

Name..... Index No.....
 School..... Candidate's sign.....
 Date.....

232/2
PHYSICS
Paper 2
THEORY
July/August 2010
2 Hours

BORABU - MASABA NORTH DISTRICTS JOINT EVALUATION TEST - 2010
Kenya Certificate of Secondary Education (K.C.S.E)

PHYSICS
Paper 2
July/August 2010
2 Hours

Instructions to candidates

1. Write your name, index number, school and date in the spaces provided above
2. Sign and write the date of the examination in the spaces provided above
3. This paper consists of two sections: A and B.
4. Answer all the questions in the spaces provided
5. All writing **MUST** be clearly shown in the spaces provided
6. Non programmable silent electronic calculators and KNEC mathematical table may be used.

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAXIMUM SCORE	CANDIDATE'S SCORE
A	1 – 14	25	
B	15	12	
	16	09	
	17	09	
	18	07	
	19	09	
	20	09	
	TOTAL	80	

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

SECTION A (25 MARKS)

1. A vertical object O is placed at the principal focus F of a diverging lens as shown in Fig. I

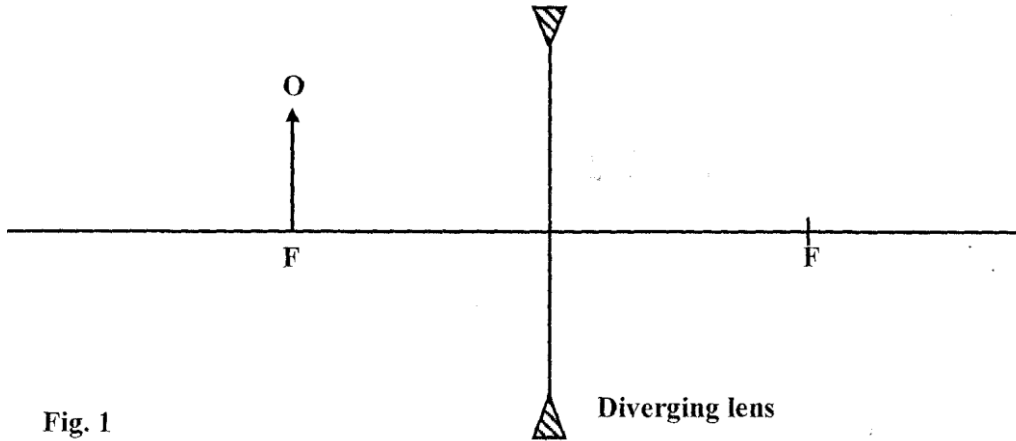


Fig. 1

Complete the diagram by drawing appropriate rays to show the image formed. (3mks)

2. Two electric heaters A and B rated 1000 W and 2500 W respectively are connected in parallel across a 240 mains supply. Calculate the ratio $R_A : R_B$ of their resistances. (3mks)

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3. Fig. 2 represents crests of water waves approaching a wide opening.

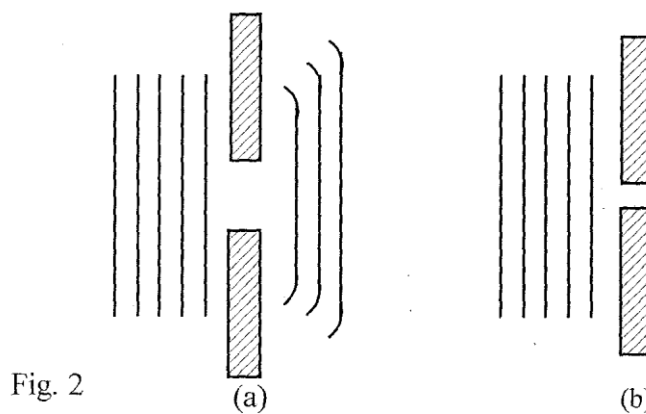


Fig. 2

Crests of the same water waves are now approaching a narrow opening. Sketch the crests after passing through the opening. (2mks)

4. Why is it advisable to store magnetized magnetic tapes in an iron box? (2mks)

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5. Alpha particles are said to be more ionizing than beta particles. Give two reasons for this observation. (2mks)

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6. One of the factors which affect the capacitance of a parallel plate capacitor is the area of overlap of the plates. Name **two** other factors. (2mks)

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7. Name the part of the electromagnetic spectrum used in communication by mobile phones. (1mk)

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8. A student set up the circuit shown in Fig. 3. The lamps didn't light when she closed the switch S.

