**NAME: ……………………………………………ADM.NO.…………….STREAM…………**

**PHYSICS FORM THREE**

**END TERM EXAM – TERM TWO 2017.**

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

**SECTION A:-**

1. The figure below shows a micrometer screw gauge being used to measure the diameter of a metal rod. The thimble scale has 50 divisions. What is the reading shown? (1 mark)
2. Name two forces that come into play when a body is suspended by a string in air.

(2 marks)

1. Calculate the refractive index of glass to air in figure below. (2 marks)

 Air

 65ᵒ Glass

1. A ray of light is incident at an angle of 25° to a plain mirror. The mirror was rotated through an angle of 10ᵒ. Through what angle was the reflected ray rotated? (1 mark)
2. The figure below shows a convex lens and an object placed on its principal axis.

 F F

1. Draw rays to locate the image of the object. (2 marks)
2. State three characteristics of the image formed. (3 marks)
3. The figure below shows a kitchen cupboard resting on a support and attached to a wall by a screw.

The weight of the cupboard and its content is 75 N. G is the position of the centre of mass of the cupboard. Calculate the force F exerted by the screw. (3 marks)

1. Two equal mass travel towards each other on a frictionless air track at a speed of 60 cm/s and 40 m/s. They stick together on impact.

 60 cm/s 4 0 m/s

What is the speed of the masses after impact? (2 marks)

1. Explain why a fish can curve under water when the surface is already frozen. (1 mark)
2. (a) Explain how an electric current can be used to demagnetize a permanent magnet.

 (2 marks)

(b) Why is soft iron preferred as core in making electromagnets? (1 marks)

**SECTION B:-**

1. (a) What is the voltage output for the cell arrangement below? (2 marks)

(b) The figure below shows how Batula a form three student set up a circuit using 3

 identical bulbs X, Y and Z each rated “12V, 2.0A”

1. When operating normally calculate the resistance of one of the bulbs. (2 marks)
2. Calculate the effective resistance of the three bulbs connected in the figure above.

 (2 marks)

1. Calculate the current drawn from the power supply. (2 marks)
2. Draw circuit diagram showing the three bulbs connected in such a way that they would all work at normal brightness. (2 marks)

(c) When the switch S is kept open in the circuit shown in figure below the voltmeter

 reads 1.5 V. When the switch is closed, the reading drops to 1.3 V and the current

 through the resistor is 0.5 A.

1. What is the e.m.f of the cell? (1 mark)
2. What is the terminal voltage of the cell? (1 mark)
3. Calculate the internal resistance of the cell and the value of R. (5 marks)
4. (a) State Charles’s law. (1 mark)

(b) (i) Draw a Labelled diagram of the apparatus you would use to verify Charles’s law.

 (4 marks)

 (ii) Describe how you would use the apparatus to verify the law. (5 marks)

(c) A gas has a volume of 40 cm3 at s.t.p. Calculate the new volume of the gas if it is

 heated to 27°C at the same pressure. (3 marks)

1. (a) (i) Distinguish between heat and temperature. (2 marks)

(ii) Define specific heat capacity of a substance. (1 mark)

(b) Two substances of equal masses contain equal quantity of heat but are at different

 temperature. Justify this statement with a suitable example. (3 marks)

(c) A piece of iron of mass 200 g at 300°C is placed in a copper container of mass 200 g

 containing 100g of water at 20°C.

(i) Find the final stead temperature of the mixture. (4 marks)

(ii) What assumption have you made in arriving at the answer? (1 mark)

(Specific heat capacities of copper, iron and water are 390 J/KgK, 460 J/KgK and 4200 J/KgK respectively).

1. The figure below shows the appearance of a part of a tape for the motion of a trolley. The ticker-tape timer makes 50 dots in one second.

1. Taking measurement from the figure calculate:
2. The speed to the left of X (2 marks)
3. The speed to the right of X (1 marks)
4. The average speed at X (1 mark)
5. Similarly or otherwise, calculate the average speed at Y.
6. Calculate the acceleration of the trolley between. (2 marks)

The point X and Y. (3 marks)