NAME..CLASS........................ADMNO.........

FORM FOUR PHYSICS P2

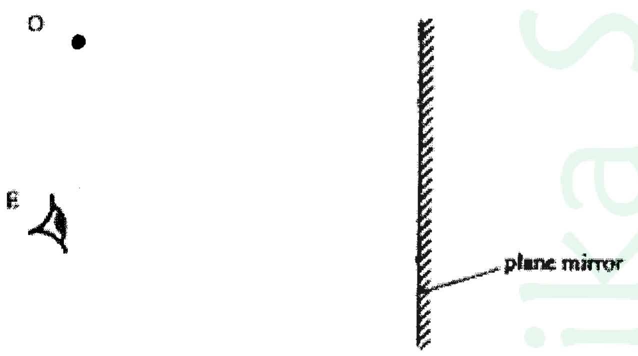
TIME: 2 HOURS

INSTRUCTIONS

- Write your name, admission number and class number at the top of every page.
- Answer all the questions in the spaces provided below each question.
- All working must be clearly shown on the spaces provided.
- This paper has **10** printed pages.

SECTION A (25 MARKS)

1. The diagram below shows an object **O** placed in front of a plane mirror



Draw rays to locate the position of the image as seen by the eye **E** through the mirror. (3mks)

2. Outline how a gold leaf electroscope can be charged positively through induction. (3mks)

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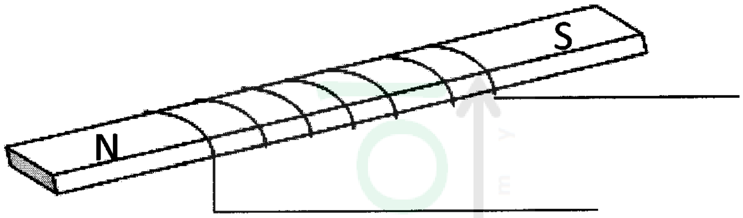
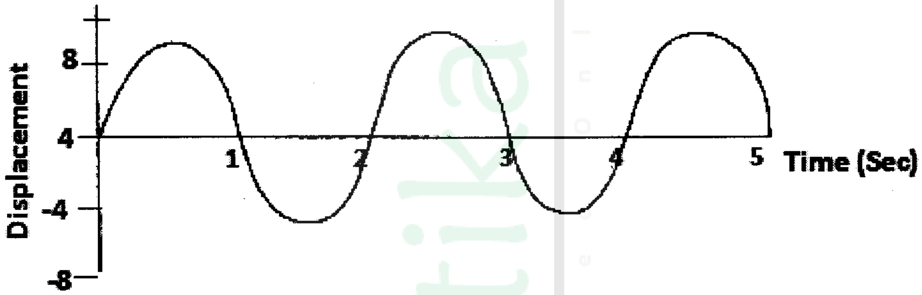
3. (i) The diagram below shows one method of demagnetization. Complete the diagram for demagnetization to take place. (1mk)



(ii) In the diagram below, show the arrangement of the dipoles after demagnetization. (1mk)

4. The figure below shows the displacement – time graph for a certain wave.



Determine the frequency of the wave. (3mks)

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5. A child drops a rock down a well 25 m deep and hears the sound of the rock hitting the water 2.32 seconds after the rock is dropped .Calculate the speed of sound (3mks)
(Take acceleration due to gravity g = 10 m/s^2 and air resistance is negligible)

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6. If the current passing through the electric kettle is doubled, the power dissipated increases by 4000W.Determine the power dissipated before doubling the current. (4 mks)

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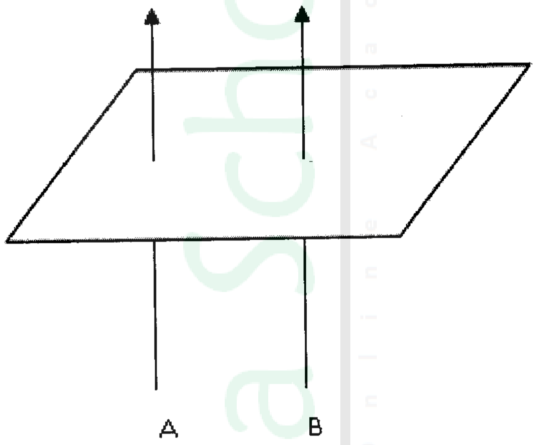
7. The figure below shows two parallel current carrying conductors A and B cutting through a piece of card board.



