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**QUESTION 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

Newton’s second law states that the acceleration of an object depends upon two variables which are the net force acting on the object and the mass of the object.  The acceleration of the body is directly proportional to the net force acting on the body and inversely proportional to the mass of the body. This means that as the force acting upon an object is increased, the acceleration of the object is increased. Likewise, as the mass of an object is increased, the acceleration of the object is decreased. It is expressed as **F= ma .**

From drawing field lines, the lines come out of the positives and go to the negatives Also, the field that the positive charges produce repel other positive charges, making other positive charges flow tangentially toward the direction of the field line. In this case we have an electron with a negative charge. And since like forces attract, the electron will go in the opposite direction (negative to positive).

So the direction of the force depends not only on the charge of the electron but also on the charge of the EM field source. Remember that E = kQ/r^2 for a point charge Q field.

So if Q is positive and e, the electron is negative, which is will be by definition of an electron, then the net force f = kqQ/r^2 will be attractive and towards Q. But if Q is a negative charged source, the net force will be repulsive, the electron will be pushed away from Q. The direction of the field E depends in part on the electron charge and in part on the source charge. So you have to know both charges before you can say what direction that field is pointing.

**QUESTION 2:**  Describe electric field, magnetic field and electric current with respect to charges

ANSWER

Electric field: Electric fields are regions of space around electrically charged particles or objects in which other electrically charged particles or objects would feel force. An electric charge, which can be either positive or negative, is a property of matter that causes two objects to attract or repel. If the objects are oppositely charged, they will attract and if they are similarly charged, they will repel.

Magnetic field: Magnetic attraction or repulsion can be explained as the effect of one magnet on the other, or it can be said that one magnet sets up **a magnetic field** in the region around it that affects the other magnet. : If a charge moves through a magnetic field at an angle, it will experience a force. The equation is given by **F** = q **v** × **B** or F = qvB sin θ, where q is the charge, **B** is the magnetic field, **v** is the velocity, and θ is the angle between the directions of the magnetic field and the velocity; thus, using the definition of the cross product, the definition for the magnetic field is

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Electric current: Electric current is the rate of flow of electrons in a conductor. Electrons are minute particles that exist within the molecular structure of a substance. Sometimes, these electrons are tightly held, and the other times they are loosely held. When electrons are loosely held by the nucleus, they are able to travel freely within the limits of the body. Electrons are negatively charged particles hence when they move a number of charges moves and we call this movement of electrons as electric current. It should be noted that the number of electrons that are able to move governs the ability of a particular substance to conduct electricity.