**Name: ………………………………………………………………… ADMIN No: …………………..……………**

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232/2

**PHYSICS**

Paper 2

(THEORY)

**Time: 2 Hours**

**NZAUI SUB COUNTY FORM 4 ENTRANCE EXAM 2015**

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

**PHYSICS**

Paper 2

**Time: 2 Hours**

**INSTRUCTIONS TO CANDIDATES:-**

* *Write your* ***name****,* ***Admin******number*** *and* ***school*** *in the spaces provided above.*
* *This paper consists 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 and electronic calculators may be used*
* *Take the earth’s gravitational field strength g = 10 m/s2.*
* *This paper consists of 10 printed pages. Candidates should check to ascertain that all pages are printed as*

*indicated and that no questions are missing.*

**For Examiner’s Use Only:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum****Score** | **Candidate’s****Score** |
| **A** | **1 – 14** | **25** |  |
|  | **15** | **11** |  |
|  | **16** | **10** |  |
| **B** | **17** | **12** |  |
|  | **18** | **11** |  |
|  | **19** | **11** |  |
| **Total Score** | **80** |  |

**SECTION A (25 MARKS) Answer all the questions in this section.**

1. State one method of varying the size of the image formed by a pin hole camera. (1 Mark)

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1. Figure 1 shows a point O placed in front of a plane mirror, M

M

O

Figure 1

By use of two rays, complete the diagram to show the position of the image. (2 Marks)

1. Give a reason why soft iron is used as the core of the coil of an electric bell. (1 Mark)

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1. An electric bulb is rated 75W, 240V. Determine the resistance of the bulb (3 Marks)

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1. Figure 2 shows a ray of light passing into a glass block ABC.

450

450

A

C

B

Sketch the path of the ray until it goes out of the block (critical angle of glass is 420) (3 Marks)

1. Recharging is one of the practices of one maintainance of accumulators. State measurement which need to be taken to help you decide when an accumulator is due for charging. (1 Mark)

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1. The figure 3 below shows how to magnetize a u-shaped magnetic bar by use of electric current.

+

-

Magnetic bar

X

Y

Figure 3

Draw the magnetic field pattern between poles X and Y (2 Marks)

1. When a highly charged polythene rod is brought close to a positively charged leaf electroscope, it is observed that the leaf initially falls and then rises.
2. State the charge on the polythene rod. (1 Mark)

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1. Explain your answer in (a) above. (1 Mark)

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

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1. Explain in terms of domain theory of magnetism what happens when a bar magnet is placed in a solenoid in which an alternating current flows. (1 Mark)

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1. The figure 4 below shows a transparent water tank water. An electric lamp surrounded by a shield with a narrow slit is fixed at corner A of the tank. A ray of light from the slit shines on the water surface BC at an angle of 480. (Refractive index of water is 1.33)

B

C

A

D

480

Water

Figure 4

Determine the angle of refraction (2 Marks)

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1. State how to minimize polarization in a simple cell. (1 Mark)

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1. What happens to the wavelength of water waves when it moves from deep part to shallow part of a ripple tank.

(1 Mark)

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1. Give two reasons why convex mirrors are preferred for use as driving mirrors in cars. (2 Marks)

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**SECTION B (55 MARKS) Answer all the questions in this section**

1. The diagram below shows an electrical circuit with three capacitors A, B and C of capacitance 4.0μF, 5.0μF and 3.0μF respectively connected to a 12V battery.

4.0μF

A

B

C

3.0μF

5.0μF

+ -

12V

1. Determine

(i) The combined capacitance of the capacitors. (3 Marks)

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(ii) The charge on the capacitor A ( 3 Marks)

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 (iii) The potential difference across the capacitor B (3 Marks)

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1. State two factors that affect the capacitance of a capacitor (2 Marks)

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1. Figure 5 shows part of a waveform. The figures on the diagram show scales in centimeters.

6

12

18

24

30

Displacement (s)

cm

20

-20

Distance (cm)

 0

Figure 5

1. State the amplitude of the waveform. (1 Mark)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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1. If the speed of the wave is 20m/sec, determine the frequency of the wave. (3 Marks)

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1. On the same figure draw the waveform when its amplitude is halved and its frequency doubled. (2 Marks)
2. Determine the speed of light in water given that light in air travels at 3.0 x 108m/s and refractive index is $\frac{4}{3}$

 (3 Marks)

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1. Give a difference between mechanical waves and electromagnetic waves. (1 Mark)
2. The figure below shows the set up used to demonstrate interference of sound.

X

Y

C

Audio frequency

generator

O

 Figure 6

1. (i) An observer O moves along XY, state the observation (s) made (2 Marks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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(ii) What will an observer hear if he moves along the line OC (2 Marks)

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(iii) Why are the loud speakers connected to the same audio-frequency generator (1 Mark)

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1. In an experiment to determine speed of sound in air, a drum at a point 150m away from a vertical wall was struck at varying frequency while listening to the echo.

The echo coincided with the sound from the drum at a time when 20 successive strikes were made within 18 seconds.

(i) Calculate the time taken for an echo to be heard. ( 2 Marks)

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(ii) Determine the speed of sound in that place. (3 Marks)

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1. State two factors that affect the speed of sound in air. (2 Marks)

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1. (a) State the Ohm’s Law (1 Mark)

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 (b) A student was attempting to measure the resistance of resistor R as shown in figure 7.

S

R

E

+ -

 Figure 7

(i) Insert the ammeter and voltmeter in the electric circuit. (2 Marks)

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(ii) Name device S shown in the figure. (1 Mark)

(c)The graph below shows the variation of p.d with the current (I) for a certain cell.



Given that V = -Ir + E holds true for the line, use the graph to determine:-

(i) the internal resistance, r of the cell. (3 Marks)

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(ii) The E.M.F, E of the cell (1 Mark)

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(d) Determine the current flowing in the circuit below when the switch, S is closed. (3 Marks)

10V

4Ω

2Ω

S

1. An object is placed in front of a concave mirror of focal length 10cm as shown below.



1. On the same diagram draw a ray diagram showing the position of the image. (4 Marks)

(i) The image distance (2 Marks)

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(ii) The magnification (3 Marks)

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(iii) State the characteristics of the image (2 Marks)

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