**OFFOR ONYEBUCHI NOBLE**

**CIVIL ENGINEERING**

**19/ENG03/019**

**ENG 221 ASSIGNMENT**

Question 1;

Using the concept of Newton's second of motion, describe the magnitude and direction of the acceleration of an electron being shot horizontally into a closed space with a uniform field being directed upward.

Answer

Newton's second law of motion states that the sum of the forces **F** acting on an object is equal to the mass **m** of that object multiplied by the acceleration **a** of the object : **F = ma.** When an electron enters the field, there's a vertical downward force acting on it. This is becauce electric force acts in the opposite direction to an electric field and the electric field always points upward

The magnitude of force is given by **F = Gq**

where **G** = electric field strenght

**q** = charge of electron

in this case when no force is acting horizontally the magnitude of acceleration is obtained using newton 2nd law of motion **F=ma**

where **m** = mass

**F** = force

**a** = acceleration

**a=F/m = G(g/m) = Gq/m**

The direction of acceleration is downward just like the way force is directed. This obeys Newton's second law of motion, force is directly proportional to the acceleration undergone by a body.

Question 2;

Describe electric field, magnetic field and electric current with respect to charges.

Answer

**Electric field ;**

is defined as the electric force per unit charge measured in ohms. The direction of the field is taken to be the direction of the force it would exert on a positive test charge. The electric field is radially outward from a positive charge and radially in toward a negative point charge.Electric field isn't defined by just one vector but an infinte series of vector quantities which are associated with each point in space. Electric field is a vector field.

It is represented mathematically as;

**E = F/q**

where **E**  is the electrical field

**F** is the force

**q** is the charge

**Magnetic field;**

A magnetic field is a vector field that describes the magnetic influence on moving electric charges, electric currents, and magnetized materials. The magnitude of this force is proportional to the amount of charge **q**, the speed of the charged object **v**, and the magnitued of the applied magnetic field. The direction of the force is perpendicular to both the direction of the moving charged partice and the direction of the applied magnetic field. Based on these observations, we define the magnetic fiels strength **B** based on the magnetic force **F** > on a charge **q** moving at velocity **v** > as the cross product of the velocity and magnetic field, that is mathematically;

**F = qvBsin**angle

where **F** is the magnetic force

**q**  is the charge of the particle

**B**  is the magnetic field strength

**v** is the velocity at which the charge is moving with

**Electric Current;**

this is a stream of charged particles such as electrons or ions moving through an eletrical conductor or space.It is measured as the net rate flow of electric charge past a region. The moving particles are called charged carriers, which may be of several types of particles depending on the conductor.