URANGA PHYSICS EXAMINATION

Kenya Certificate of Secondary Education

232/2 PHYSICS Paper 2

(Theory)

FORM 3

4TH EDITION (FEBRUARY 2022) – TIME: 2 Hours

Name: ……..……..…….…….. **Adm. No:** …… **Class:** ……

School: ……..…….…… **Candidate's Sign:** …..…… **Date:** ……../02/2022

INSTRUCTIONS TO CANDIDATES

a) Write your name, school and admission number in the spaces provided above.
b) Sign and write the date of examination in the spaces provided.
c) This paper consists of two sections: **A** and **B**.
d) Answer ALL questions in section A and B in the spaces provided below each question.
e) ALL working **must** be clearly shown.
f) Silent non – programmable electronic calculators may be used.
g) This paper consists of **14 printed pages**. Candidates should check the question paper to ensure that all pages are printed as indicated and that no questions are missing.
h) All questions must be answered in **ENGLISH**.

FOR EXAMINER'S USE ONLY.

SECTION	QUESTIONS	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 10	25	
B	11	13	
	12	12	
	13	12	
	14	09	
	15	09	
TOTAL SCORE		**80**	

SECTION A(25MARKS)

1. A student was attempting to measure the resistance of resistor R as shown in **Figure 1**.

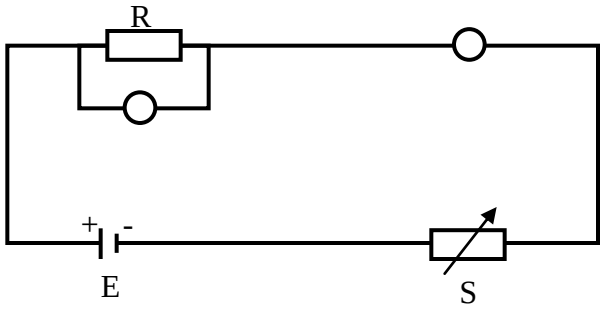

Fig. 1

a) Insert the ammeter and voltmeter in the electric circuit. (2marks)

b) State function of device S shown in the figure. (1mark)

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2. You are provided with the following apparatus;

- a white screen,
- metre rule
- concave mirror.

Using the apparatus, describe an approximate method of determining the focal length of the mirror.

(4marks)

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3. Give one reason why convex mirrors are preferred for use as driving mirrors in cars. (1mark)

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4. A water wave travels 12m in 4s. If the frequency of the wave is 2Hz,
   Calculate;
   a) the speed of the wave (1mark)

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   b) the period. (1mark)

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   c) the wavelength of the wave (2marks)

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5. **Figure 2** shows a ray of light passing into a glass block ABC.

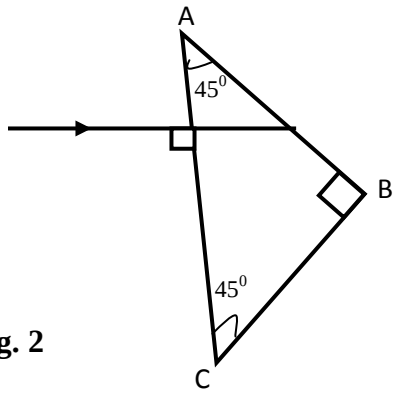

Fig. 2

Sketch the path of the ray until it goes out of the block (critical angle of glass is 42^0). (2marks)

6. In a certain pinhole-camera, the screen is 10cm from the pinhole. When the camera is placed 6m away from a tree, a sharp image of the tree 16cm high is formed on the screen. Determine the height of the tree. (3marks)

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7. **Figure3** shows a highly negatively charged rod being brought slowly near the cap of a positively charged leaf electroscope. It is observed that the leaf initially fall then rises.

