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COURSE TITLE: BASIC ELECTRICAL ENGINEERING

COURSE CODE: ENG 221

DEPT/COLLEGE: ELECTRICAL ENGINEERING

LEVEL: 200

QUESTIONS

(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 a closed space with a uniform field being directed upward.

ANSWER

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

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

Where m is mass of the body, F is the force

And a is the acceleration.

And since the electric field is uniform and Force**, F=qE**

Where E is the electric field

q is the charge of the electron.

ma =qE

a=$\frac{qE}{m}$

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 moves in the downward direction and is constant.

(2)

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

ANSWER

ELECTRIC FIELD WITH RESPECT TO CHARGES

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

$$E=\frac{F}{q}$$

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 is radially outward from a positive charge and radially in toward a negative point charge.

MAGNETIC FIELD WITH RESPECT TO CHARGES

A magnetic field 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 flowing through a long straight wire is a simple example of magnetic field.

$$F= q[E + (v\times B)]$$

Where,

q= charge

E= Electric field

V= velocity

B= magnetic field

ELECTRIC CURRENT WITH RESPECT TO CHARGES

This can be defined as the flow of one coulomb of charge per unit second. It is measured in ampere. The movement of an electron charge within a conductor is referred to as Electric Current Flow.