

MARANDA HIGH SCHOOL

Kenya Certificate of Secondary Education
PRE-MOCK EXAMINATIONS 2022

232/2

PHYSICS

Form 4

June 2022 – 2 Hours

Name: Adm No:

Class: Candidate's Signature: Date: 27/6/2022.

Instructions to candidates

- This paper consist of TWO sections; A and B. Answer ALL the questions in section A and B in the spaces provided.
- ALL working MUST be clearly shown. Mathematical tables, electronic calculators and slide rules may be used.
- Candidates should check the question paper to ensure that all the 11 pages are printed as indicated and that no questions are missing.
- Take:

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SECTION	Question	Maximum Score	Candidate's Score
A	1-15	25	
B	16	11	
	17	09	
	18	06	
	19	16	
	20	13	
TOTAL		80	

SECTION A: 25 MARKS

1. State the condition under which the p.d. across the terminals of a cell is equal to its e.m.f. (1 mark)

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2. **Figure 1** shows the pattern of water ripples in a dam.

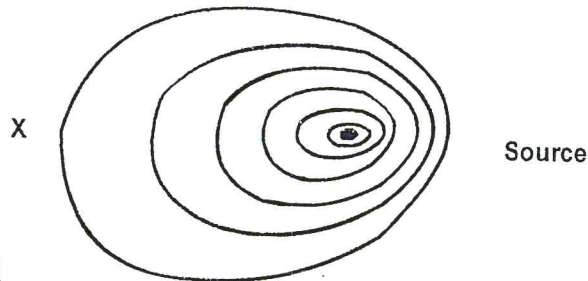


Figure 1

What information about the depth of the dam at point X can you deduce from the pattern? Explain your answer. (2 marks)

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3. Kiss Fm is broadcasting at a frequency of 70MHz. What is the wavelength of the waves, if the speed of the waves is 3.0×10^8 m/s? (2 marks)

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4. **Figure 2(a), 2(b) and 2(c)** show the process of charging an electroscope by induction.

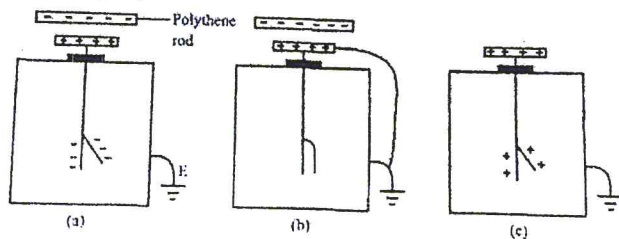


Figure 2

It is observed that the leaf rises in (a), collapses in (b) and then rises in (c). Explain why the leaf collapses in (b) (3 marks)

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5. Give **one** reason why soft iron is used as a core of the coil in an electric bell. (1 mark)

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6. What property of light is suggested by the formation of shadows? (1 mark)

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7. A student holds a large concave mirror of focal length 1m, 80cm from her face. State **two** characteristics of her image in the mirror. (2 marks)

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8. Convex mirrors are used in cars as driving mirrors because they have a wide field of view. Sketch a labeled diagram to show the wide field of view. (2 marks)

9. Arrange the following in order of increasing frequency. *Visible light, infrared radiation, X-rays, U.V radiation, Radio waves.* (1 mark)

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10. State the reason why radio waves signals are easier to receive than TV signals in a place surrounded by hills. (1 mark)

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11. **Figure 3** shows three capacitors connected between two points A and B.

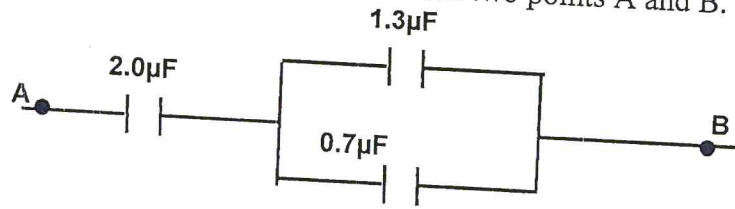


Figure 3

Determine the capacitance across AB.

(3 marks)

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12. Two magnets **A** and **B** in **figure 4** were brought from a point high above a table towards a steel pin.

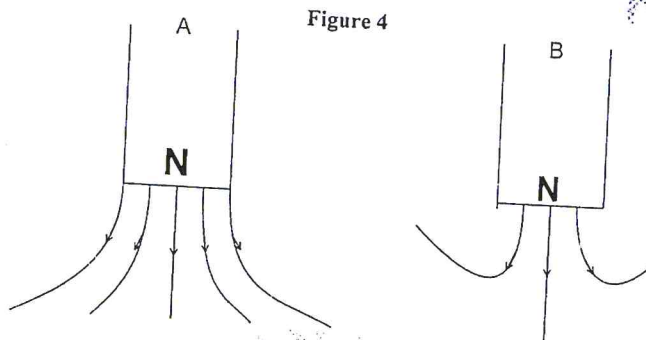


Figure 4

State with a reason which magnet will attract the pin at a bigger height above the table.