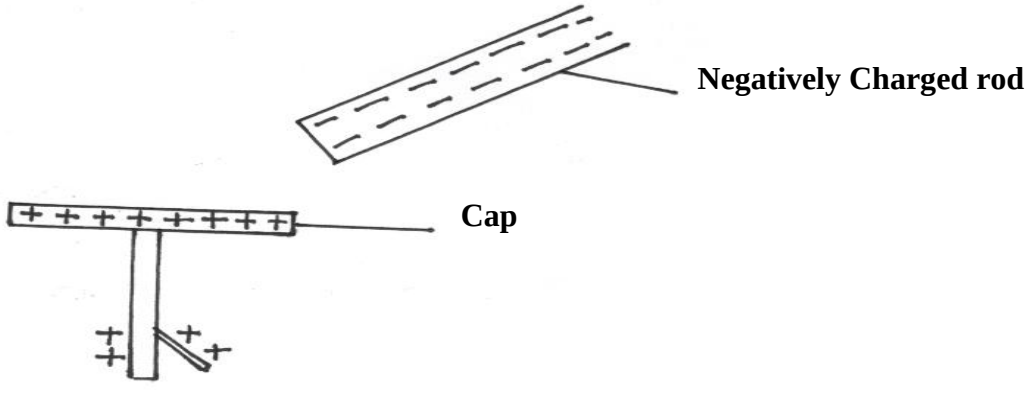

Fig. 3

Explain this observation. (2marks)

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8. **Figure 4** below shows a dry cell.

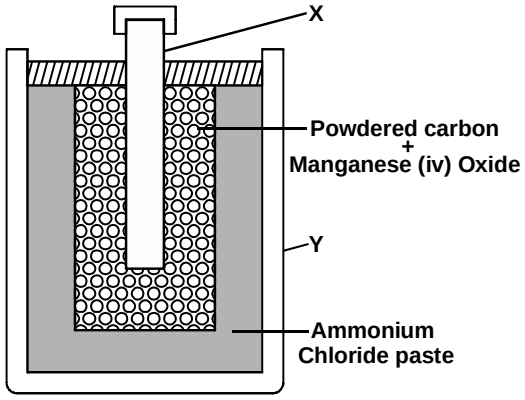

Fig. 4

a) Name the parts **X** and **Y**. (2marks)

X- ……

Y-……

b) State the function of the powdered carbon and manganese (IV) oxide. (1mark)

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9. **Figure 5** below shows a thin wire connected to a charge generator and placed close to a candle flame.

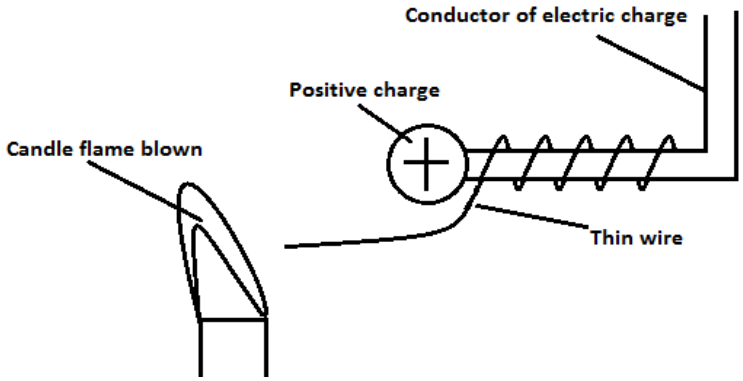

Fig.5

Explain why the candle flame is deflected as shown. (2 marks)

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10. What happens to the wavelength of water waves when it moves from deep part to shallow part of a ripple tank? (1mark)

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SECTION B(55 MARKS)

11.

a) State two factors that affect capacitance of a parallel plate capacitor. (2marks)

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b) **Figure 6**below shows a circuit for charging a capacitor

