. **Question 1**

**Using the concept of Newton’s second 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 upwards.**

**Answers**

Newton’s second law of motion is closely related to Newton’s first law of motion. It mathematically states the cause and effect relationship between force and changes in motion. Newton’s second law of motion is more quantitative and is used extensively to calculate what happens in situations involving a force. The answer is that a change in motion is equivalent to a change in velocity. A change in velocity means, by definition, that there is an acceleration. Newton’s first law says that a net external force causes a change in motion; thus, we see that a net external force causes acceleration.

Since the electron is negatively charged, and unlike charges attracts so that it will move to the direction of the positive terminal of the electric field.

Therefore, the electron will be acted upon by a force that will be directed opposite to the electric field i.e. force is downward direction

For Newton 2nd law, force =Mass x Acceleration

F=qE f=m x a

F=eE F=ma

eE=ma

a=e x E/m

Since the electric field is uniform, therefore the magnitude and direction of the electric field will be

constant. The force will be constant and the magnitude of the acceleration will be constant while the

direction of acceleration will be downward.

**Question 2**

**describe electric field, magnetic field and electric current with respect to charges.**

ELECTRIC FIELD

* The region around the electric charge in which the stress or electric force act is called an electric field or electrostatic field. If the magnitude of charge is large, then it may create a huge stress around the region. The electric field is represented by the symbol E. The SI unit of the electric field is newton per coulomb which is equal to volts per meter.
* MAGNETIC FIELD

A region of space near a magnet, electric current, or moving charged particle in which a magnetic force acts on any other magnet, electric current, or moving charged particle. A charge that is moving in a magnetic field experiences a force perpendicular to its own velocity and to

the magnetic field. Magnetic fields are produced by moving electric charges and intrinsic magnetic

moments of elementary particles. A stationary charged particle does not interact with a static magnetic

field. A charge placed in a magnetic field experiences a magnetic force., the charge must be moving, for

no magnetic force acts on a stationary charge.

* ELECTRIC CURRENT

An electric current is a flow of particles (electrons) flowing through wires and components. Itis the rate of flow of charge. If the electric charge flows through a conductor, we say that there is an electric current in the [conductor](https://www.toppr.com/guides/physics/electric-charges-and-fields/conductors-and-insulators/). The conventional direction of electric current is taken as opposed to the direction of [flow of electrons](https://www.toppr.com/guides/physics/current-electricity/electric-current/).  The S.I unit of charge is**coulomb** and measurement of electric current happens in units of coulomb per second which is**‘ampere**