

# KCSE REVEALED 2021

## PHYSICS PAPER II

*This PDF comprises two sample exams that contain questions that are expected in the national exam 2021*

***For marking schemes call Mr Machuki 0795491185.***

### SAMPLE I

Kenya Certificate of Secondary Education

232/2 PHYSICS (Theory)

PAPER TWO

TIME: 2HRS

#### INSTRUCTIONS TO CANDIDATES

- This paper consist of two sections: A and B
- Answer all questions in section A and B in the spaces provided
- All workings must be clearly shown. Mathematical tables & electronic calculators may be used

#### FOR EXAMINERS USE ONLY

PART	QUESTION	MAX SCORE	STUDENT'S SCORE
A	1 - 11	25	
B	12	11	
	13	07	
	14	10	
	15	11	
	16	11	
	TOTAL	80	

**SECTION A (25 MARKS)**

**ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED**

1. Figure 1 below shows two plane mirrors inclined at an angle  $x$  from each other. A viewer counts a total of seven images by looking directly from the object O. Determine value of angle  $x$ .  
(2mks)

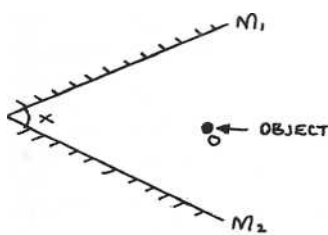
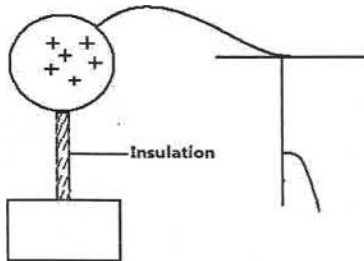


Figure 1

2. A charged metal sphere is connected to an uncharged electroscope as shown in the figure 2 below. State and explain the observations made. (2mks)



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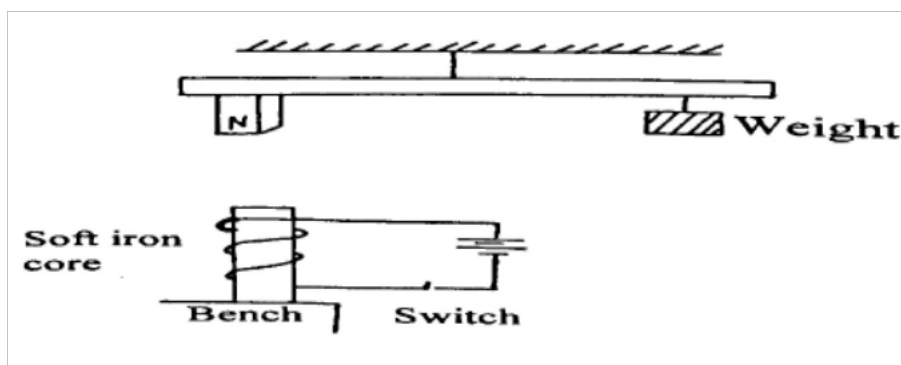
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3. A metre rule is suspended by a thread such that it is in equilibrium balanced by a permanent magnet attached to the metre rule and some weight as shown in figure 3 below.



If the soft iron is fixed to the bench, state and explain the effect on the metre rule when the switch is closed.

(2mks)

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4. a) Explain why convex mirrors are preferred to plane mirrors as vehicle side mirrors.

(1mk)

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b) A part from images being formed behind the mirror, state any other two similarities of images formed by a plane mirror and a convex mirror.

(2mks)

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5. i) Differentiate between polarization and local action in a simple cell

(2mks)

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ii) State the use of manganese IV oxide in a dry cell

(1mk)

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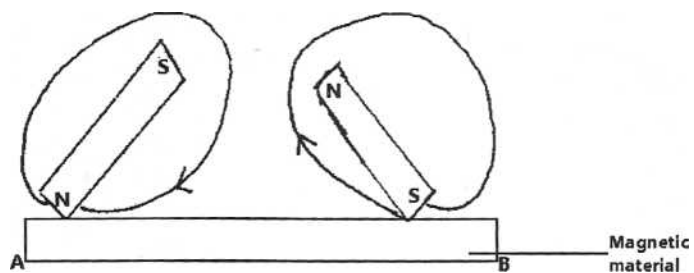
6. Other than progressive waves travelling in opposite direction at the same speed, state any other two conditions necessary for the formation of stationary

