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DEPARTMENT: MECHATRONICS ENGINEERING

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BASIC ELECTRONICS ASSIGNMENT

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.

There are multiple forces acting on the electron that is begin shot into the field. The force that is propelling the electron horizontally and the upward electric field. Because there are multiple forces acting on the electron its resultant direction and magnitude of acceleration would be a function of both forces acting on it.

Newton’s second law of motion states that when a body is acted on by a force, the body will move with an acceleration proportional to that of the force, and in the same direction. We can think of the electron in the question as a canoe trying to floor is entirely to the opposite side of a river that has an upward current.

Here is a diagram of the resultant force on the force on the electron passing through the field;

The electron’s horizontal acceleration and the field’s upward acceleration result in an acceleration between the positive y-axis and the positive x-axis.

Positive y axis

Positive x axis

Question 2

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

1. An electric field is a region of space in which a charge experiences an electrical Force. The direction of the field is taken to be the direction of the force it would exert on a positive test charge. The electric field is radially outward from a positive charge and radially in toward a negative point charge.
2. A magnetic field is a vector field caused by the movement of electrical charges where magnetic force is experienced. The direction of the magnetic force on a moving charge is perpendicular to the plane formed by v and B and follows the right hand rule.
3. An electric current is a stream of charged particles such as electrons or ions, flowing (moving) through an electrical conductor like a wire or an electric field. It is measured as the net flow of electric charge past a region.