**NAME: ……………………………………………… ADM NO: ………… CLASS: ……….**

**232/2**

**PHYSICS**

**PAPER 2**

2 HOURS

##### SET 3

**FORM THREE**

**Instructions**

*Write your name, admission number and class in the spaces provided above.*

*This paper consists of* **TWO** *sections:* **A** *and* **B**.

*Answer* **ALL** *the questions in sections* **A** *and* **B** *in the spaces provided.*

***ALL*** *working* **MUST** *be clearly shown.*

***ALL*** *numerical answers***MUST** *be expressed in decimal form.*

*KNEC mathematical tables and non-programmable silent electronic calculators* ***may be used****.*

**For Examiners Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum**  **Score** | **Candidate’s**  **Score** |
| **A** | 1 - 9 | 25 |  |
| **B** | 10 | 5 |  |
| 11 | 15 |  |
| 12 | 11 |  |
| 13 | 14 |  |
| **Total Score** | | **70** |  |

**This paper consists of 10 printed pages**

**SECTION A (25 Marks)**

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

1. Give a reason why the core of the electromagnet of an electric bell is made of soft iron and not steel *(1 mark)*

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1. A form two made the electromagnet shown below to lift and release nails of various sizes

Switch

Dry cell

B

A

steel rod

She however realized that it could only attract the smallest nails. Give three ways which she could have done to make the electromagnet attract even the largest nail. *(3 marks)*

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1. The figure below shows an iron bar being magnetized with a magnet.

Y

X

Magnet

N

N

S

(a) Identify the magnetization method being used.  *(1 mark)*

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(b) Name the polarities XY of the resulting magnet. *(2 marks)*

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1. 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 ms-1) *(4 marks)*

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1. The figure below shows a rope AB



1. What is the wave length of the waves? *(2mark)*....................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................................
2. If end A is swung up and down 20 times a minute, what is the speed of the waves? *(3 marks)*

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1. A negatively charged rod is bought close to two metal cans A and B touching one another and placed on an insulator as shown in the figure below.

A

B

Negatively charged rod

Insulator

Explain what happens to can A and B when they are separated and the charged rod removed.

*(1 mark)*

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1. (a) A certain curved mirror of focal length **10 cm** formed an upright magnified image which was **8 cm** high and **30 cm** from the mirror.

Determine:

1. The object distance.*(3 marks)*

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1. Height of object.*(3 marks)*

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1. How is polarization reduced in dry cell? *(1 mark)*

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1. State a reason why the caps of the cells of lead acid accumulator are openedwhen charging the battery. *(1 mark)*

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**SECTION B (55 Marks)**

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

1. (a) (i) A pinhole of 1mm diameter is in the middle of a piece of black paper covering one end of a tube 1m long. The end of the tube is covered by a screen of a tracing paper. When the pin hole is directed towards the sun, the diameter of the image is found to be10mm. Draw a ray diagram showing how the images are formed. *(2 marks)*

(ii) The sun is just covered by a disc of 2 cm diameter placed about 2 metres from the eye from the eye. In the length of the diameter of the sun’s image formed by a pinhole camera is 0.5 cm, calculate the distance from the pinhole to the screen. *(3marks)*

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1. a) You are provided with a metre rule, distant object, concave mirror and a white screen. Briefly describe how you can estimate the focal length of the concave mirror. *(3marks)*

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b) In a experiment to determine the focal length of a curved mirror, the results in table below were obtained.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| U (cm) | 20 | 25 | 30 | 40 | 50 | 70 |
| V (cm) | 20 | 16.7 | 15 | 13.3 | 12.5 | 11.6 |

1. Plot a graph of UV (y-axis) against (U + V) (x-axis). *(5marks*
2. From your graph, determine the focal length of the mirror. *(3 marks)*

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c)Explain why a concave mirror is used as a shaving mirror. *(2 mark)*

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d) Give one difference and one similarity between virtual images formed by plane mirrors and concave mirrors. *(2 marks)*

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1. (a) State **two** ways of increasing the strength of an electromagnet. *(2 marks)*

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(b) The diagram below shows an electric bell.

Contacts

D

Battery

Switch

C

Contact

screw

Soft iron

armature

B

A

* 1. Name the parts labeled **A**, **B**, **C** and **D**. *(2 marks)*

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* 1. State and explain what happens to the soft iron armature when the switch is closed***.*** *(2 marks)*

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(c) A thin copper wire XY is placed over two parallel thick copper conductors connected to a d.c. power supply as shown below. When the switch in the circuit is closed, the wire XY experiences a force.

**N**

**S**

X

Y

1. Indicate on the diagram direction in which the wire XY experiences the force.*(1 mark)*
2. Explain how you have determined the direction of the force in (*i*) above.*(2 marks)*

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1. When is the force acting on the wire XY greatest?*(1 mark)*

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1. What is the effect of reversing the direction of flow of the current? *(1 mark)*

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1. (a) State **two** conditions which must be satisfied for total internal reflection to occur.

*(2 marks)*

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(b) The diagram below shows two rays of light incident normally on face **PQ** of a glass prism, whose critical angle is **420**.

450

P

R

Q

Complete the diagram to show the paths of the two rays as they pass through the prism.

*(3 marks)*

(c) A pin is fixed horizontally at the centre of a rectangular container with thin transparent walls as shown below.

Pin

16 cm

Rectangular

container

A

A transparent liquid is then poured into the container. When viewed from side **A**, the distance of the pin is **6 cm** from the surface of the liquid. Determine the refractive index of the liquid. *(3 marks)*

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(d) The figure below shows a coin placed in a large empty beaker. An observer looking into the beaker from the position shown is unable to see the coin.

Coin

Observer

Container

Sketch two rays from a point on the coin to show how the observer is able to see the image of the coin after the container if filled with water. *(3 marks)*

(e) A ray of light is incident on a water-glass interface as shown in the diagram below.

r

300

Water

Glass

Calculate the value of angle, **r**, given that the refractive index of glass and water are **1.5** and **1.33** respectively. *(3 marks)*

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