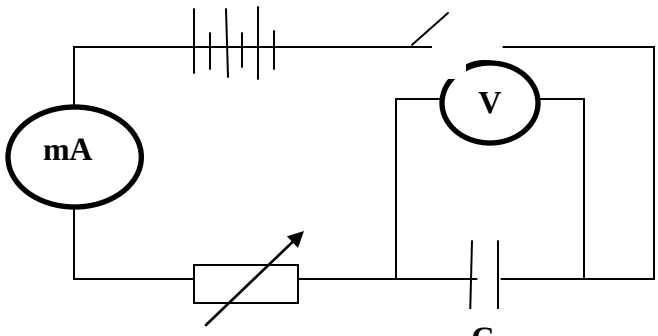

Fig.6

State what is observed on the following when the switch S is closed;

I. the milliammeter. (1mark)

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II. the voltmeter. (1mark)

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c) **Figure 7** below shows an electrical circuit with three capacitors A, B and C of capacitance 4.0μF, 1.0μF and 3.0μF respectively connected to a 12V battery.

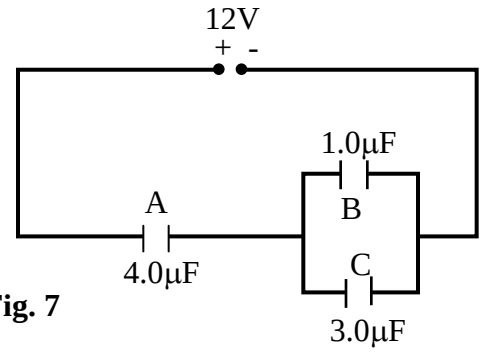

Fig. 7

Determine

i. The combined capacitance of the capacitors. (3marks)

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ii. The charge on the capacitor A. (3marks)

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The potential difference across the capacitor B. (3marks)

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12.

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

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b) It was noted that for the circuit in **Figure 8**below when S was open the voltmeter gave a reading of 12V but when the switch was closed the voltmeter reading drops to 10V.

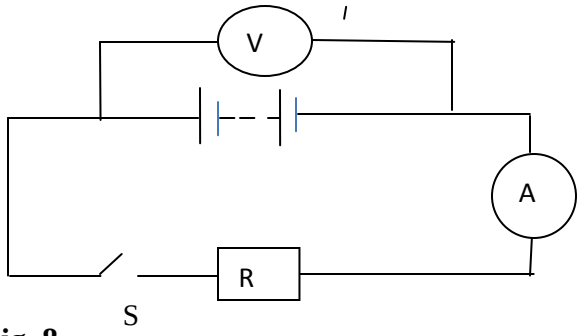

Fig. 8

i) Give an explanation for the difference in the reading on the voltmeter when the switch is open and when it is closed. (2marks)

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ii) What is the e.m.f, E, of the battery? (1mark)

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……If the ammeter gave a reading of 0.8A when S is closed, determine the value of R.

(2marks)

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iii) What is the internal resistance of the battery? (2marks)

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c) **Figure 9**shows the voltage – current relating for a certain battery used in an electrical circuit.