(2mks)

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7. A gun is fired and an echo heard at the same place 0.6s later. How far is the barrier, which reflected the sound from the gun? (Speed of sound in air= $330\text{ms}^{-1}$  (3mks)

8. In an attempt to make a magnet, a student used the double stroke method as figure 4 shown below. (2mks)

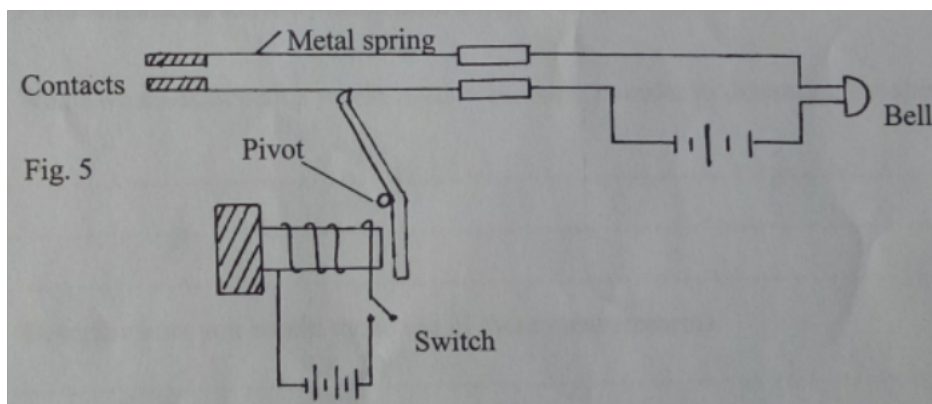


State the polarities at the ends A and B

A.....

B.....

9. a) The figure 5 below shows an electromagnetic relay.



Explain what happens when the switch is closed. (2mks)

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10. A current of 12A flows through a circuit for 2.5 minutes. How much charge passes through the circuit. (2mks)

11. a) Define term light (1mk)

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b) Other than the image being real, state any other characteristics of the images formed by pin-hole camera

(1mk)

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**SECTION B(55MARKS)**

**ANSWER ALL THE QUESTIONS IN THIS SECTION IN THE SPACES PROVIDED**

12. a) A student stands some distance from a high wall and claps his hands

i) What two measurements would need to be made in order to determine the speed of sound?

(2mks)

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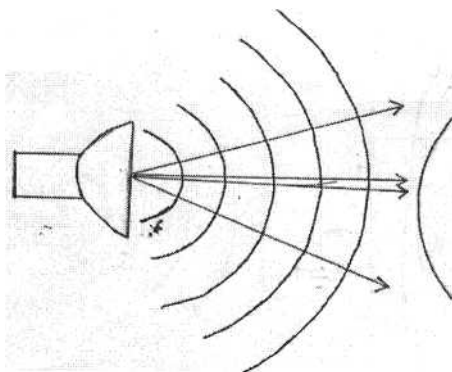
- ii) Describe how you would make use of these measurements  
(2mks)

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- iii) The speed of sound in air is 330m/s. How far from the wall would you stand?  
Choose an answer from the following distances 10m, 200m, 500m. Give reasons  
why you did not choose each of the other two distances.  
(2mks)

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- b) The balloon filled with carbon dioxide can act like a lens and focus sound from a loud speaker. On to the microphone, Figure 6 show waves produced by loud speaker moving toward the balloon.