(2 marks)

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13. Sound is classified as a longitudinal mechanical wave. Explain why sound is classified as;

a) A longitudinal wave.

(1 mark)

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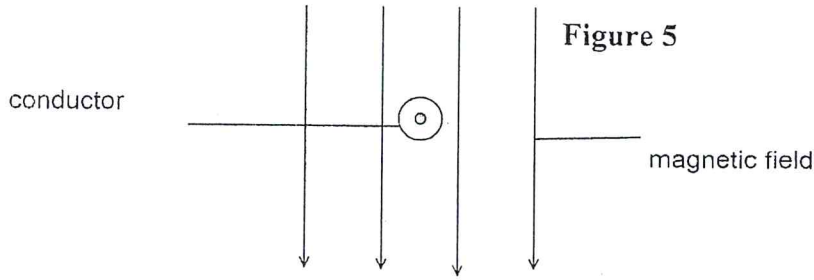
b) A mechanical wave.

(1 mark)

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14. **Figure 5** shows a conductor in a uniform magnetic field carrying current in the direction shown.



Indicate on the diagram the direction of motion of the conductor. (1 mark)

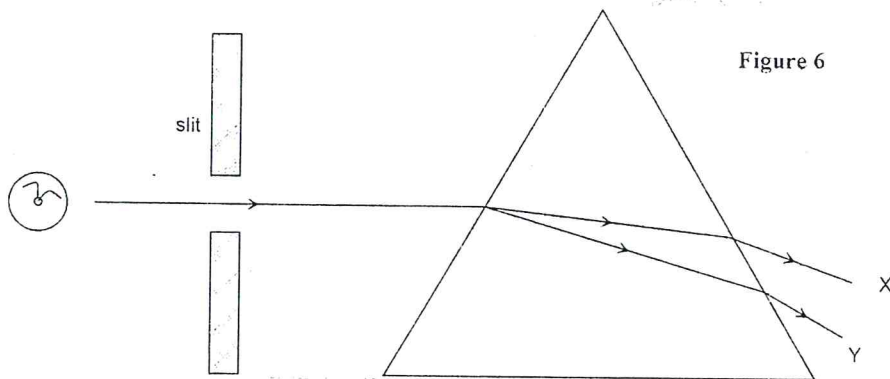
15. Name the property of light applied in transmitting light signal in optical fibres. (1 mark)

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SECTION B (55 MARKS)

16.

a) **Figure 6** shows a narrow beam of white light incident onto a glass prism.



(i) What is the name of the phenomenon represented in the diagram? (1 mark)

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(ii) Name the colour at **X** and **Y**. Give a reason for your answer (3 marks)

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(iii) What is the purpose of the slit? (1 mark)

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- b) **Figure 7** shows the path of ray of yellow light through a glass prism. The speed of yellow light in the prism is $1.8 \times 10^8 \text{ m/s}$.

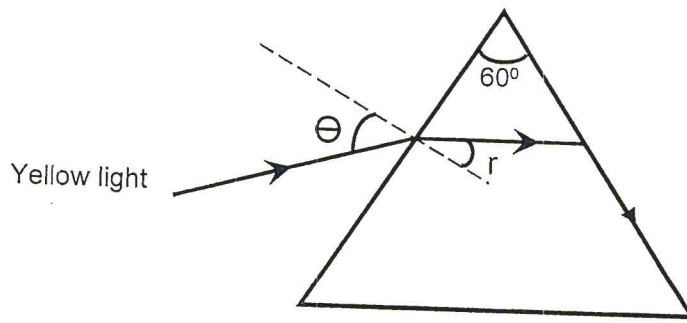


Figure 7

- (i) Determine the refractive index of the prism material (speed of light in vacuum $c = 3.0 \times 10^8 \text{ m/s}$). (3 marks)

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- (ii) Show on the same diagram, the critical angle, C , and hence determine its value. (3 marks)

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17. In an experiment to observe interference patterns of light waves, a double slit is placed close to the source as shown in **figure 8**.

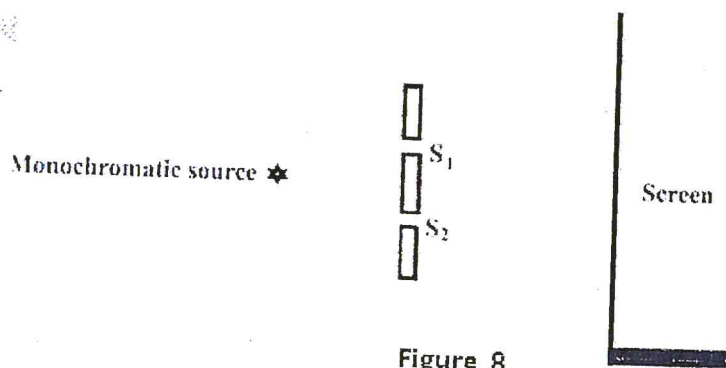


Figure 8

- a) State the function of the double slit. (1 mark)

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b) Briefly describe what is observed on the screen.

