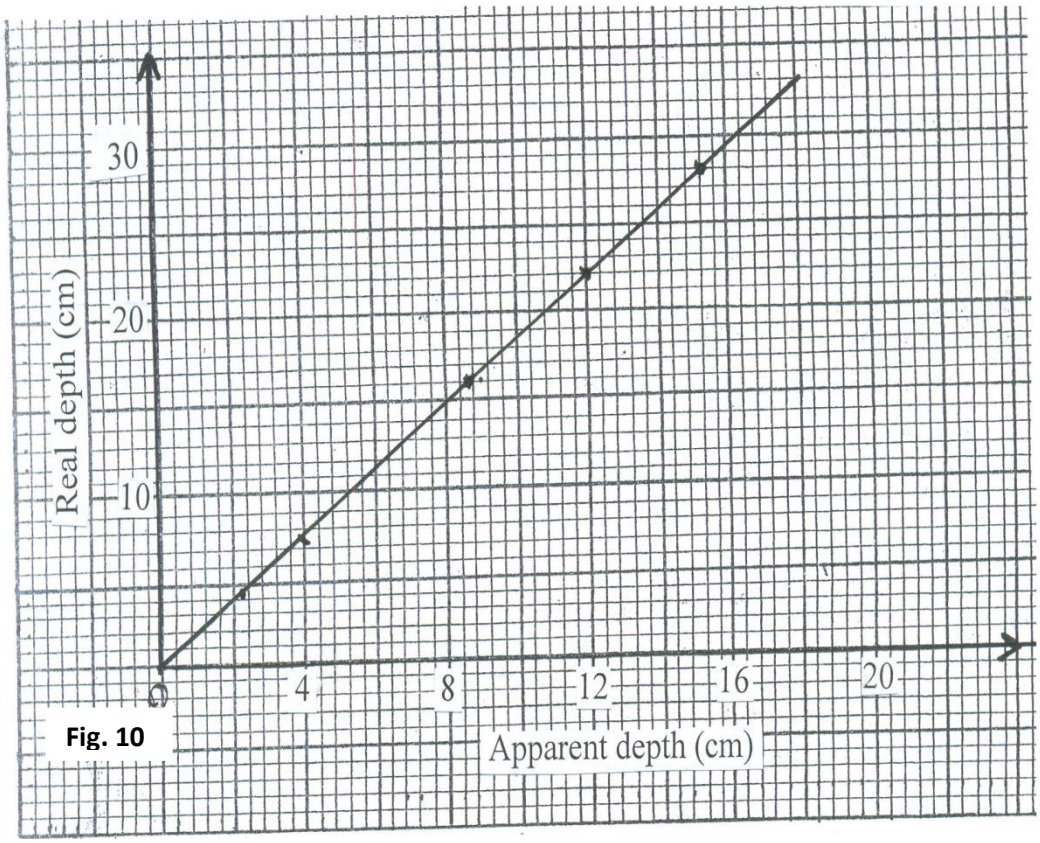

Fig. 10

Use the graph to determine the refractive index of the material. (3 marks)

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17.

a. State the difference between a transverse wave and a longitudinal wave (2 marks)

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b. Give one example of a transverse and one example of a longitudinal wave. (2 marks)

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c. When a metre rule was placed in a ripple tank, it was noted that the distance between 15 successive dark lines (crests) was 30cm. The frequency of the vibrator was 20HZ. Determine:

i) One wave length of the waves in the ripple tank. (2 marks)

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ii) The periodic time of the wave. (2 marks)

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iii) The velocity of the waves over the water surface. (3 marks)

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18.

a. State the law of magnetism (1 mark)

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b. State the difference between magnetic properties of steel and soft iron. (1 mark)

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c. State **two** ways of demagnetizing a magnet (2 marks)

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d. **Figure 11** shows a circuit that can be used to magnetize a given bar. Indicate the direction of the current around the bar that will result the polarities shown. (1 mark)

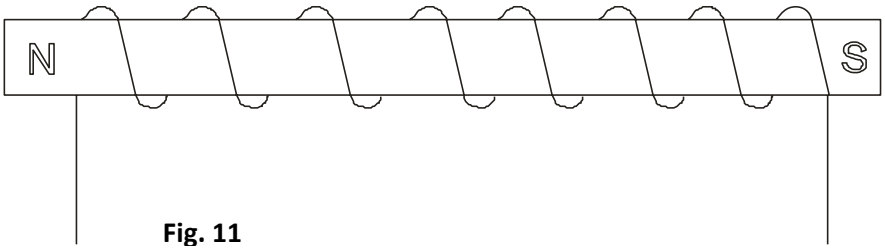

Fig. 11

e. **Figure 12** shows the set – up for a simple cell.

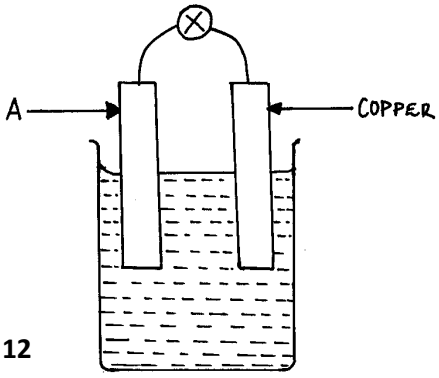

Fig. 12

(i) Name the electrode A. (1 mark)

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(ii) Explain why the bulb goes off after only a short time. (1 mark)

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(iii) How can the problem stated above be corrected. (1 mark)

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