NAME: .....ADM NO: .....CLASS: .....

CANDIDATE SIGNATURE: .....DATE: .....

232/ 2
PHYSICS
FORM 4 PAPER 2
MARCH 2019
2 HOURS
END TERM 1

KENYA CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

INSTRUCTIONS TO CANDIDATES

a) Write your name, admission number and class in the spaces provided above.
b) Sign and write the date of examination in the spaces provided above.
c) This paper consists of two sections A and B.
d) Answer all questions in section A and B in the spaces provided.
e) All working must be clearly shown in the spaces provided.
f) Non-programmable silent electronic calculators may be used.

FOR EXAMINERS USE ONLY

Section	Question	Maximum score	Candidate score
A	1-11	25	
B	12	10	
	13	9	
	14	8	
	15	9	
	16	9	
	17	10	
TOTAL		80	

This paper consists of 15 printed pages, candidate should check the question paper to ascertain that all pages are printed as indicated and no questions are missing.

SECTION A (25MKS)

1. (a) State the property of light that a pinhole camera illustrates (1mk)

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(b) Figure 1 below shows a ray of light incident on a plane mirror

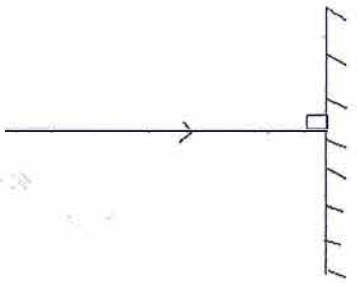

Figure 1

(i) On the diagram, indicate the direction of the reflected ray. (1mk)

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(ii) Give the reasons for the answers in (i) above (1mk)

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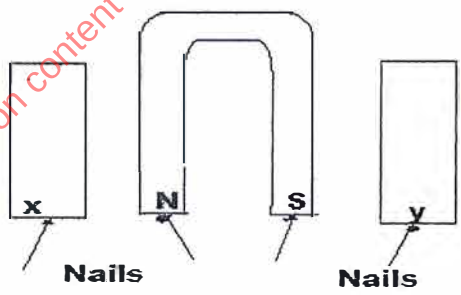
2. Figure 2 below shows a horse-shoe magnet whose poles are labelled and two other magnets placed near it

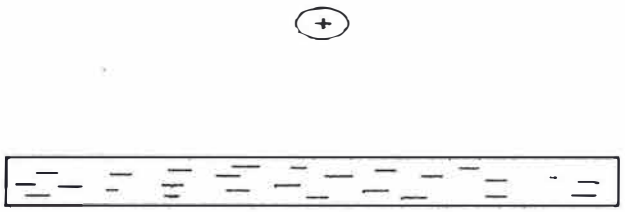


Identify the poles (1mk)

X.....

Y.....

3. (a) Sketch the electrostatic field pattern due to the arrangements of the charges in the figure 3 below (1mk)



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(b) Mechanics at a textile industry experiences electrostatic forces at certain points. Suggest a method that can be used to reduce these forces. (1mk)

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4. A current of 0.6 A flows in a circuit. If the quantity of charge that crosses a point is 360C. Calculate duration of flow of charges in minute (2mks)

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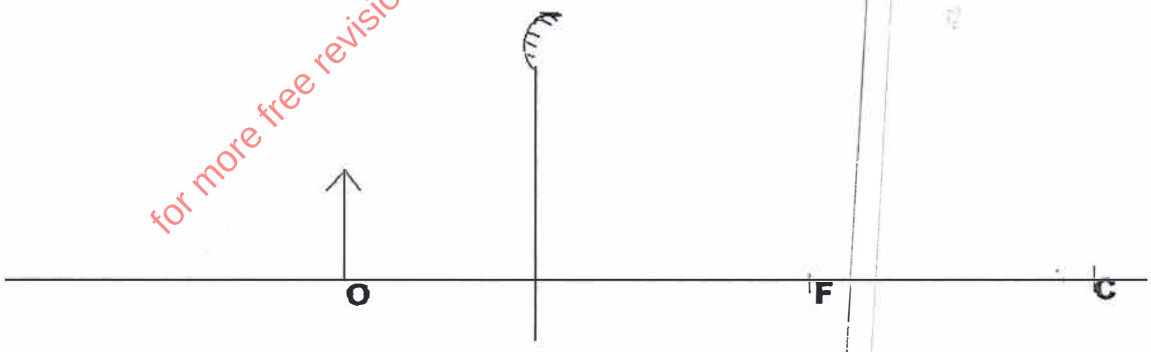
5. Figure 4 below shows a vertical object O placed in front of convex mirror