- i) Complete the diagram to show what happens to the sound waves when they have passed through the balloon and moves towards the microphone.  
(2mks)

- ii) The loud speaker is now moved toward the balloon. This results in less sound at the microphone. Explain why there is less sound at the microphone (1mk)

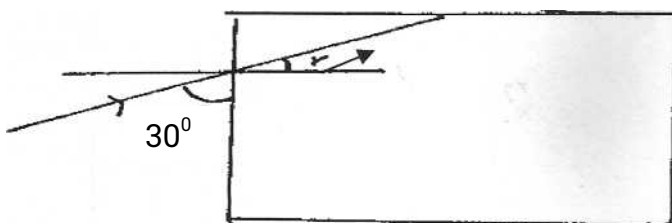
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- iii) The frequency of the sound emitted by the loud speaker is 1020Hz. Calculate the wavelength of the sound wave in air where its velocity is 340m/s (2mks)

13. a) Define critical angle (1mk)

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- b) Figure 7 below shows a ray of light incident on the face of a cube made of glass refractive index 1.50



Calculate

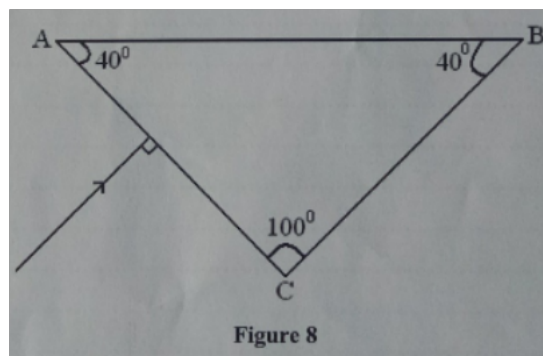
- i) The angle  $r$ : (2mks)



ii) The critical angle for the glass air interface (2mks)

c) The figure 8 below shows a ray of light incident on a glass prism. Given that the critical angle for the grass is  $39^\circ$ , sketch on the diagram the path of the ray through the prism.

(2mks)



14. a) i) Define capacitance of a capacitor and state its S.I unit (2mks)

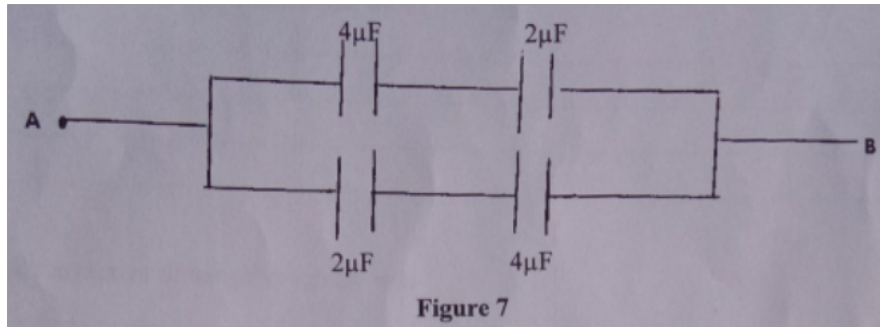
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ii) State any two factors that affect the capacitance of a capacitor

- .....
- .....
- iii) The figure 9 below shows three capacitors connected between two points A and B. (3mks)



Determine the capacitance across AB

- iv) Sketch a simple diagram that contains a capacitor, a two way switch, and a load resistor that can be used for charging and discharging a capacitor. (3mks)

15. a) State Ohm's law

(1mk)

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b) A wire was connected to a battery and was found that the energy converted to heat was 30J when 20C of charge flowed through the wire in 5 seconds. Calculate;

i) The p.d between the ends of the wire

(2mks)

ii) The current flowing through the wire

(1mk)

