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19/ENG05/058

MECHATRONICS ENGINEERING

BASIC ELECT

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

The electron is negatively charged therefore it will be acted upon by a force opposite the direction of the electric field since unlike charges attract and like charges repel. Meaning the force is directed downward and the acceleration is therefore in a downward direction.

From Newton's second law of motion **F=ma**

Where m=mass of the body

a=acceleration of the body

F=Force

Since the electric field is uniform and force **F=qE**

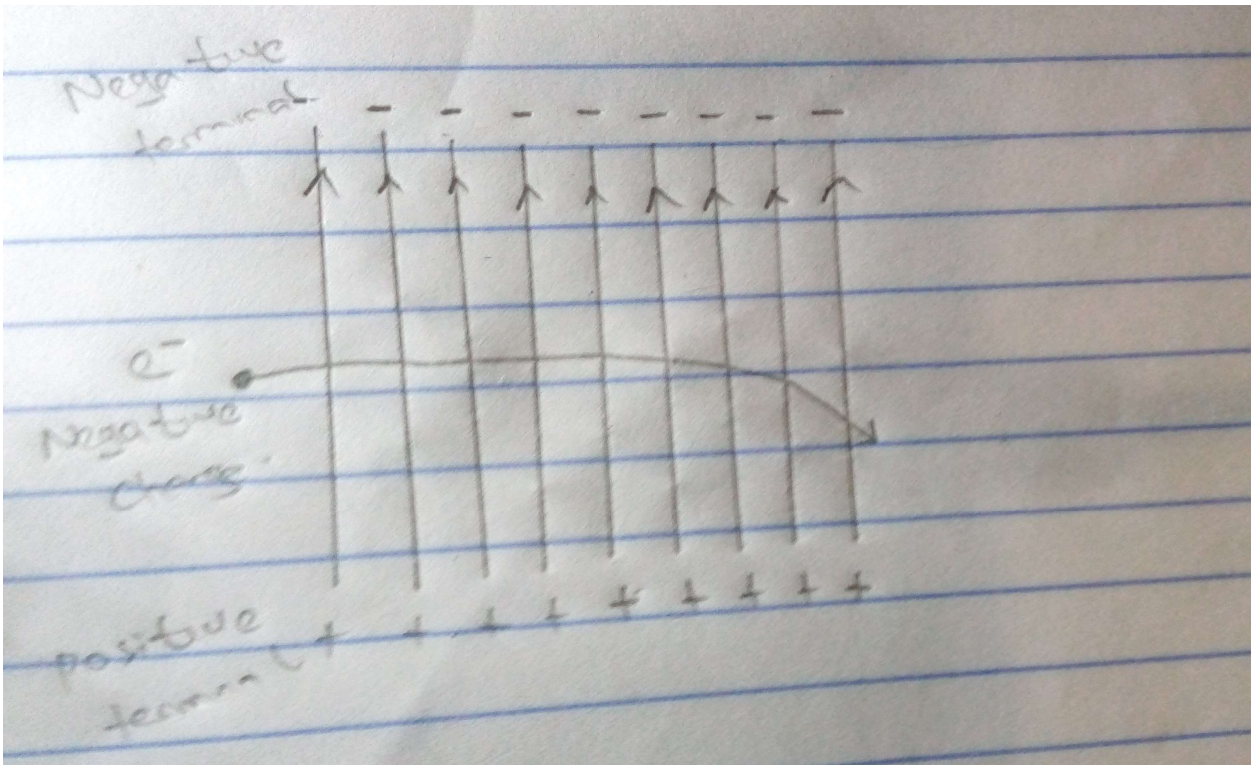
Where E is electric field strength

Q is charge of electron

ma=qE

a=qE/m

The magnitude and direction of the electric field are constant since the electric field is uniform and the force is constant and magnitude of acceleration is constant so it moves in a downward direction and is also constant.



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

Electric field: Electric field is defined as the electric force per unit charge

E=F/q

The direction of the field is taken to be the direction of the force it would exert on a positive test charges. The electric field goes the opposite direction if the charge is negative. Therefore, the electric field radiates outward from a positive charge and into toward a negative point charge.

Magnetic field: this is a vector field that describes the magnetic influence on moving electric charges. A charge that is moving in a magnetic field experiences a force perpendicular to its own velocity and to the magnetic field. Electric current through a long straight wire is a simple example of magnetic field.

F=q(E+VB)

Electric current: can be defined as the flow of one coulomb of charge per unit second. It is measured in ampere.