On the same diagram, draw appropriate rays to locate the image formed (3mks)

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6. (a) An echo sounder produces a pulse and an echo is received from the sea bed after 0.4 seconds. If the speed of sound in water is 1500m/s. Calculate the depth of the sea bed. (2mks)

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(b) State a reason why ultra sound is appropriate in (a) above (1mk)

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7. The figure 5 below shows a conductor carrying current placed in a magnet field

On the same diagram, draw the resultant magnetic field pattern and show the direction in which the conductor will move (2mks)

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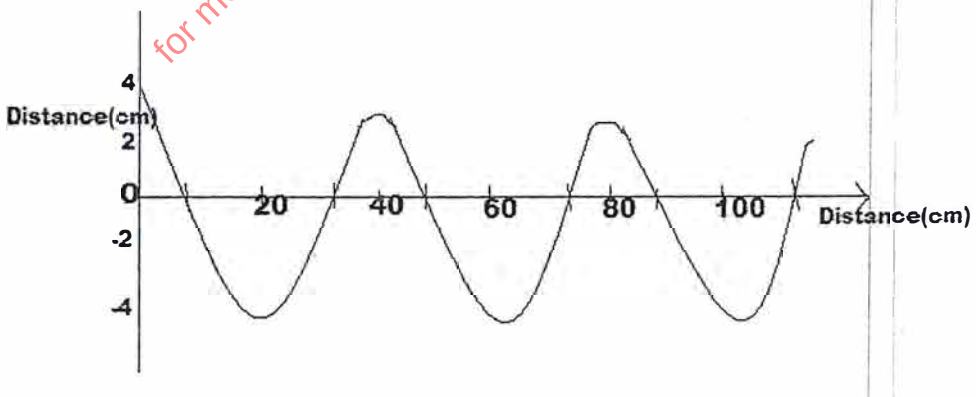
8. The figure 6 below show a s wave travelling a long a medium



Determine the speed of the wave of the value if the source produces 480 vibrations per minute (3mks)

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9. One of the conditions for total internal reflection to occur is that the ray must be travelling from an optically denser medium to optically less dense medium. State the other condition (1mk)

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10. A battery of e.m.f 3V drives a current through a 20Ω resistor. The p.d across the resistor is 2.8V as measured by a voltmeter. Calculate the internal resistance of the battery (2mks)

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11. Find the maximum number of 60W bulbs that can be connected to a 5A fuse on a mains supply of 240V. (3mks)

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SECTION B (55 MARKS)

12. (a) State two factors that affect the strength of an electromagnet. (2 mks)

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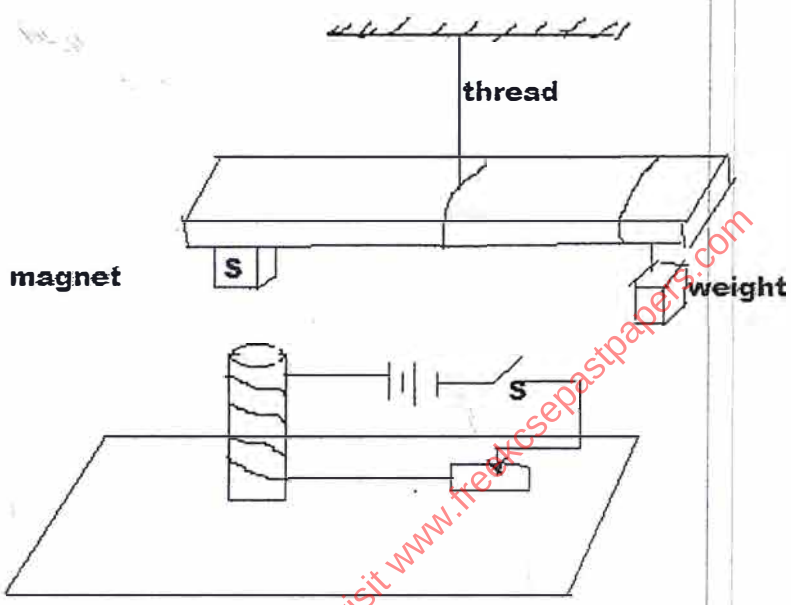
(b) Figure 7 below shows a suspended metre rule in equilibrium and balanced by a magnet and a weight. The iron core is fixed on the bench.