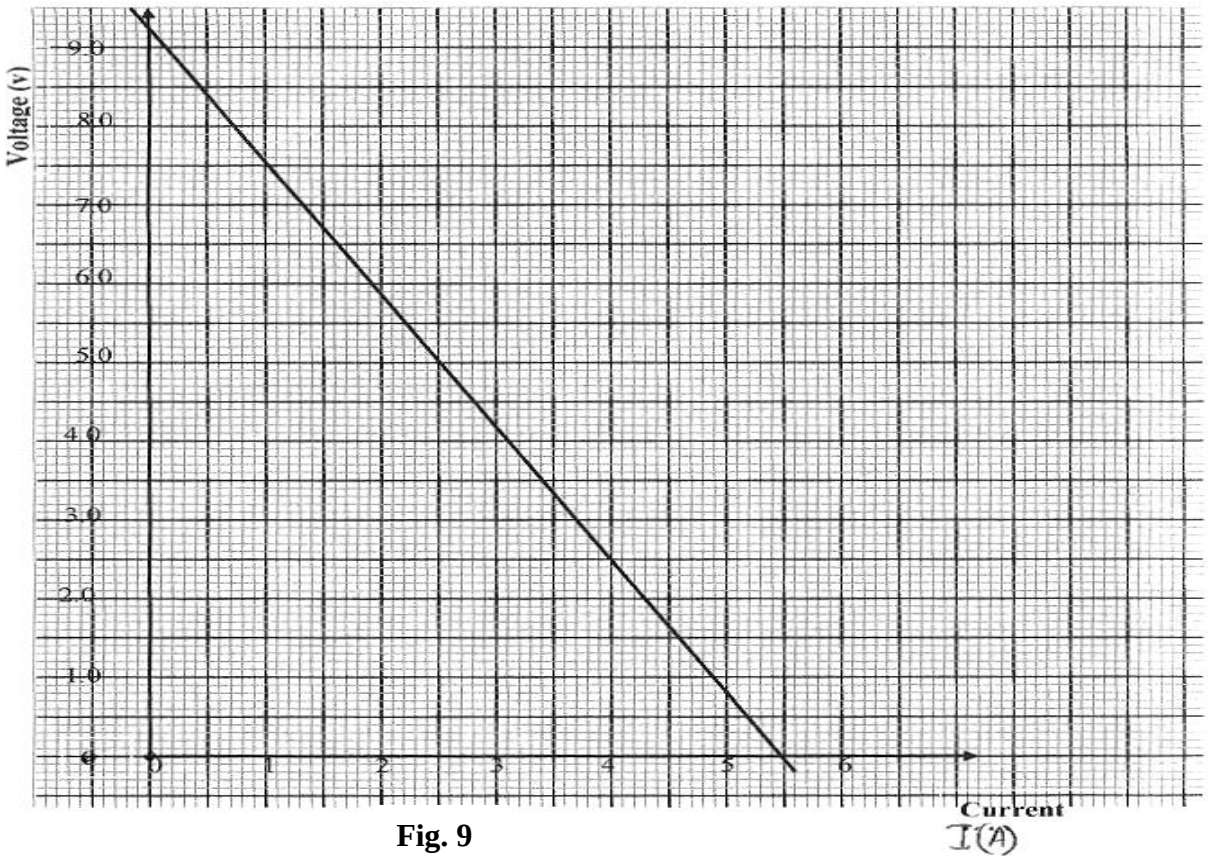

Fig. 9

Given that the equation of the graph is V = E – Ir, from the graph determine:

i. The e.m.f. E of the battery. (1 mark)

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ii. The slope S of the graph and state what S represents. (3 marks)

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13.

a. When light is reflected by a plane mirror, the angle of incidence is equal to the angle of reflection. State the other law of reflection on the mirror. (1mark)

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b. **Figure 10** below shows a ray of light incident on a mirror.

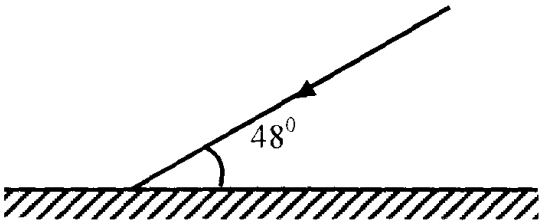

Fig. 10

Complete the diagram to show the path of ray of light and indicate the angle of reflection.

(2marks)

c. Two plain mirrors at an angle form 19 images. Calculate the angle between the mirrors.

