

Name.....

Index No.....

School.....

Candidates Signature.....

Date

232/2

PHYSICS

Paper 2

(Theory)

July/August 2009

2 Hours

BORABU INTER – SECONDARY SCHOOLS

JOINT EVALUATION TEST - 2009

Kenya Certificate of Secondary Education (K.C.S.E)

232/2

PHYSICS

Paper 2

(Theory)

July/August 2009

2 Hours

Instructions to Candidates

- Write your name and index number in the spaces provided above.
- Sign and write the date of the examination in the spaces provided above
- This paper consists of **two** questions **A** and **B**.
- Answer **all** the questions in section **A** and **B** in the spaces provided
- All working **MUST** clearly be shown in the spaces provided in this booklet.
- Non programmable silent electronic calculators and KNEC mathematical tables may be used except where stated otherwise.

Take: Speed of light in vacuum $C = 3.0 \times 10^8 \text{m/s}$

FOR EXAMINER'S USE ONLY

Section	Question (s)	Max. Score	Candidates Score
A	1 – 12	25	
B	13	13	
	14	10	
	15	11	
	16	12	
	17	09	
	Total		80

This paper consists of 8 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. Explain why enlarging the pinhole of the pinhole camera causes the image to be blurred. (2 marks)

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2. Fig. 1 shows a bar magnet and two points A and B in front of the magnet.

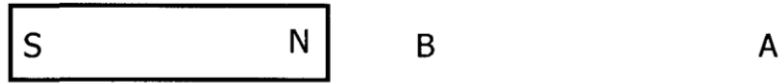
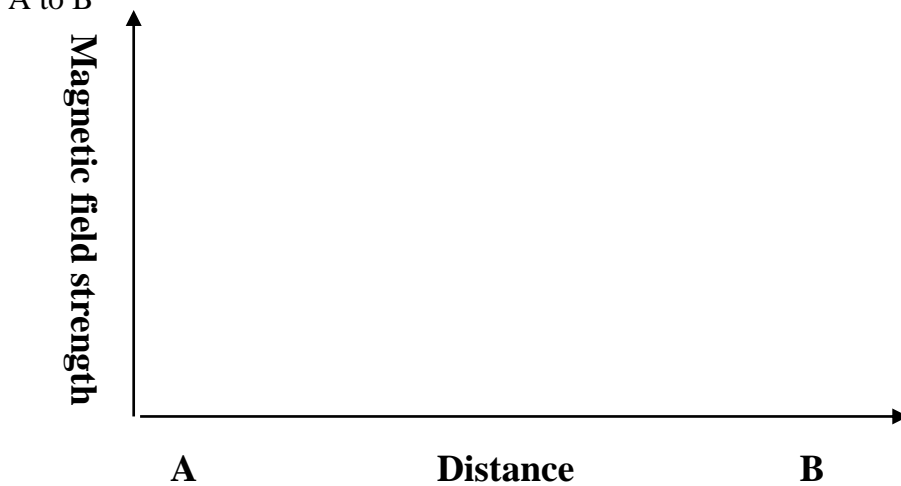


Fig. 1

- On the axes provided sketch a graph showing how the magnetic field strength changes from A to B (2 marks)



3. In a practical motor, the coil is wound on a laminated soft iron core. State **one** problem which arises due to the rotation of the coil. (1 mark)

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4. Light is incident on an air-glass boundary at an angle of incidence of 40° . If the refractive index of the glass is 1.7, determine the angle of refraction. (3 marks)

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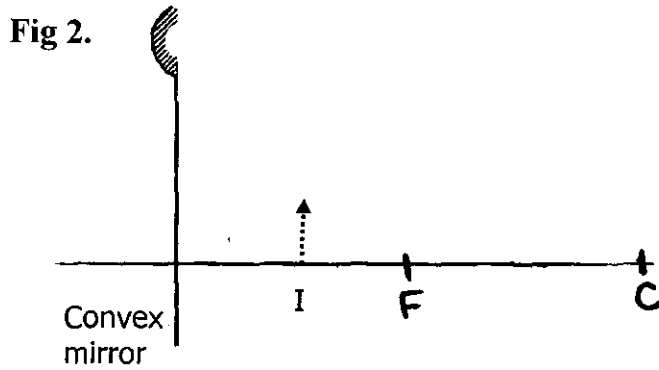
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5. Arrange the following radiations in order of increasing wavelength: ultraviolet, gamma rays, radio waves and infra red. (1 mark)