i) State and explain the effect on the metre-rule when the switch s is closed. (2 mks)

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(ii) What would be effect on the metre-rule when the terminals of the battery are reversed (1 mk)

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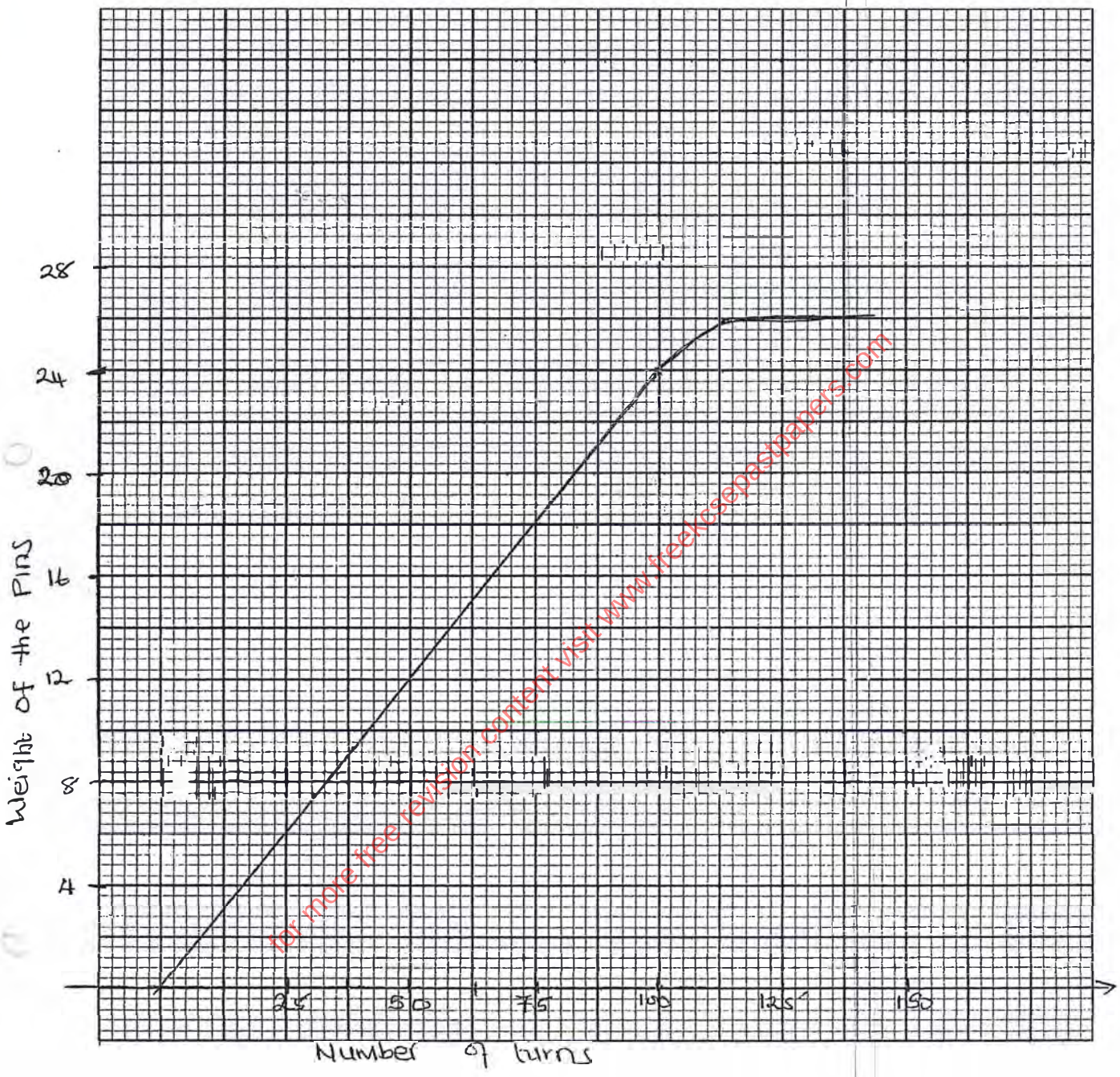
(c) In an experiment to determine the strength of an electromagnet, the weight of pins that can be supported by the electromagnet was recorded against the number of turns in the coil. The amount of current was kept constant throughout the experiment. A graph of weight of the pins against the number of turns was plotted as shown below.