(2marks)

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d. A ray of light is incident on a glass-water interface as shown in **figure11.**

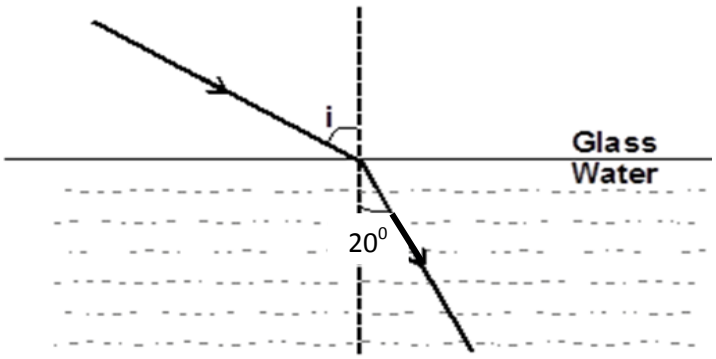

Fig. 11

Calculate the angle of incidence i. (Take the refractive index of glass and water $^{3}/_{2}$ and $^{4}/_{3}$ respectively. (3marks)

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e. **Figure 12** shows a cross-section of an optical fibre made of two types of glass A and B. The refractive index of B is lower than that of A.

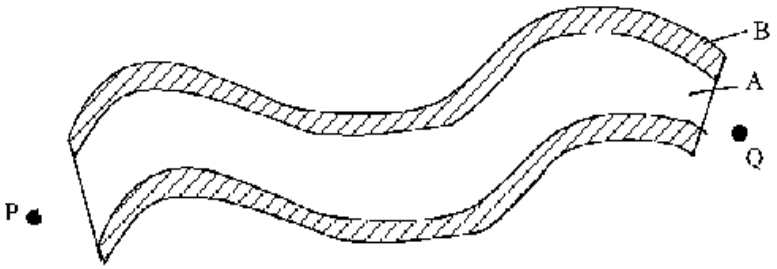

Fig. 12

A ray of light enters the optical fibre at P and emerges from Q.

(i) Sketch the path of the ray through the fibre. (1mark)

(ii) State the reason why light travels through the fibre as in (i) above. (1mark)

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f. **Figure 13** represents an object O and its image I formed by a concave mirror.

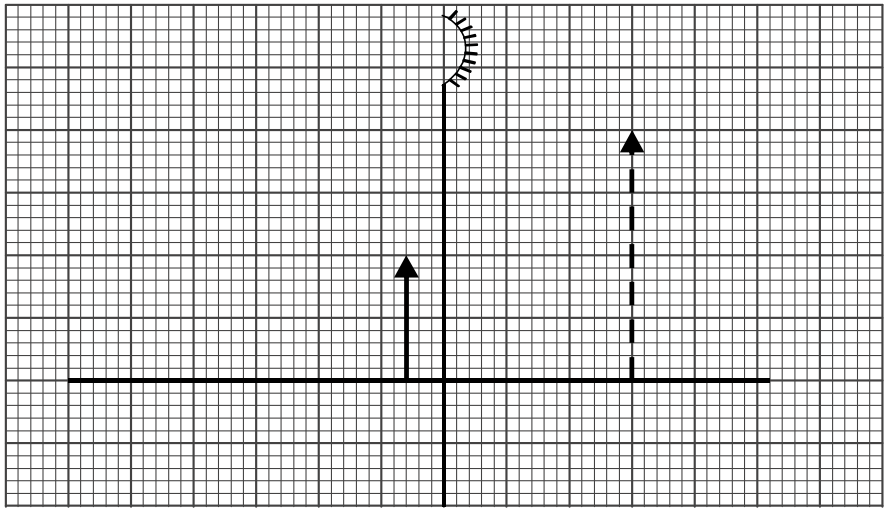

Fig. 13

By drawing suitable rays, locate the mark on the f**igure** the position of the principal focus F of the mirror. (2marks)

14.

a. State the basic law magnetism. (1mark)

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b. Give a reason why attraction in magnetism is not regarded as a reliable method of testing for polarity. (1mark)

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c. **Figure 14** shows two similar iron pins. One is placed on a wooden block and the other on a soft iron block.

