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ASSIGNMENT 1

Question 1

Newton second's law states that the vector sum of the forces F acting on an object is equal to the mass of the ~~object~~ multiplied by the acceleration of the object. When an electron is being shot horizontally into the closed space with the uniform field being upward, there will be a vertically downward force acting on the electron ~~since~~ because the point charge is an electron which is negative which means that the electric field and electric force are acting in opposite directions. The magnitude of the force is ~~gie~~ given by $F = qE$ where q is the charge of the electron and E is the electric field strength.

Since acceleration is directly proportional to force, it will also act downwards just as the force acts downwards.

To find the magnitude of the acceleration;

$F = ma$ —— (1) $\quad F = qE$ —— (2)

$ma = qE$

$\therefore a = \frac{qE}{m}$ and acts downwards

QUESTION 2

Electric field

An electric field is the region that surrounds each charge and exerts forces on other charges either repelling them or attracting them. Electric field can also be defined simply as the force per unit charge. The direction of an electric field is outward from a positive charge and inward towards a negative charge. The magnitude of the electric field at a point charge could be given as

$E = \frac{k|q|}{r^2}$ where q is ~~the point~~ a charge, r is the distance away from the point charge.

Magnetic field.

Magnetic field is a vector field that describes the magnetic influence on moving electric charges, electric currents and magnetized materials.

A charge that is moving in a magnetic field experiences a force perpendicular to its own velocity and to the magnetic field. All moving charged particles create magnetic field and can detect magnetic field thereby resulting in magnetic force. A simple source of magnetic field is the electric current flowing in a conductor. Magnetic force is given as;

$F = qVB \sin\theta$ where q = charge of the particle.

V = velocity at which the charge moves

B = Magnetic field strength.

Electric Current.

Electric current is a stream of charged particles such as electrons or ions moving through an electrical conductor. It is measured as the net rate of flow of electric charge past a region. The moving particles are known as charge carriers which may differ depending on the conductor. The charge carriers could be electrons, holes, ions and so on. Electric currents create magnetic fields which are used in motors, generators, inductors and transformers. The SI unit is Ampere and it is measured with an ammeter. ~~The~~ It could be derived using; $I = V/R$.