**Name …………………………………………………… Adm. No. …………..………**

**232/2**

**PHYSICS**

**PAPER 2**

*TIME: 2 HOURS*

**SET 3**

**FORM THREE**

**Instructions to Candidates**

1. Write your name and classregister 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. Mathematical tables and non-programmable silent electronic calculators may be used.

 **For Examiner’s Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section**  | **Question**  | **Maximum****Score**  | **Candidate’s** **Score**  |
| **A** | 1 – 10 | 25 |  |
| **B** | 11 | 11 |  |
| 12 | 17 |  |
| 13 | 16 |  |
| 14 | 11 |  |
| **Total Score** | **80** |  |

**SECTION A**  (25 marks)

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

1. The figure below shows a current carrying wire placed in a magnetic field.

S N

S N

Show the direction of motion of the wire when current is flowing in the direction shown. **(1 marks)**

1. Using a ray diagram, show how a concave mirror forms a virtual magnified image. **(2 marks)**
2. State two conditions that are necessary for a conductor to obey Ohm’s law. **(2 marks)**

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1. Draw a circuit diagram of 8, 2 Ω so that the total resistance is 5.5 Ω **(2 marks)**
2. Study the figure below (not drawn to scale)

Displacement (m)

0.2 0.6 1.0 1.4 1.8 2.2 2.6 Time (s)

45 cm

Determine the velocity of the wave. **(3 marks)**

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1. (i) What do you understand by the term magnetic shielding? **(1 mark)**

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(ii) Give one application of magnetic shielding. **(1 mark)**

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1. A ray of light is incident on a water glass boundary at 40° with the normal. Calculate,
2. The angle of refraction given that the refractive index of water is $^{4}/\_{3}$ and that of glass is$^{3}/\_{2}$. **(3 marks)**

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1. The speed of light in glass if the speed of light in water is 2.25 x 108 m/s. **(2 marks)**

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1. A ray of monochromatic light incident on the face CA of an equilateral prism emerges out of the prism just grazing surface AB as shown below.

A

B

C

Calculate the angle of incidence as the ray enters the prism if ang = 1.5 **(2 marks)**

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1. An angle of reflection of a ray reflected from a plane mirror is 20o. If the mirror is rotated through an angle of 25o, calculate the angle between the incident ray and the new reflected ray. **(2 marks)**

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1. a) Define the term Capacitance **(1mark)**

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b) The figure below shows combination of capacitors across a power supply.

100μF

100μF

20 V

200μF

400μF

Determine the energy stored in the 200μF capacitor **(2marks)**

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c) State any two application of a capacitor. **(2marks)**

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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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(b) Figure 5 below shows an electrical circuit with some of the quantities represented by symbols I1, I2, R and E.

I = 1.5 A

R

3 Ω

5.6 Ω

I2

I1

E

If the p.d. across resistance R is 3.6 V, determine the values of:

1. I1 **(3 marks)**

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1. I2 **(2 marks)**

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1. E **(2 marks)**

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(c) State three factors, which determine the amount of heat produced by an electric current through a conductor. **(3 marks)**

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1. (a) What is the difference between longitudinal and transverse waves? **(2 marks)**

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(b) The following figure shows a transverse wave traveling along the *x*-axis

 

1. Determine the wave length and the amplitude of the wave. **(2 marks)**

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1. If the time taken by the wave to move from O to A is 0.04 seconds, determine the frequency and the speed of the wave. **(4 marks)**

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(c) A person stands between two vertical cliffs 400 m from the nearer cliff. The cliffs are *x* distance apart. Every time the person strikes the rock once, two echoes are heard the first one after 2.5 seconds and the other 2.0 later. Calculate;

1. The speed of sound in air. **(3 marks)**

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1. The value of *x*. **(2 marks)**

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(d) The diagram below shows wave fronts before and after passing a n opening.

State, with help of illustrations the observation made on the pattern after passing the opening if:

1. The gap was made smaller. **(1 mark)**

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1. The wave length was made very large. **(1 mark)**

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1. They meet a concave barrier. **(2 mark)**

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1. (a) Draw diagrams to show
2. A convex mirror can be used to give a large field of view **(2 marks)**
3. A concave mirror can be used to give an enlarged upright image **(2 marks)**
4. A convex mirror and a small source of light can be used to produce an approximate parallel beam of light **(2 marks)**

b) An illuminated on a concave mirror are used to produce a sharp image of the object on the screen. The corresponding magnification (linear) and the image distance are as given below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Magnification (m) | 0.25 | 1.5 | 2.5 | 3.5 |
| Image distance V cm | 20 | 40 | 56 | 72 |

1. Draw a graph, plotting m along the vertical axis and V along the horizontal axis **(5marks)**
2. Use the graph to find the image distance when m = 1. **(2 mark)**

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1. What is the focal length of the mirror? **(3 marks)**

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

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(ii) 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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