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6. Fig.2 shows an image; I formed by an object placed in front of a convex mirror. C is the centre of curvature of the mirror.



On the diagram draw appropriate rays and locate the position of the object. (3 marks)

7. A wire of resistance X connected in series with a 1.5 V battery is found to carry a current of 0.075 A . If the wire is now connected in parallel with an identical wire, find the total current in circuit. (3 marks)

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8. An object is placed at $2F$ in front of a converging lens and its image is observed. State how the image changes as the object is moved from $2F$ towards F . (1 mark)

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State **one** difference between hard and soft X-rays. (1 mark)

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10. Fig. 3 shows a graph the output voltage of a rectifier circuit with only one diode.



Fig. 3 Time

Sketch output voltage — time graph for rectifier using two diodes. (2 marks)

11. Fig. 4 shows the profile of a transverse wave.

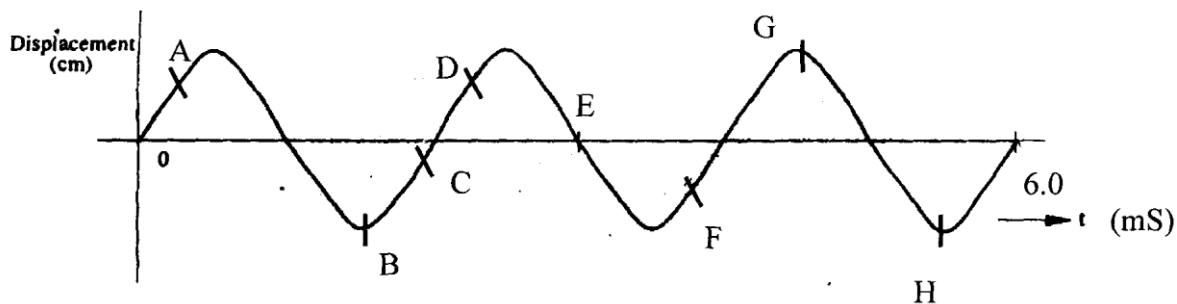


Fig. 4

i) Identify **two** sets of points that represent points that are in phase. (2 marks)

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ii) Determine the frequency of the wave. (3 marks)

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12. State **one** difference between a cathode ray tube (CRT) of a TV and that of a CRO. (1 mark)

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SECTION B (55 MARKS)

13. a) (i) State **one** property of standing waves. (1 mark)

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ii) With the aid of diagram, explain the lowest possible mode of vibration in closed pipe. (3 marks)

- b) Complete the diagram in Fig. 5 to show the patterns of the waves after passing through the slits S₁ and S₂. (2 marks)

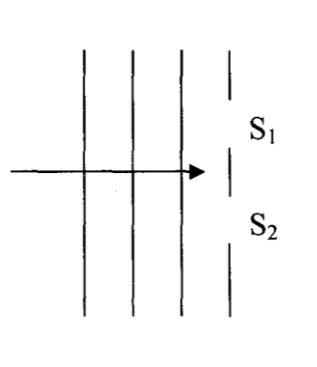


Fig. 5

- c) Water waves are observed to pass a fixed point at a rate of 60 crests per minute. A wave crest takes 4.0 seconds to travel between two fixed points 12.0 m apart. Determine:

i) The velocity, v , of the waves. (3 marks)

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ii) The wavelength, λ of the waves. (3 marks)

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- d) A girl standing in front of a wall 90 m away claps her hands at time intervals of 0.5 seconds. She notices that each echo produced by the wall coincides with the next clap. Determine the speed of sound. (3 marks)