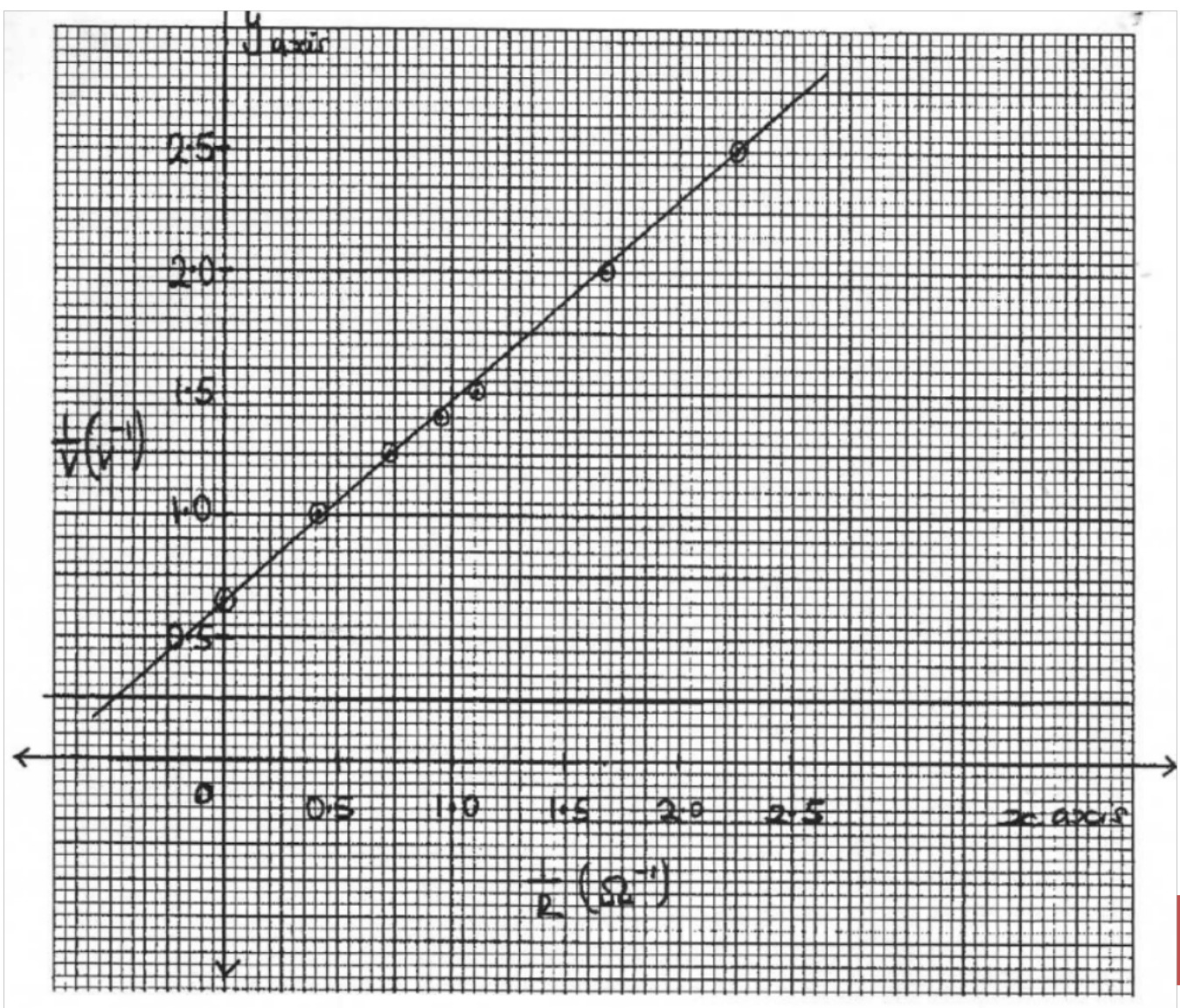
iii) The resistance of the wire

(2mks)

iv) The average power development in the wire

(2mks)

c) The graph below shows results obtained in an experiment the emf ( $E$ ) and the internal resistance,  $r$ , of a cell. Given that the equation of the graph is  $E = r + 1$



Use the graph to determine the values of:-

Given that the equation of the graph is  $\frac{E}{V} = \frac{r}{R} + 1$

Use the graph to determine the values of:-

(i) E (2mks)