(3 marks)

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c) State and explain what is observed on the screen when the slit separation $S_1 - S_2$ is reduced.

(2 marks)

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d) State and explain what is observed on the screen when white light is used in place of the monochromatic light.

(3 marks)

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18. **Figure 9** shows how a near object O is focused in a defective eye.

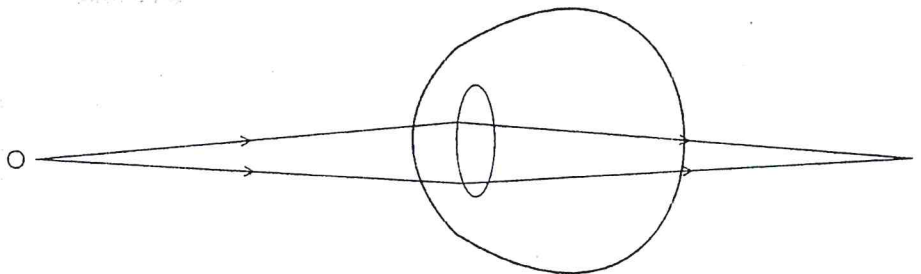


Figure 9

a) What problem does the observer face when viewing an object at the near point?

(1 mark)

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b) Sketch on the same figure how a distant object is focused by the eye. (2 marks)

c) State the nature of the defect. (1 mark)

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d) A pastor is known to have the defect stated in (c) above. How will the pastor handle a bible as he reads it? (1 mark)

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e) How would you advise the pastor as he goes about correcting the defect? (1 mark)

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19.

a) State Faraday's law of electromagnetic induction. (1 mark)

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b) **Figure 10** shows a bar magnet being moved towards a solenoid. The solenoid is connected to a galvanometer.

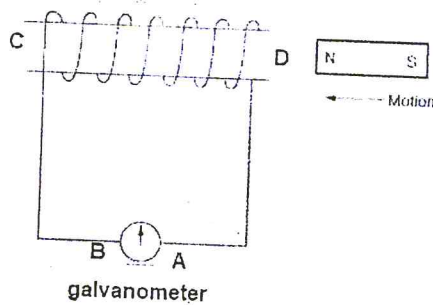


Figure 10

(i) Indicate on the diagram the direction of the induced current in the solenoid. (1 mark)

(ii) Identify the pole induced at D (1 mark)

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(iii) Explain the answer in (b)(ii) above (2 marks)

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c) Explain how laminating the core of a transformer increases its efficiency (2 marks)

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d) A transformer has 1000 turns in its secondary coil and 10 turns on its primary coil. An alternating current of 2.5A flows in the primary circuit when it is connected to a 12V a.c. supply.

(i) State the type of transformer. (1 mark)

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(ii) Calculate the power input to the transformer. (3 marks)

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(iii) Calculate the e.m.f. across the secondary coil. (3 marks)

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e) In transmitting power is it necessary to step up before transmission. Explain. (2 marks)

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20.

- a) Distinguish between electromotive force (e.m.f) and potential difference, p.d of a cell. (2 marks)

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- b) Lead acid accumulators and alkaline accumulators are all sources of electromotive force. State **one** advantage of:

- (i) Lead acid accumulator over alkaline accumulator. (1 mark)

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- (ii) Alkaline accumulator over lead acid accumulator. (1 mark)

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- c) Three resistors of resistances 2.0Ω , 4.0Ω and 6.0Ω are connected together in a circuit. Draw a circuit diagram to show the arrangement of the resistors which gives.

- (i) Effective resistance of 3.0Ω . (2 marks)

- (ii) Minimum resistance. (1 mark)

- d) In **figure 11**, the voltmeter reads 2.1V when the switch is open. When the switch is closed, the voltmeter reads 1.8V and the ammeter reads 0.1A.

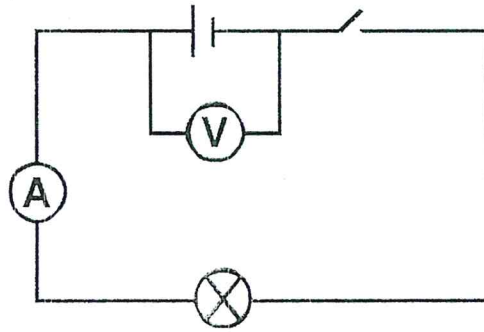


Figure 11

Determine;

- (i) The e.m.f of the cell. (1 mark)

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- (ii) The internal resistance of the cell. (3 marks)

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- (iii) The resistance of the lamp. (2 marks)

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