19/ENGO6/030  
MECHANICAL ENGINEERING  
ENG 221  
BASIC ELECTRICAL ENGINEERING  
18th November 2020

1). Using concept of newtons 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 upwards.  
 *Solution*Newtons law relates an object’s motion to the forces acting on it. Newtons 2nd law of motion states that the acceleration of an object as produced by a netforce is directly proportional to the magnitude of the net force in the same direction as the net force and inversely proportional to the mass of the object. Mathematically,

*Fnet­­* = *ma*

When an electron enters the field, it would experience a vertically downward force. The reason for this is because electric force acts in opposite direction as the electric field, and the electric field is directed upwards.  
The magnitude of the force is mathematically represented as *F=Eq* where E is the strength of the electric field, and q is the charge of an electron. No force acts horizontally, hence the magnitude of acceleration can be gotten using Newtons 2nd law of motion.

*F= ma  
 therefore; a= ……. Note: f= Eq  
 a=.*

In conclusion, the direction of a(accel) is downward like how force is directed due to Newtons 2nd law of motion; force is directly proportional to acceleration

2). Describe electric field and current with respect to charges.  
 *Solution*

Electric field can be defined as a region around a charge where another charge can experience electric force. Supposing the point charge is positive, its electric field and force’s direction would be equal. When the test charge is negative, the direction is opposite. That is, electric field is not a single vector quantity associated with each point in space, this is called a vector field.  
 Therefore, if an electric field exists within a conductor, the field exerts a force in every charge within the conductor. This proves the theory of electric current flow  
 Electric current is the flow of electric charge  
 *E = where E=electric field, f=force, q= charge…*