(ii) R

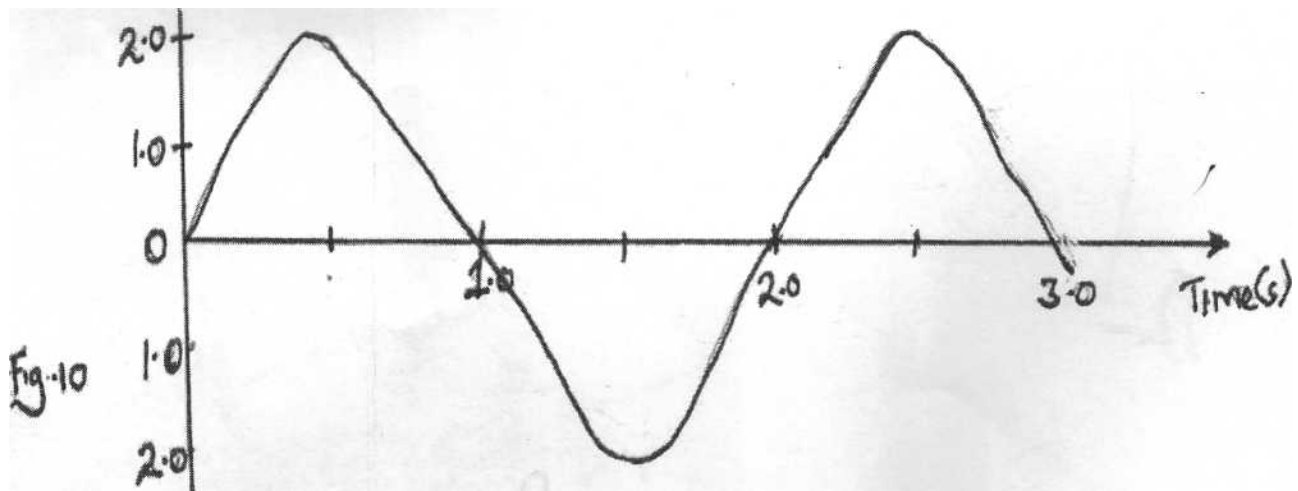
16. a) Distinguish between stationery waves and progressive waves. In terms of their propagation (2mks)

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b) The figure 10 represents an oscillation taking place at a particular point while a wave in a gas passes the point. The vertical axis is labeled displacement.



- i) Explain what is meant by displacement in this context. (1mk)

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- ii) From the figure determine

- I) The period (1mk)

- II) The frequency (1mk)

c) Calculate the wavelength of the sound wave in the figure. Take the velocity of sound in the gas to be 340m/s

(3mks)

d) State two factors that can increase the speed of sound in solids (2mks)

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## SAMPLE II

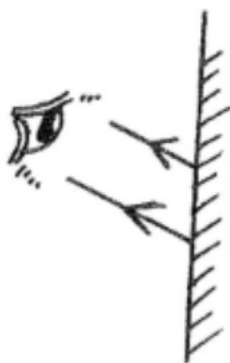
NAME .....ADM NO.....CLASS.....  
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### FORM 4 PHYSIC P2

#### SECTION A: 25 marks

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

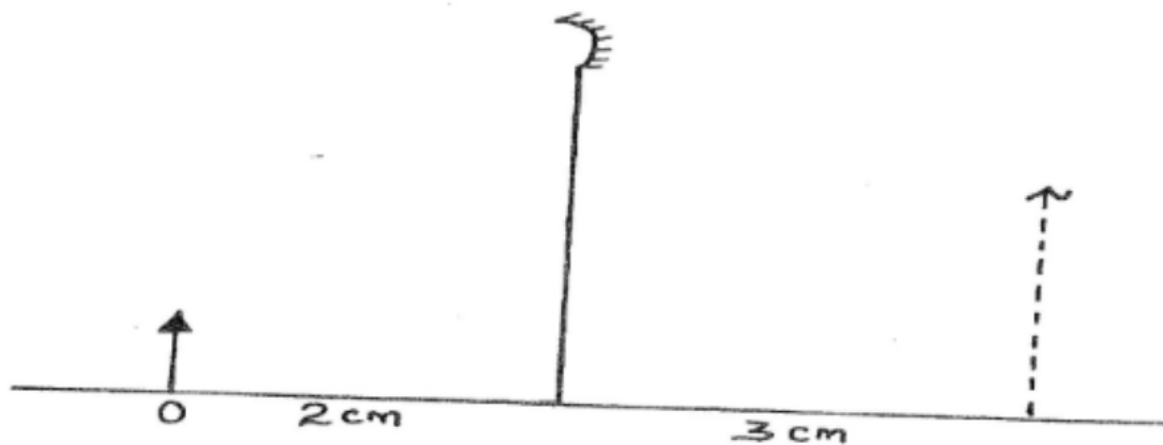
1. Figure 1 below shows reflected rays from a plane mirror.



By ray construction, show the position of the image and the object.

(1 mark)

2. Figure 2 represents an object O and the image I formed by a concave mirror.



By suitable rays, determine the focal length of the mirror.

