**NAME: ………………………………………,………....… ADMISSION NUMBER: ……………**

**232/2 SIGNATURE: …………………………..…….**

**FORM 3 PHYSICS DATE…………………………………….…….**

**Paper 2**

**JUNE 2017**

**2 Hours**

**HOLA SECONDARY SCHOOL**

***Mid Term Examinations 2017***

**INSTRUCTION TO CANDIDATES**

1. *Write your name, index number in the spaces provided above.*
2. *Sign and write the date of examination in the spaces provided above.*
3. *This paper consists of* **two** *sections:* **A** *and* **B**.
4. *Answer* **all** *the questions in sections* **A** *and* **B** *in the spaces provided.*
5. ***All*** *working* **must** *be clearly shown.*
6. *Silent non programmable electronic calculators may be used.*
7. *Candidates should answer the questions in English.*

 **For Examiners Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum****Score** | **Candidate’s****Score** |
| **A** | 1 – 11 | 25 |  |
| **B** | 12 | 15 |  |
| 13 | 10 |  |
| 14 | 12 |  |
| 15 | 14 |  |
| 16 | 4 |  |
|  **Total Score** | **80** |  |

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

**SECTION A (25 marks)**

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

1. The figure 1 below shows the image in front of a mirror M.



 By ray diagram construction, locate the position of the object. (2 marks)

1. Repulsion is the only sure way of testing polarity of magnets. Explain? (1 mark)

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1. State the basic law of electrostatics. (1 mark)

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1. The figure below shows two spheres in contact placed close to a positively charged rod.

+

+
+

+
+

Insulating stand

Show the distribution of charges in the two spheres. (1 mark)

1. State two reasons why prism periscopes are preferred to mirror periscope. (2 marks)

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1. A current carrying conductor AB is in a magnetic field as shown in figure 1 below.

Conductor

Direction of current

S

N

1. Indicate the direction of the force F acting on the conductor. (1mark)
2. State two factors that determine the direction of the force F. (2marks)

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1. Five successive wave fronts in a ripple tank are observed to spread over a distance of 6.4cm. If the vibrator has a frequency of 8 Hz, determine the speed of the wave. (3 marks)

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1. In a certain pinhole camera, the screen is 10 cm from the pinhole. When the camera is placed 6 m away from a tree, a sharp image of the tree 16 cm high is formed on the screen. Determine the height of the tree. (3 marks)

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1. Draw a diagram to illustrate how dispersion of white light can be achieved using a prism by drawing only the red and violet rays (2 marks)
2. A small object lies at the bottom of a water pond at a depth of 1.2m. given that the refractive index of water is 1.3, determine the apparent depth of the object.*(Give your answer to one decimal place)*

 (3 marks)

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1. State two maintenance practices of a lead acid accumulator. (2 marks)

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1. A charge of magnitude 2.1 x 103C flows through a point in 14 minutes. Calculate the amount of current that flows. (2 marks)

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**SECTION B (55 marks)**

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

1. (a) State Ohm’s law. (1 mark)

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1. The figure below shows part of the scale of a voltmeter, which is being used in an experiment to measure potential difference across a resistor.

**0.6V**

**3.0V**

1

2

0

3

0.2

0

0.4

0.6

**V**

1. State the accuracy of the upper and the lower scales of the voltmeter. (2 marks)

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1. Record the reading shown by the lower scale of the voltmeter. (1 mark)

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1. (i) Define electrical resistance. (1 mark)

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 (ii) A current of 2.5mA flows through a conductor of resistance 1.2 kΩ. Calculate the voltage

 across the conductor. (3 marks)

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 (iii) State and explain two factors that affect the resistance of a given length of a conductor.

 (4 marks)

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1. (i) Determine the current passing through L1 in the figure shown below, given that 0.8A passes through the battery, 0.28A through L2 and 0.15A through L3.



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 (ii) Give a reason why the above method of bulb connection is preferred for domestic wiring than series connection. (1 mark)

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1. (a) Define the terms. (2 marks)
2. Wavelength.

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1. Speed as used in waves.

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(b) Below is a wave traveling to the right side. Use it to answer the questions that follow.

 Q

1. Indicate the direction in which the particle at point Q is going to move. (1 mark)
2. Show on the diagram a distance of one wavelength from particle Q. (1 mark)

(c) Differentiate between longitudinal waves and transverse waves. (2 marks)

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(d) Sound waves are generated at point P. They hit a reflecting surface at Q and come back. A detector is put at point P. If it takes a time of 3 seconds to detect the echo,

 Detector

 Q P

1. How far is Q from P.? Take speed of sound as 340m/s (3 marks)

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1. What will be the effect of increased humidity of the surrounding air
2. Decreasing the amplitude on loudness of sound? (1 mark)

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1. Increasing the frequency? (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.

300

r

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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1. (a) Define principal focus (1 mark)

…………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………….…………………………………………………………………………

1. The figure below shows an object,O, placed in front of a convex mirror.



**F**

**O**

1. On the same diagram draw the appropriate rays and locate the image formed. (3marks)
2. Determine the magnification of the image formed. (3 marks)

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(c) An object is placed 12cm from a convex mirror of radius of curvature 20cm. Calculate the position of the image. (3 marks)

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(d) (i) A lady holds a large concave mirror of focal length 1.8m from her face. State two characteristics of her image in the mirror. (2 marks)

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(e) State two applications of convex mirrors. (2 marks)

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