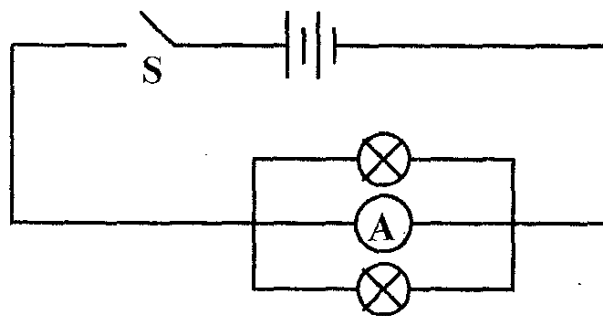
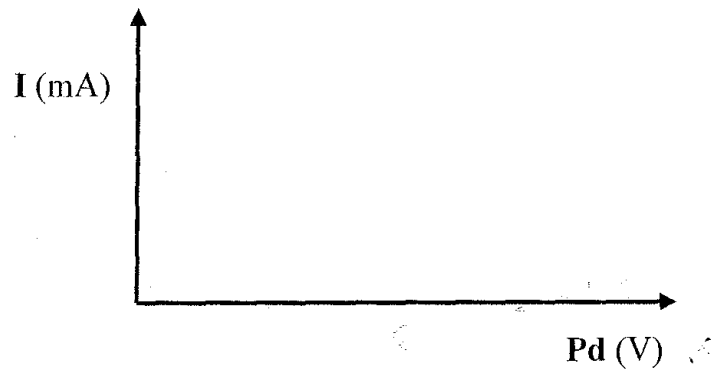


Fig 3

Suggest a reason for this observation. (2mks)

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9. In the axes provided sketch the characteristic for a forward biased p-n junction diode. (1mk)



10. A lady standing in front a mirror sees an upright image, that is of the same size as herself. State with a reason the type of the mirror she was standing in front. (2mks)

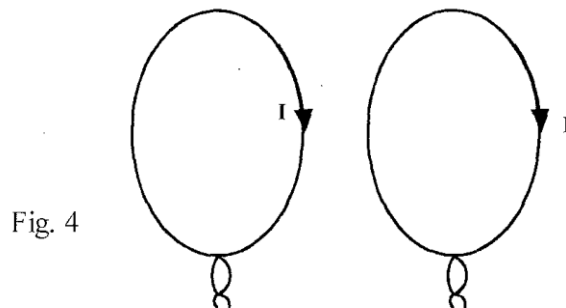
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11. Fig 4 shows two conductor wires each carrying a current.

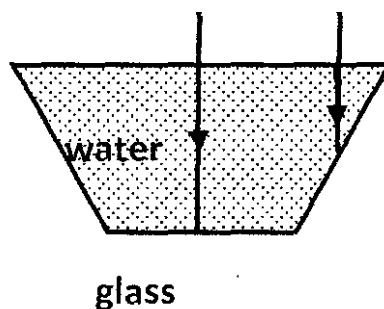


State whether the force between the conductors is attractive or repulsive. (1mk)

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12. Fig. 5 shows two rays of light incident on a water-glass surface.