(2 marks)



3. Two heaters A and B are rated as shown on the table below

	Heater A	Heater B
Resistance, ohms	$R_A$	$R_B$
Power, watts	$W$	$3W$
Voltage, volts	$N$	$\frac{1}{4}N$

Determine the ratio  $R_A : R_B$

(3 marks)

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4. The figure below shows the path of light through a transparent material placed in air.

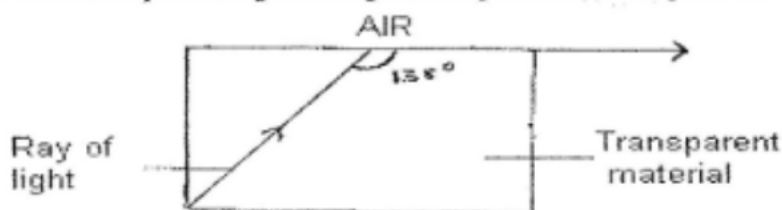


Fig.2

Calculate the refractive index of the transparent material.

(3 marks)

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5. Figure 4 below shows a highly charged needle brought near a candle flame

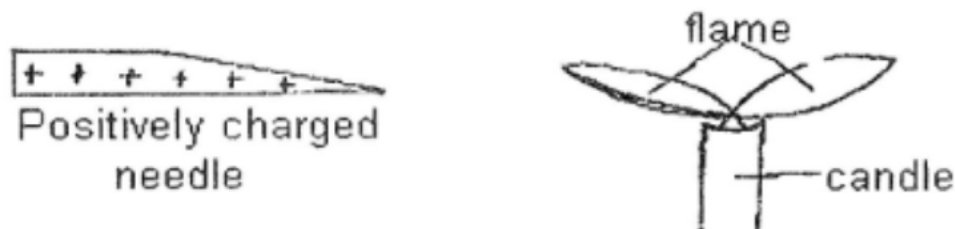


Fig.4

Explain why the flame burns in the direction shown

(2 marks)

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6. Explain with an aid of a diagram why to a diver under water, most of the surface looks silvery. Bubbles of air rising from the diver look silvery.

(2 marks)

7. Explain why soft iron keepers are suitable for storing magnets

(2 marks)

8. State **two** quantities that are used to determine whether accumulator require recharging or not.

(2 marks)

9. Figure shows arrangement of three capacities of  $10\mu\text{F}$ ,  $2\mu\text{F}$  and  $5\mu\text{F}$ .

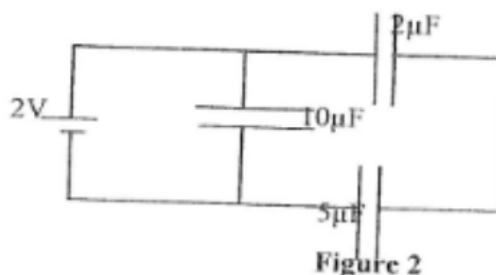


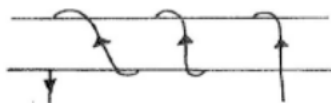
Figure 1

**Determine** the effective capacitance.

(3 marks)

10. Sketch the magnetic field for a conductor shown in the figure below.

(2 marks)



11. In a pin – hole camera, what is the effect of making the pin – hole small but square in shape?

(1 mark)

12. An electric heater is rated 3KW what is the electrical energy in kWh (Kilo watt-hours) consumed by the heater when used on a 240V supply for 180 minutes?

( 1 mark)

13. Briefly explain why in domestic wiring all the lamps in the house are connected in parallel

(1 mark)