(i) Use the dormain theory to explain the shape of the graph (2mks)

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(ii) **Use the graph** to determine the number of turns required for the electromagnet to attain magnetic saturation (1mk)

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(d) State one practical application of an electronic electromagnet (1mk)

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13. (a) State Snell's law (1mk)

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(b) Calculate the critical angle for a material whose refractive index is 1.60 (3mks)

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(c) A coin is placed at the bottom of the beaker. The beaker is then filled with a liquid to a depth of 14.0cm. By using a pin on the side of the beaker and observing from the top, the distance of the image of the coin is found to be 5.6cm from the bottom. Determine the refractive index of the liquid used (3mks)

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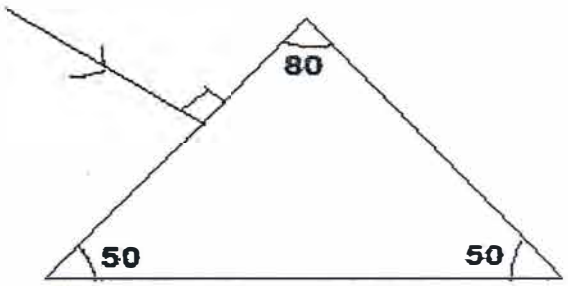
(d) Figure 8 below shows a ray of light incident on the face of a glass prism



If the critical angle of glass is 40^0. On the same diagram, sketch the path of the ray until it emerges (2mks)

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14. (a) State any two factors affect electrical resistance of a conductor (2mks)

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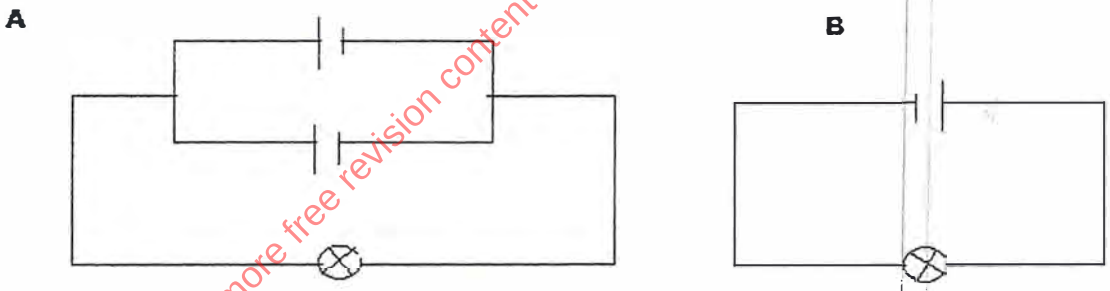
(b) In the circuit diagrams shown in figure 9 below,
the lamps are identical and the cells are also identical



State with a reason in which circuit the lamp will be light for a longer period (2mks)

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(c) A 4Ω resistor is connected in series to a battery of e.m.f 6V and negligible internal resistance. Determine the power dissipated by resistor (2mks)