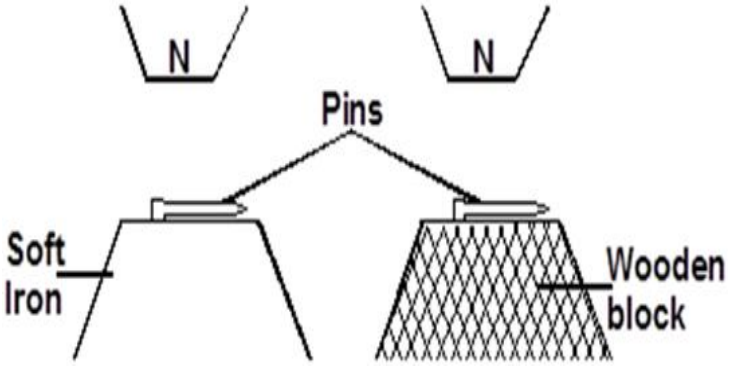

Fig. 14

It was observed that the pins on the wooden block were attracted to the magnet while the other on the soft iron block was not. Explain. (2marks)

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d. A current carrying wire is placed above a compass needle as shown in the **figure 15.**

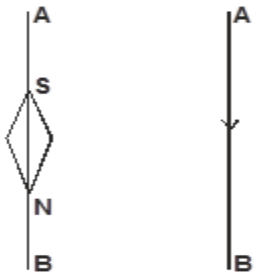

Fig. 15

If the current flows in the direction A to B, show in the diagram the deflection of the compass needle. (1mark)

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

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f. State **two** ways of increasing the strength of an electromagnet. (2marks)

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g. Why is iron used as the core of electromagnet and not steel? (1mark)

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15.

a. Distinguish between transverse and longitudinal waves. (1mark)

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b. State one way of reducing echo in a conference hall. (1mark)

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c. **Figure 16** shows a loudspeaker producing sound waves in air.

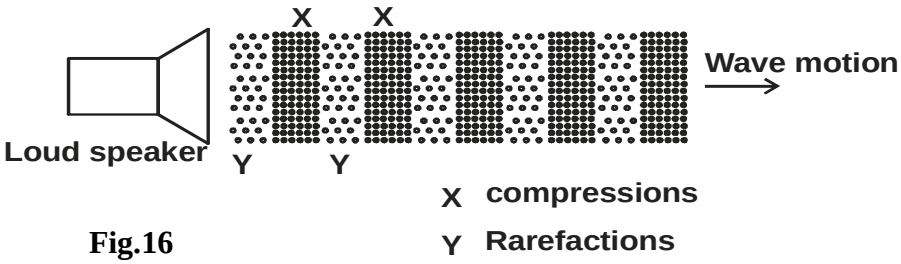

Fig.16

i. Show on the diagram the wavelength of the wave. (1mark)

ii. The wavelength of the waves produced is 0.4m. Determine the frequency of the waves if the speed of sound in air is 330m/s. (2marks)

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In an experiment to observe interference of light waves a double slit placed close to the source as shown in **figure 17** below.

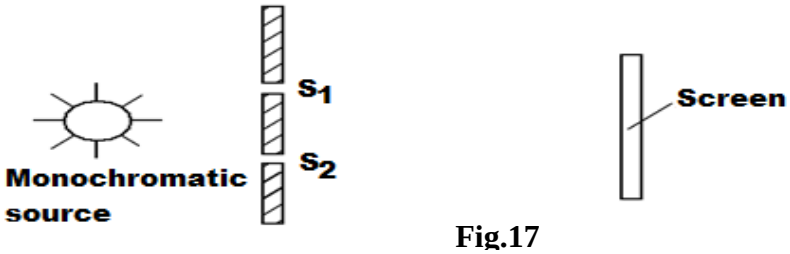

Fig.17

(i) What is monochromatic source? (1mark)

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(ii) State the function of the double slit. (1mark)

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(iii)Briefly describe what is observed on the screen. (1mark)

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(iv)Briefly explain what is observed on the screen when the slit separation S_1S_2 is reduced. (1mark)

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