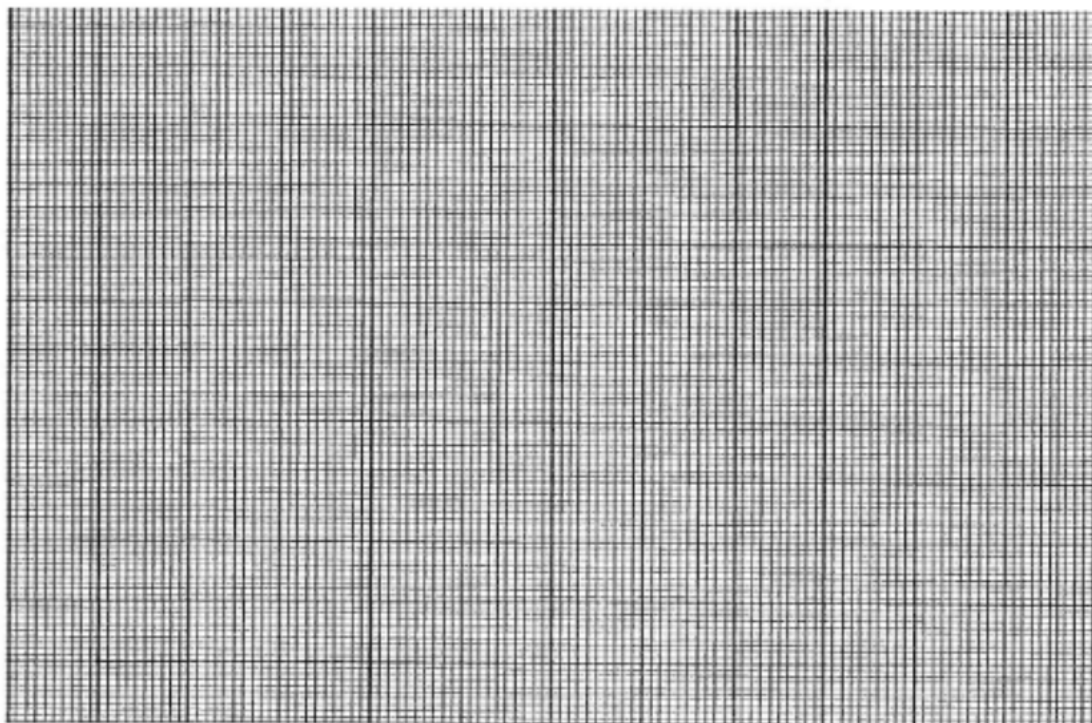
**SECTION B: 55 marks***Answer all questions in this section.*

14. (a) In an experiment with capacitor the charge stored was measured for different values of charging potential difference and the following results were obtained.

Charge stored ( $\mu\text{C}$ )	7.5	30	60	75	90
Potential difference (V)	1.0	4.0	8.0	10.0	12.0

- (i) Plot a graph of charge stored (y-axis) against potential difference on the grid provided.

(4 marks)



- (ii) Use the graph to determine the capacitance of the capacitor.

(2 marks)

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- (b) Resistors of  $2\Omega$  and  $3\Omega$  are connected in series with a cell and voltmeter connected across the  $3\Omega$  resistor reads  $1V$ , but this increases to  $1.2V$  when an extra  $2\Omega$  resistor is connected in parallel with the first  $2\Omega$  resistor, calculate the e.m.f and the internal resistance of the cell.

(4 marks)

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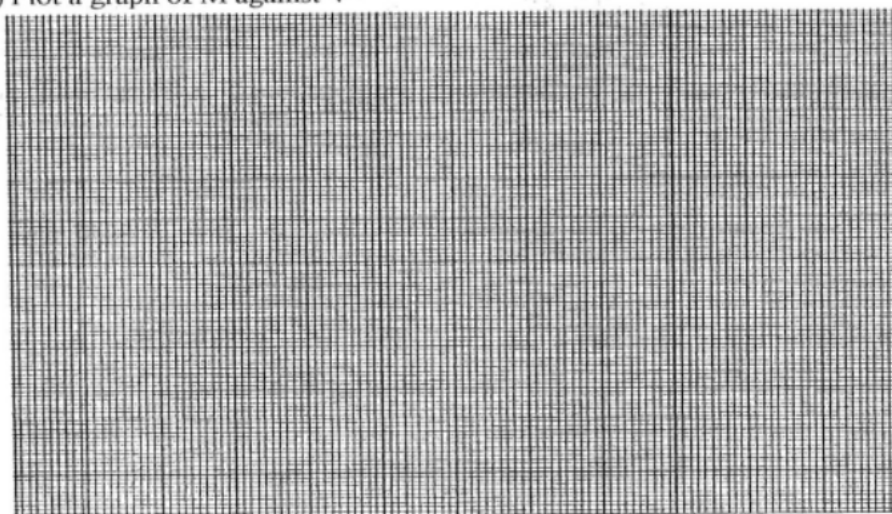
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15. (i) The following data was collected to find the focal length of a convex lens.