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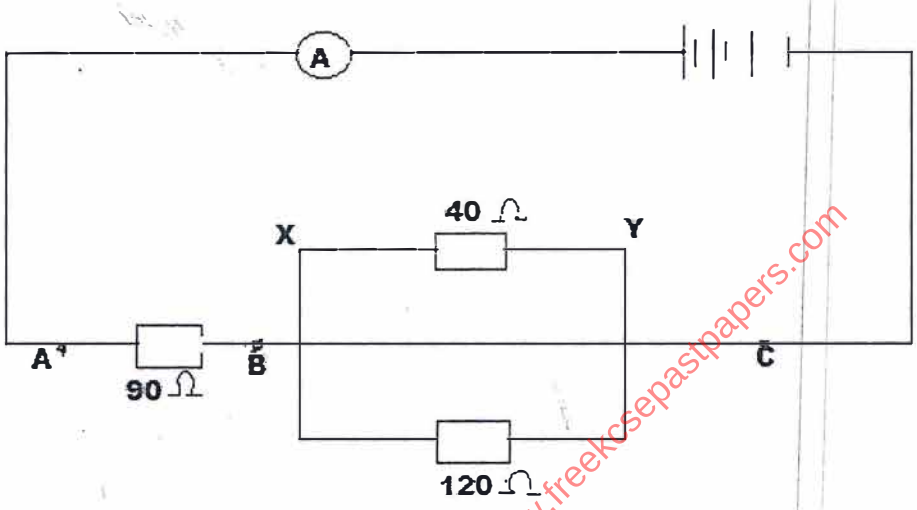
(d) Use figure 10 below to answer questions that follow



Determine:

(i) The current flowing through the ammeter (2mks)

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(ii) The potential difference between X and y (2mks)

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15. (a) Define capacitance (1mk)

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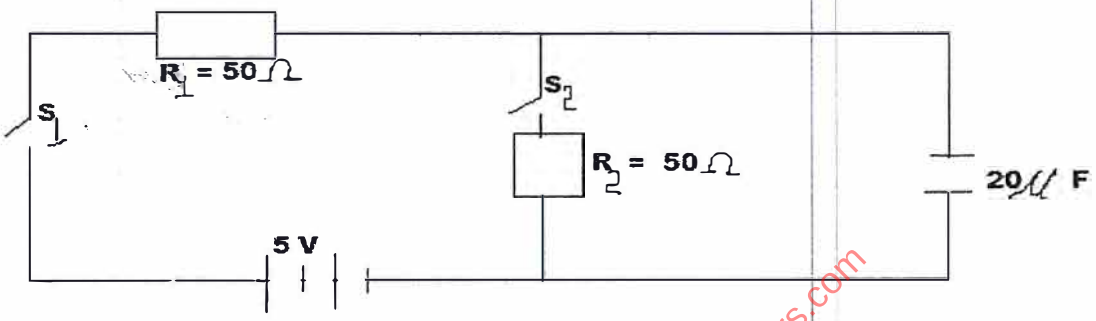
(b) Figure 11 below shows a circuit consisting of a battery, resistor R and a switch S_1 connected in series. Another resistor R_2 and switch S_2 are connected in parallel to the capacitor.



(i) On the axes provided, sketch graphs showing how the voltage V_C across the capacitor vary with time when switch S_1 is closed, and switch S_2 remaining open (1mk)

(ii) Determine the maximum charge on the capacitor (2mks)