Complete the rays to show their paths from the glass to water. (2mks)

13. State **one** difference between hard and soft X – rays. (1mk)

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14. The transmission of mains electricity on the national grid is at high voltage. Give a reason (1mk)

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SECTION B (55 MARKS)

15. a) State one difference between:
(i) Mechanical and electromagnetic waves. (1mk)

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(ii) Stationary waves and progressive waves (1mk)

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(iii) Stationary waves and progressive waves (1mk)

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(b) Briefly describe how sound is propagated in air. (2mks)

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(c) Fig. 6 shows a set up by a student.

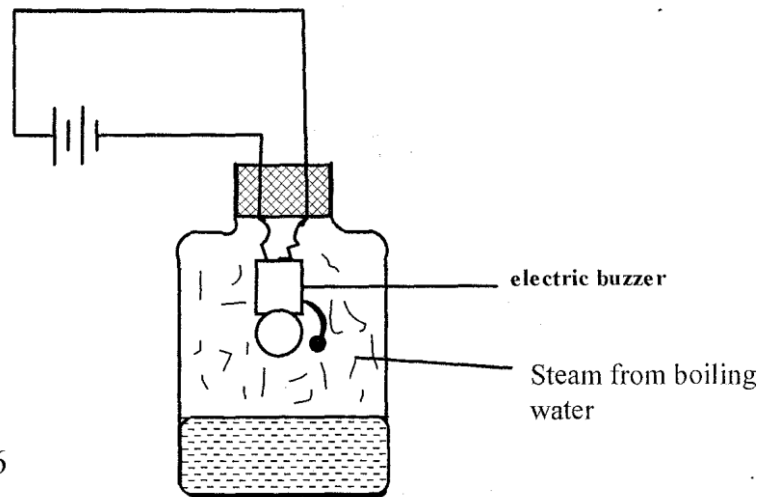


Fig. 6

(i) State what happens to the sound from the buzzer as the bottle and its contents are cooled to 0°C . (1mk)

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(ii) Explain the observation you have stated in (i) above. (3mks)

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(d) A boy standing in level ground between two high walls claps his hands. He hears an echo from one wall after 0.7s and from the other wall 0.2s later. Determine the distance between the two walls. (Speed of sound in air $v = 330 \text{ ms}^{-1}$) (4mks)

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16. (a) State Lenz's law of electromagnetic induction. (1mk)

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(b) Fig. 7 shows two coils of insulated copper wires wound on a single soft iron core. One coil is connected to a battery through a switch and the other is connected to a resistor through a galvanometer.

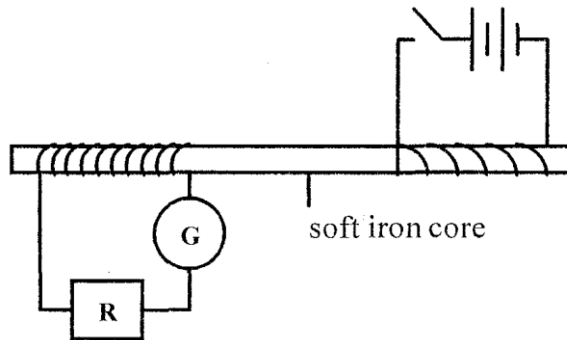


Fig. 7

It is observed that as the switch is closed, the pointer of the galvanometer deflects momentarily.

The same is observed as the switch is opened

(i) Explain why the pointer deflects momentarily. (3mks)

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(ii) State **one** way of increasing the current through resistor R. (1mk)

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(c) (i) State **one** way in which power is lost in a transformer. (1mk)

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- (ii) A transformer uses 240 V a.c supply to deliver 9.0A at 80.0V to a heating coil. If 10% of the energy taken from the supply is lost in the transformer itself, what is the current in the primary winding? (3mks)