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

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

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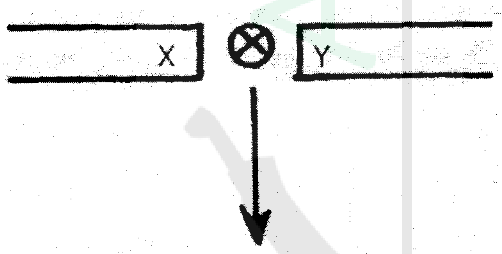
8. Figureshows a conductor carrying current placed in the magnetic field and moves in the direction shown.



Identify the polarities of X and Y. (2mks)

X...

Y...

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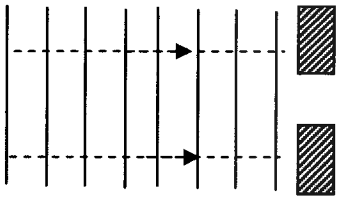
9. Figure represents plane waves approaching a barrier with an opening. On the same diagram, show how the waves will appear after passing through the opening in the barrier. (2mks)



SECTION B (55 MARKS)

10. (a). cell drives a current of 5A through A a 1.6 Ω resistor. When connected to a 2.8Ω resistor. The current that flows is 3.2A. find E and r for the cell (3mks)

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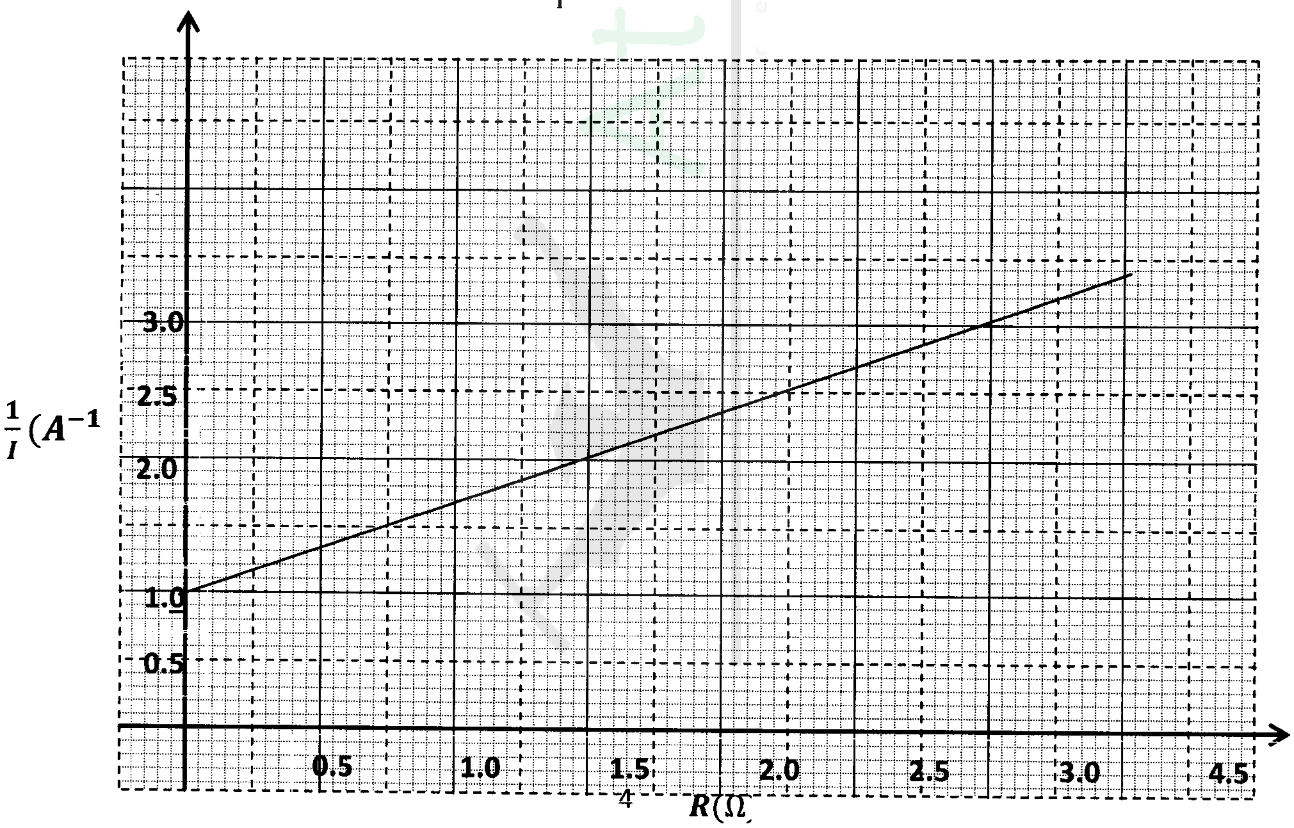
(b) A dry cell of Emf E and an internal resistance,r is used to drive a current through various resistors of resistance R and the values of $\frac{1}{I}$ and R plotted on a graph as shown below.