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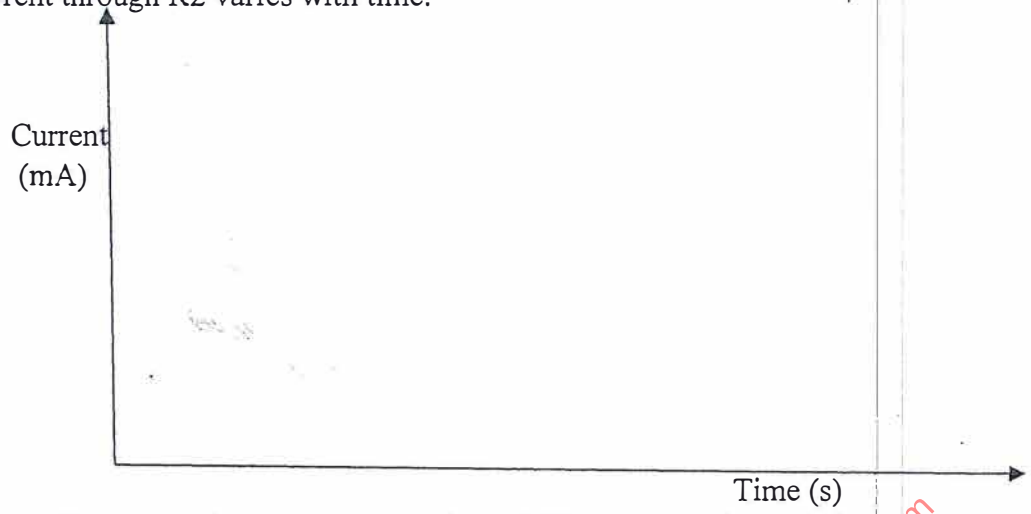
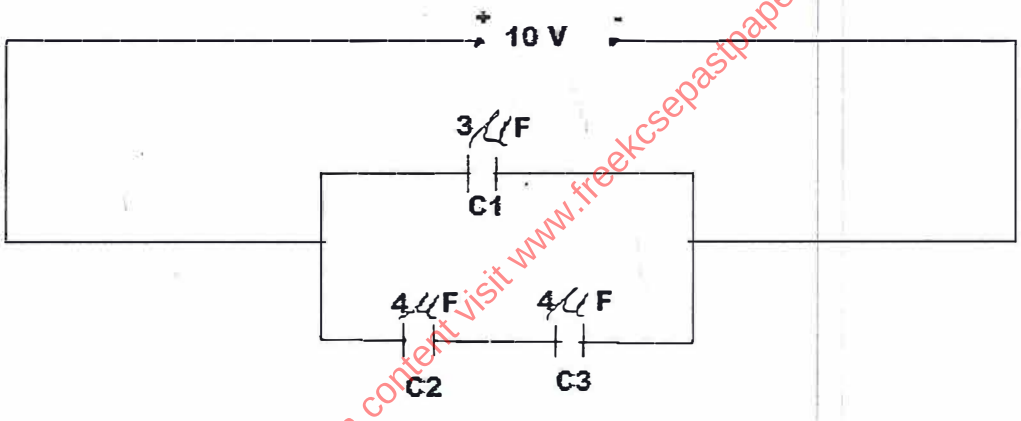
(iii) Switch S1, is now opened and S2 closed. On the axes below, sketch a graph showing how current through R2 varies with time. (1mk)



(c) Three capacitors are connected to a 10V battery as shown below.



(i) Calculate the combined capacitance (2mks)

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(ii) Calculate the charge on each of the 4μF capacitors (2mks)

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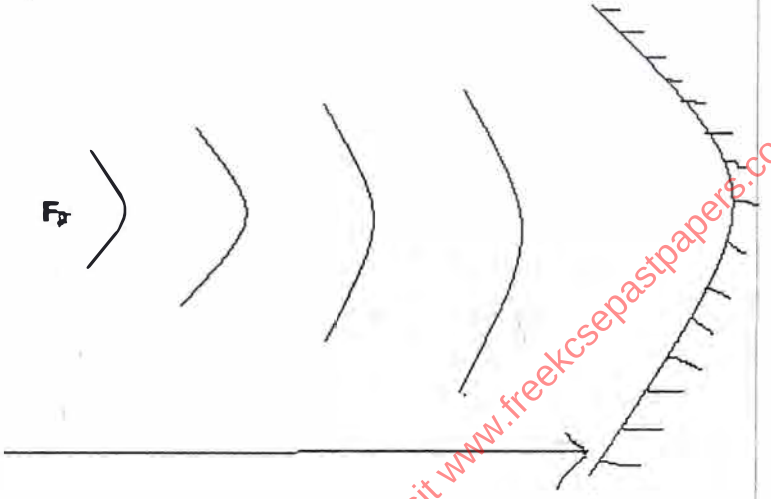
16. (a) Figure 12 below shows circular waves approaching a concave reflector



Show the reflected waves on the same diagram (1mk)

