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19/ENG04/031

ELECTRICAL AND ELECTRONICS ENGINEERING

ENG 221 assignment

1. Newton's second law of motion states that the acceleration of an object as produced by a net force is directly proportional to the magnitude of the object ($\overrightarrow{Fnet} = \overrightarrow{ma}$)

   As the electrons enter the field, there will be vertical downward force acting on it because the electric field is directed upward. F = ma

   Magnitude of force is given as F = Gq

   A= Gq/m

2. Electric field is a region around which an electrically charged particle is felt. In a case where the test charge is positive, the electric force and field will be in the same direction. But in a case where the test charge is negative, the direction will be opposite. An electric field not a single vector quantity but an

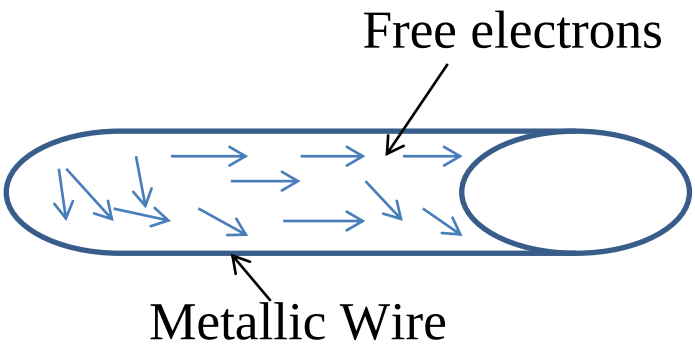
infinite set of vectors quantities associated with each point in space. This is called “vector field”. A magnetic field is vector field which describes the influence on a moving electric charge and current. Electric current can be mathematically expressed as;
$I = Qt$

Magnetic field is defined by the force that a charged particle experiences moving along in this field. The magnitude of this force is proportional to the amount of charge q, the speed of the charged particle v, and the magnitude of the applied magnetic field. The direction of this force is perpendicular to both the direction of the charged moving particle and the direction of the applied magnetic field. Based on these observations, we define the magnetic field strength B based on the magnetic force $\vec{F}$ on a charge q moving at velocity $\vec{v}$ as the cross product of the velocity and magnetic field, that is; $F = qvb\sin 0$

Where;
F = magnetic force
q = charge of the particle

B = magnetic field strength
v = velocity at which the charge moves

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



Free electrons flowing in a metallic wire