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The variables I and R are related by the equation $\frac{1}{I} = \frac{R}{E} + \frac{r}{E}$

(i) Use the graph to determine the Emf, E of the cell. (3mks)

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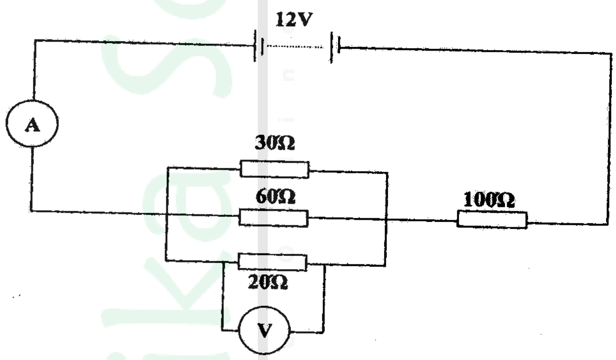
(ii) State the significance of the R - intercept. (1mk)

Thediagrambelowshows four resistors connected together in circuit.



Determine;

(i) The ammeter reading (3mks)

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(ii) The Voltmeter reading (3mks)

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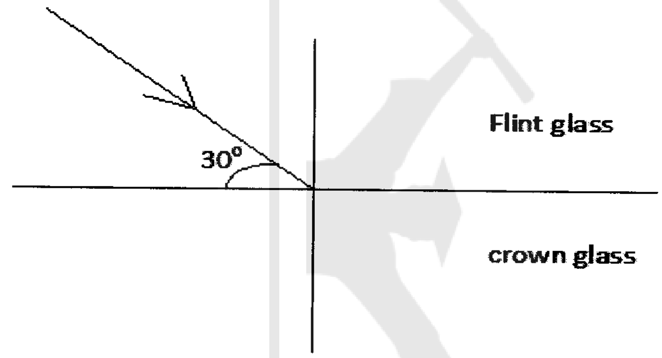
11. (a) Light passes from a prism made of flint glass of refractive index 1.89 to a second prism made of crown glass of refractive index 1.52 as shown in the diagram below.



Given that the angle between the interface and the incident ray is 30^0 ,

(i) Determine the critical angle for the pair of media. (3mks)

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(ii) Show the direction of light and indicate the angles after the ray of light hits the interface. (2mks)

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(b) State Snell's law. (1mk)

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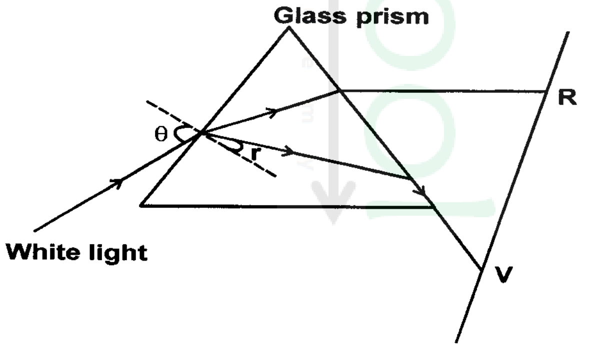
(c) The figure below shows a ray of white light dispersed in a triangular prism. The speed of violet light in the prism in 1.88×10^8 m/s.