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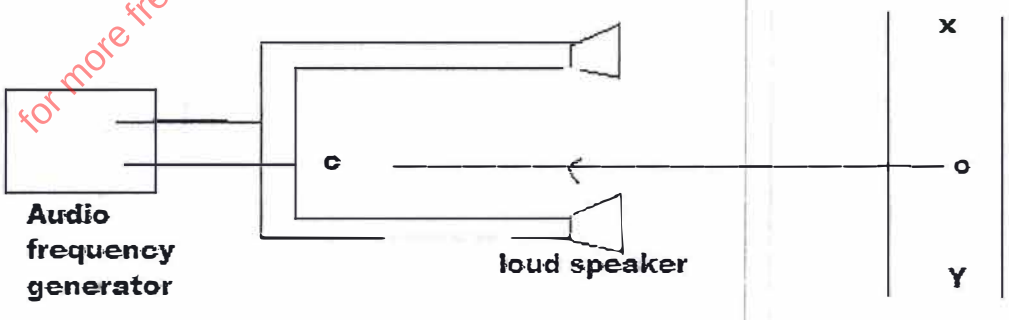
(b) Figure 13 shows the set up used to demonstrate interference of sound



(i) An observer **O**, moves along **XY.** State what he observes (1mk)

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(ii) Explain the observation made in (i) above (2mks)

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(iii) What will a student hear if he moves along the line OC? (1mk)

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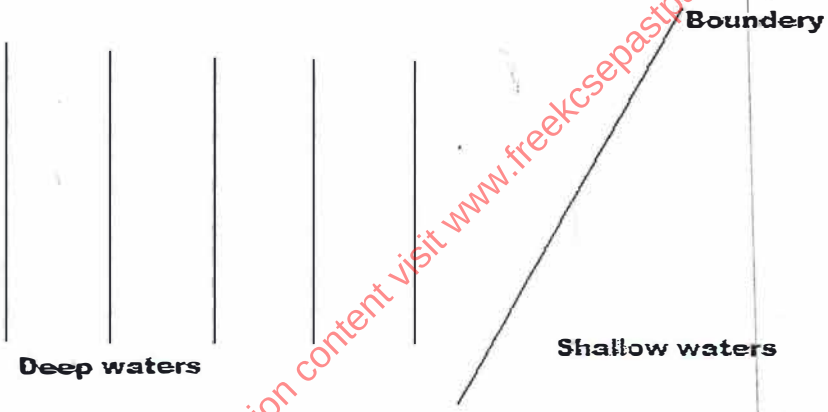
(c) (i) some plane water waves were produced in a ripple tank. They pass from a region of deep water into a region of shallow water. Figure 14 below shows what the waves look like from above



Complete the diagram to show the behavior of the waves in the shallow water (2mks)

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(ii) The waves in (i) above have a speed of 0.12m/s in deep water. Calculate the frequency of the source producing the waves given the wave crest are 0.08m apart in the deep water(2mks)

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17. (a) State the meaning of the term principal focus as used with diverging lenses (1mk)

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(b) An object is placed 30cm in front of a concave lens of focal length 20cm. Determine the magnification of the image produced (3mks)