Image distance, $v$	13.3	15.0	16.7	20.0	30.0
Magnification, $M$	0.3	0.5	0.7	1.0	2.0

- (a) Plot a graph of  $M$  against  $V$

(5marks)



- (b) Use your graph to find the focal length of the lens

(3 marks)

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(c) Find the power of the lens (2 marks)

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(d) State 4 similarities between the eye and the lens camera (4 marks)

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(e) What is long sightedness? (1 mark)

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16. State two differences between sound waves and electromagnetic waves (2 marks)



(b) Figure below shows a waveform of a wave moving at velocity of 2m/s.

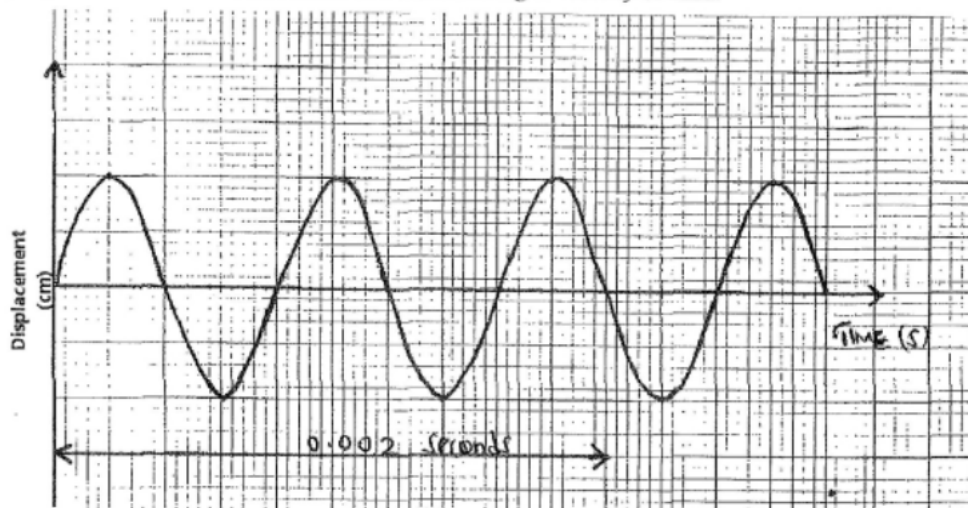


Fig.8

Determine:

- (i) The periodic time (T) (2 marks)

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- (ii) The wavelength ( $\lambda$ ) (3 marks)

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- (c) A fathometer produces sound in a ship and receives two echo's where there is a raised sea bed one after 2.5 seconds and the other after 3.0 seconds. Find the height of the raised sea bank if the velocity of sound in water is 1460m/s. (3 marks)

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17. A  $10\ \mu\text{F}$  capacitor is charged to a potential difference of  $300\text{V}$  and isolated. It is then connected in parallel to a  $5\ \mu\text{F}$  capacitor. Find the resultant potential difference. (3 marks)

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- (b) The energy stored before connection. (3 marks)

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- (c) The energy in the **two** capacitors after connection. (3 marks)

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18. (A) State any one properties of magnetic flux lines. (1 mark)

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- (b) A model railway truck has a magnet attached to it as shown in fig 6 below, not to scale. It is free to run on rails from a higher level A to a lower level B. At B, a thick loop of copper wire is placed horizontally across the track so that the magnet straddles the wire when the truck is at B. A large electric current passes through the wire, which is connected to a battery. The truck is released from A and it rebounds without physical contact when reaching B.



- (i) Explain why the truck rebounds in this manner. (2 marks)
- .....
- .....
- (ii) Describe its subsequent motion. (2 marks)
- .....
- .....
- (i) What would be the effect of increasing the current through the wire, Explain (2 marks)
- .....
- .....
- (ii) What would be the effect of increasing the load in the truck ? Explain (2 marks)
- .....
- .....
- (v) What would be the effect of reversing the holes of the magnet? Explain. (2 marks)
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- .....