17. Fig. 8 shows apparatus used to produce X-rays

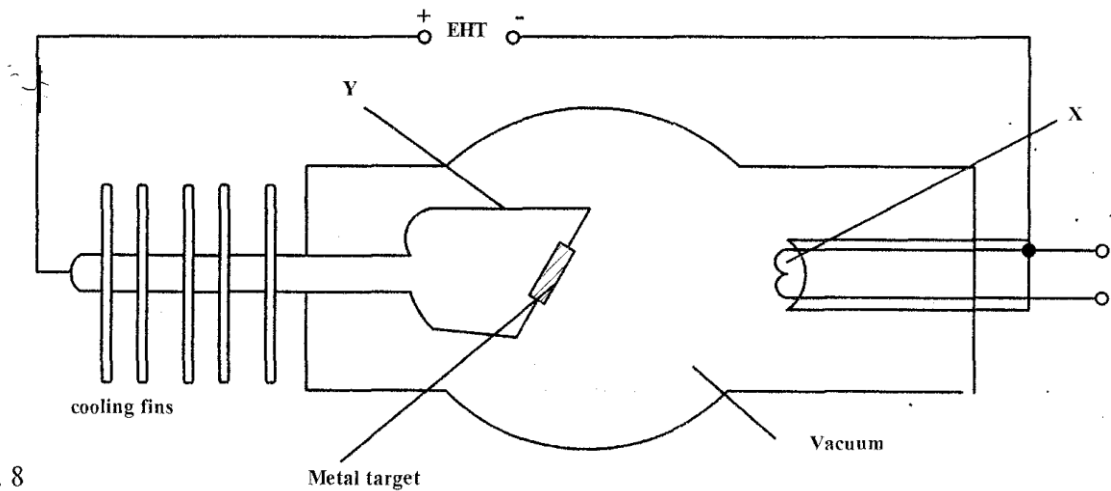


Fig. 8

- (a) (i) Name the parts marked X and Y (2mks)
 X _____ Y _____

- (ii) Suggest a suitable material for the metal target. Give a reason to support your answer. (2mks)

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- (b) (i) Give a reason why X-ray tube is evacuated. (1mk)

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- (ii) How is the intensity of X-rays increased? (1mk)

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- (c) Calculate the minimum wavelength of X-rays emitted when electrons through 30 kV stricke target. (Take electronic charge, $e = 1.6 \times 10^{-19}$ C, Planck's constant $h = 6.63 \times 10^{-34}$ Js and speed of light $c = 3.0 \times 10^8$ ms⁻¹) (3mks)

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18. (a) Define the volt. (1mk)

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- (b) Fig. 9 shows three capacitors of capacitance 3 μ F, 2 μ F, 6 μ F and 12V supply connected in a circuit.

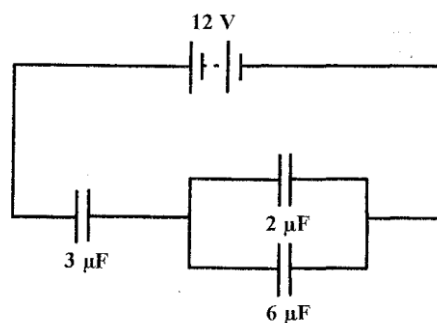


Fig. 9

Calculate:

- (i) The total capacitance of the circuit. (2mks)

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- (ii) The charge stored in the circuit. (2mks)

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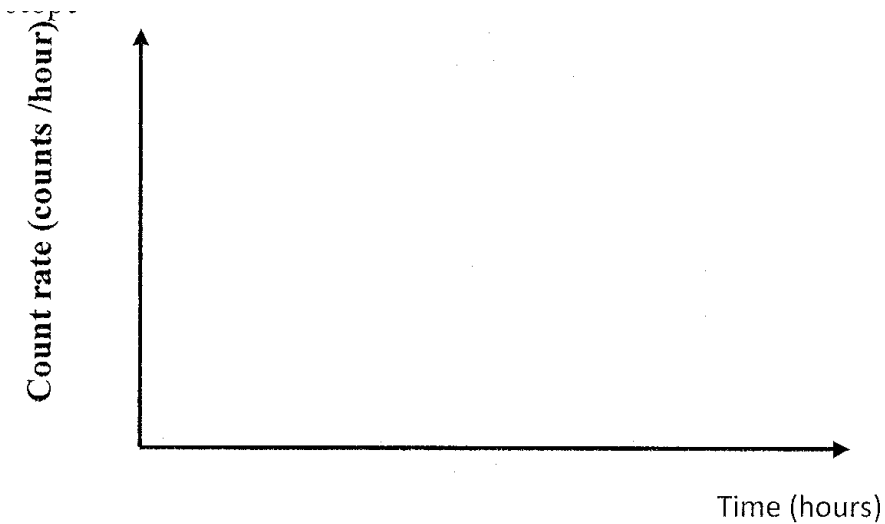
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(iii) The potential difference across the $2\mu\text{F}$ capacitor. (2mks)