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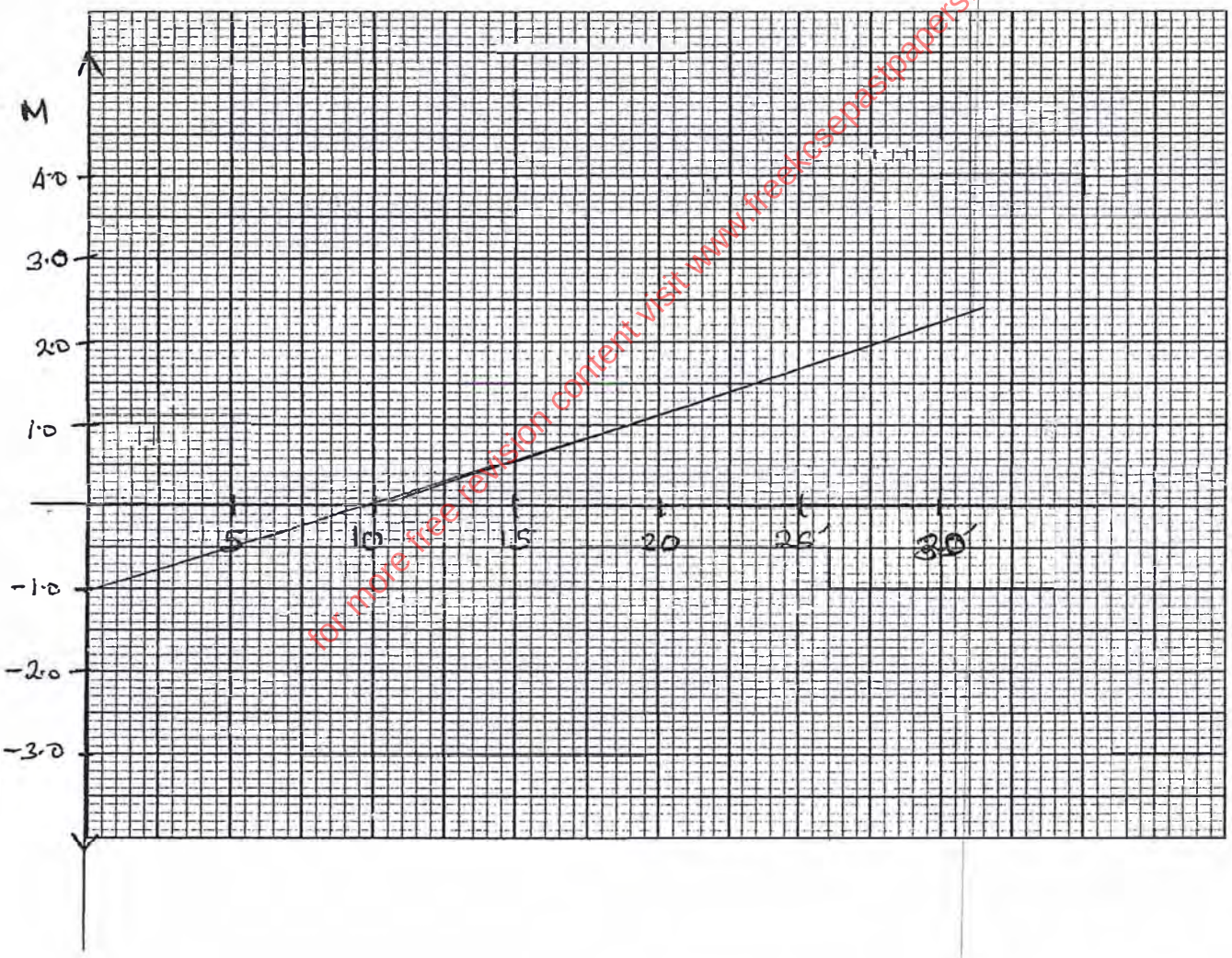
(c) In an experiment to determine the focal length of a converging lens several values of image distance and the corresponding magnification were obtained. A graph of a magnification M against image distance (v) was plotted as shown below



Given the $\underline{V}= M+1$ from the graph, determine the focal length of the lens (3mks)

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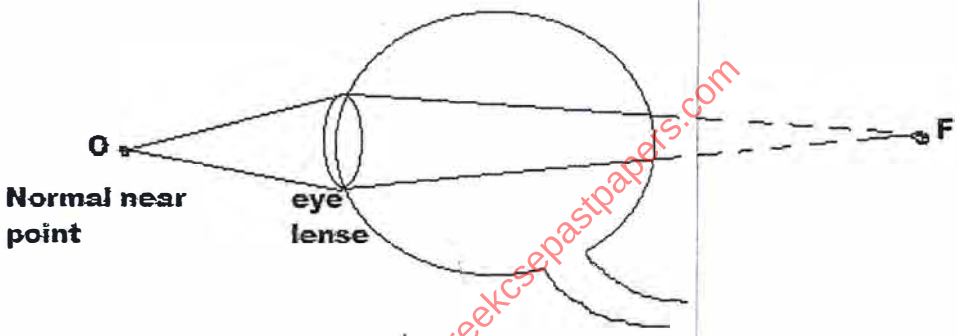
(d) Figure 15 shows a human eye with a certain defect



(i) Name the defect (1mk)

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(ii) Name one cause of the defect (1mk)

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END

MAY THE ALMIGHTY GOD BLESS THE WORK OF YOUR HANDS.