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i) Explain how glass disperses white light into red and violet bands. (1 mk)

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ii) Determine the refractive index of the prism material for light (take speed of light in vacuum = 3×10^8m/s (2mks)

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iii) Show on the figure the critical angle c for violet light and determine its value (3 mks)

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iv) Given that r =21.5° determine the angle θ. (3 mks)

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12. (a) An object of height 10cm is placed 12cm in front of concave lens of focal length 3cm. determine:

(i) Position of the image. (2mks)

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(ii) Size of the image. (2mks)

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(iii) Nature of the image formed. (2mks)

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13. (a) A capacitor was connected in a circuit and charged until it was full. The Potential difference (Pd) across it was measured using a voltmeter. The corresponding values of the charge stored was calculated and tabulated in the table below.

Pd across the Capacitor (V)	1.2	1.5	1.8	2.0	2.2
Charge stored (μC)	2.88	3.60	4.32	4.80	5.28

I)Plot a graph of the charge stored against the Pd. (4 mks)

II)Using the graph, determine:

i) The capacitance of the capacitor. (3 mks)

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ii) The energy stored by the capacitor. (2 mks)

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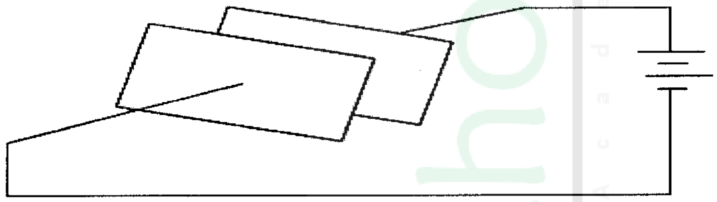
(b) The diagram below shows a parallel plate capacitor.



State one way by which the capacitance of the capacitor above can be reduced. (1mk)

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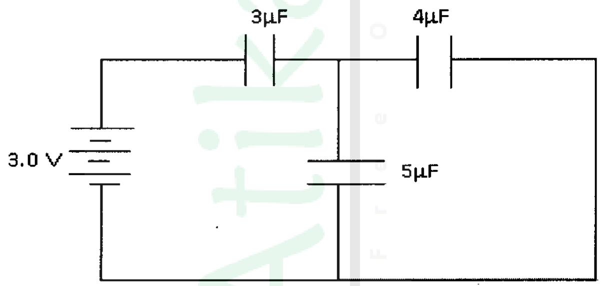
(c) Three capacitors are connected as shown.



(i) Calculate the total capacitance of the circuit above. (3mks)

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(ii) Calculate the total energy stored by the capacitor network above. (3mks)

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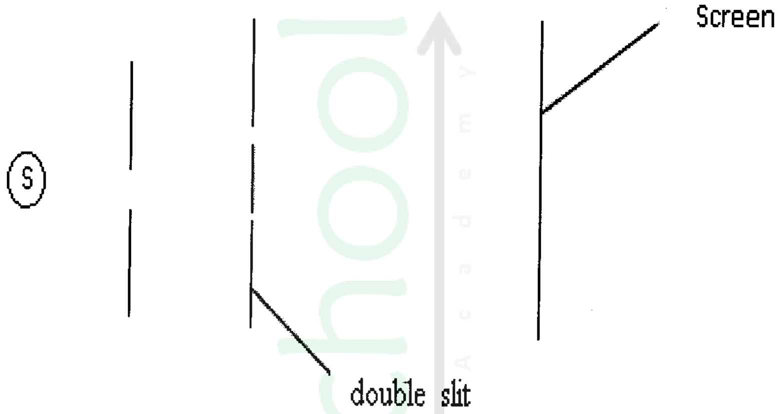
14. (a) In an experiment to observe interference of light waves, a double slit is placed close to the source S of light as shown in the figure below.



i) State the function of the double slit. (1mk)

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ii) Describe what is observed on the screen. (2mks)

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iii) State what is observed on the screen when the slit separation is reduced. (1mk)

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(b) Differentiate between refraction and diffraction of water waves (1mk)

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