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19. (a) (i) Sketch a graph of count rate against time for a sample of a radio isotope whose initial count rate is R_0 counts per hour. Indicate on the sketch the half-life, $T_{1/2}$ of the radioisotope (3mks)



(ii) Radon has a half-life of 4 days. A sample of radon has a mass of 40 g. What mass of the sample will have decayed after 16 days? (3mks)

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- (b) Sodium has a work function of 3.68×10^{-19} J. Calculate the minimum frequency of light that can free a photoelectron from the surface of sodium. (3mks)

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20. (a) Briefly describe how an n-type semiconductor is made from a pure silicon crystal. (3mks)

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- (b) The graph in Fig. 10 shows a voltage – current graph for a cell.

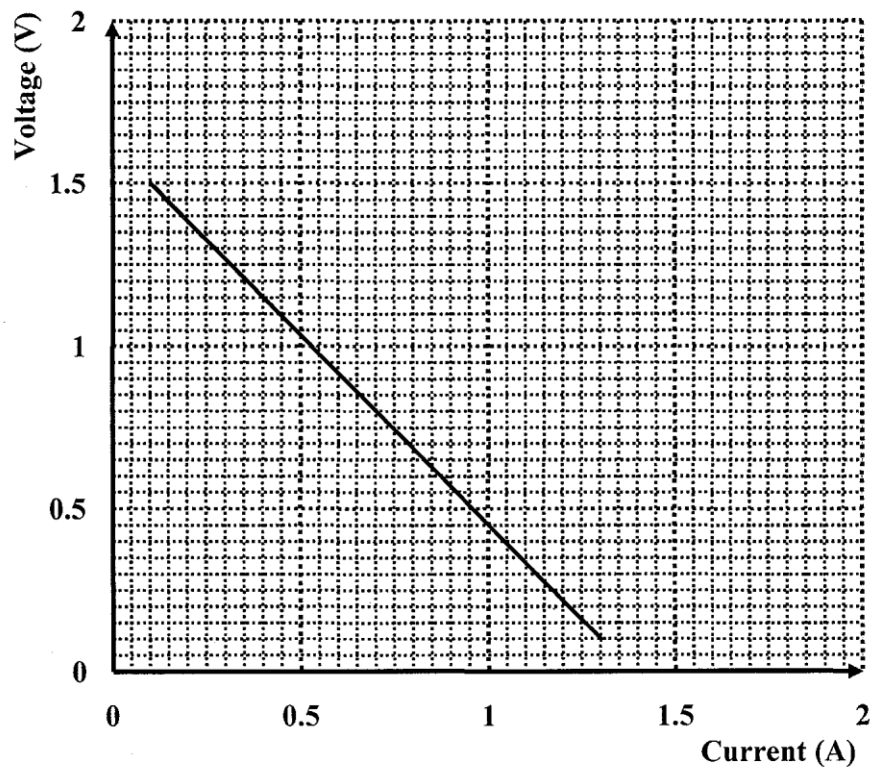


Fig. 10

Determine:

(i) The emf of the cell. (1mk)

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(ii) The internal resistance of the cell. (4mks)

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(c) State **one** condition necessary for total internal reflection to occur. (1mk)

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