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14. a) State **one** similarity and **one** difference between a diverging lens and convex mirror (2 marks)

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- b) A lens forms a focused image on a screen when the distance between the object and the screen is 100 cm. The size of the image is thrice that of the object.

i) What kind of lens was used? Give a reason. (2 marks)

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ii) Determine the distance of the image from the lens. (3 marks)

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iii) Determine the power of the lens. (3 marks)

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15. a) Define:

i) Radioactivity. (1 mark)

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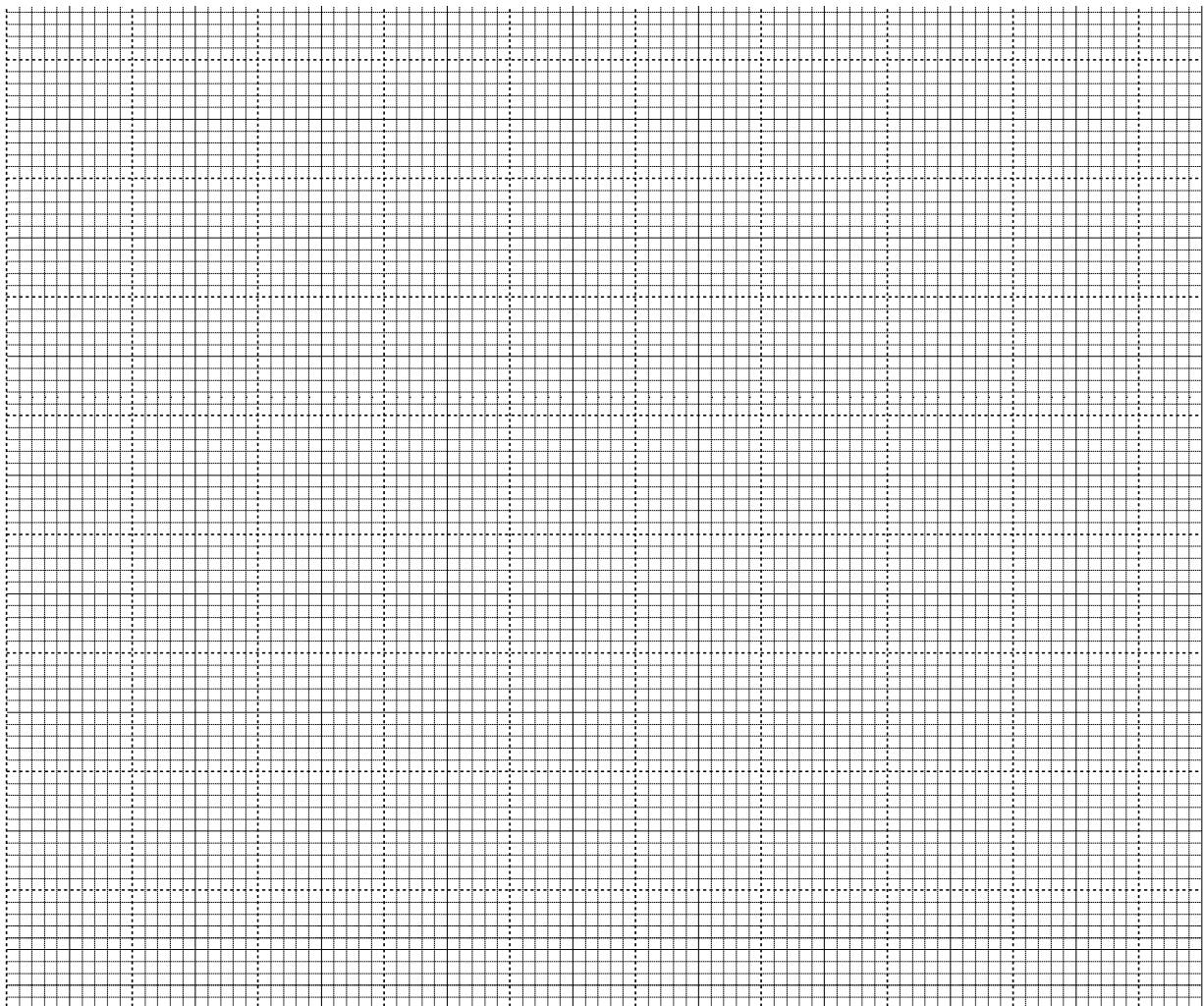
ii) Half-life of a radioisotope. (1 mark)

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b) The readings in table 1 were obtained from a sample of a radioisotope.

Count rate(s^{-1})	1440	1272	1128	840	624	480	264	204		
Time(hours)										

i) On the grid provided, plot a graph of count rate (y-axis) against time. (5 marks)



Using the graph, determine:

i) The half life of the radioisotope (2 marks)

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iii) How long it would take the count rate to fall from 320 to 40 counts s⁻¹ (2 marks)

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16. a) A driver observes that when he alights from the car, while touching its body he receives an electric shock. While inside there is no effect even he touches the car. Explain these observations. (2 marks)

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b) State **two** factors other than area of overlap of the plates that are considered when constructing a parallel plate capacitor. (2 marks)

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c) Fig. 6 represents a circuit which is used to charge a 20 μF capacitor by connecting it to a 15 V battery. Later the capacitor is connected to a 10 μF capacitor.

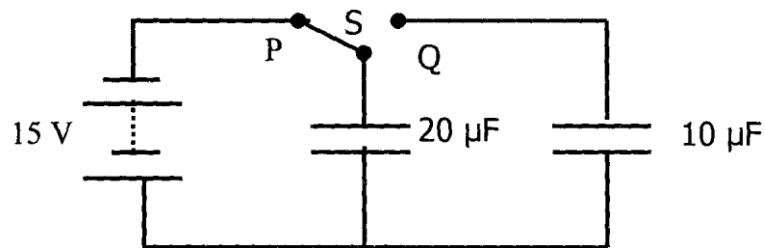


Fig. 6

i) Switch S is first closed at position P so that the 20 μF capacitor charges. Find the maximum charge stored. (3 marks)

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- ii) The switch S is now moved to Q. Determine the final potential difference, V across the capacitors. (3 marks)

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17. a) i) Explain how P — type semiconductor is made from a pure semiconductor crystal. (3 marks)

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- ii) What are the majority charge carriers in a p-type semiconductor? Explain. (2 marks)

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- b) Fig. 7 show the N- pole of a bar magnet approaching an aluminium ring. The ring moves away from the magnet.

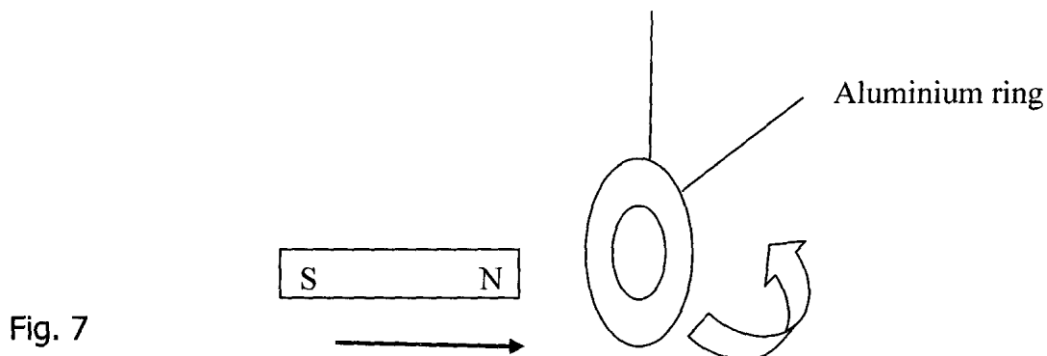


Fig. 7

- i) Indicate on the ring the direction of the induced current. (1 mark)
- ii) Explain why the ring moves away. (3 marks)

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