

NAME: JAMES ONYEKACHI NATHANIEL

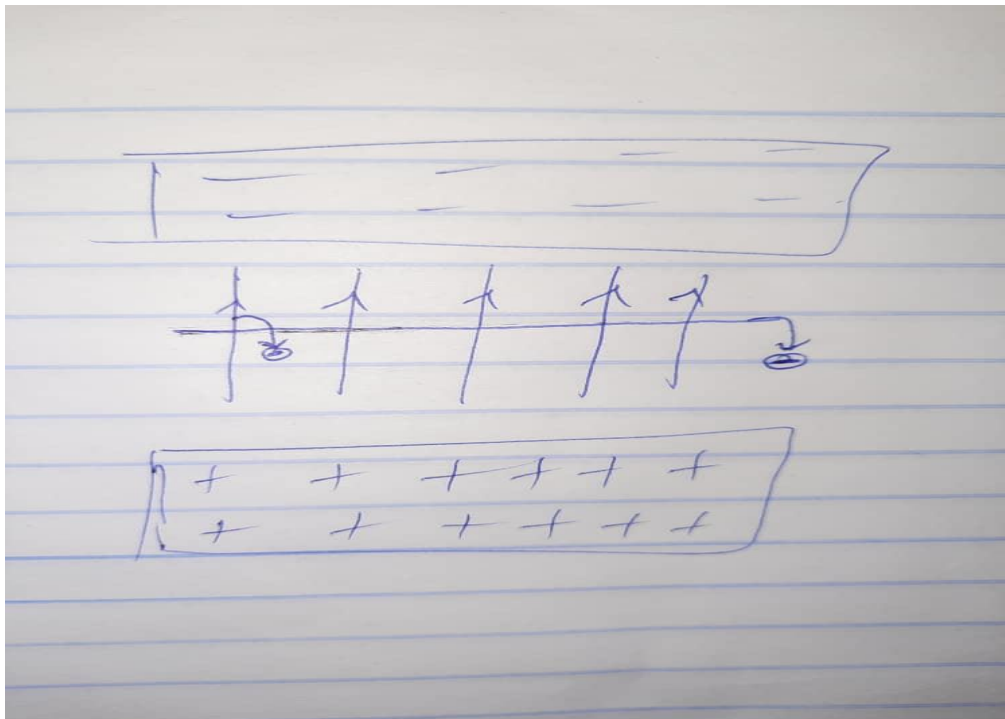
MATRIC NO: 19/ENG05/031

COURSE CODE: ENG221

ASSIGNMENT 1

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:



Since the electron is negatively charged, and unlike charges attract 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

$$F=qE$$

$$F=m \times a$$

$$F=eE$$

$$F=ma$$

$$eE=ma$$

$$a=e \times E/m$$

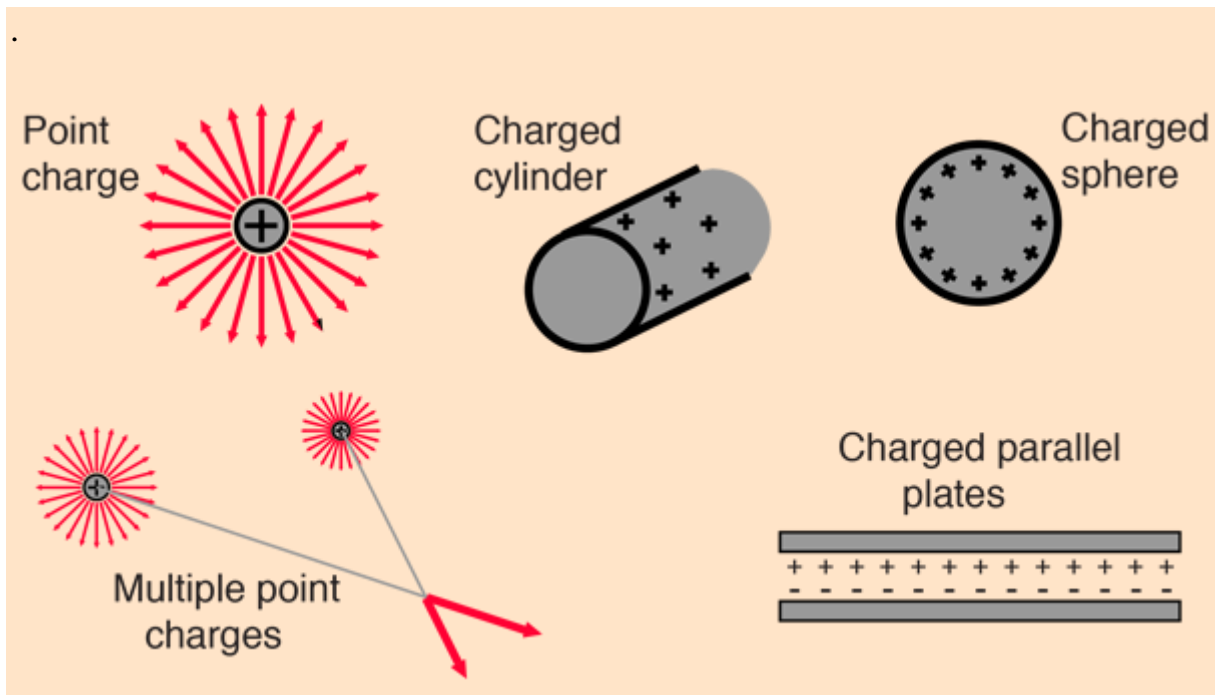
Since the electric field is uniform, therefore the magnitude and direction of the electric field will be constant. The force will be constant and the magnitude of the acceleration will be constant while the direction of acceleration will be downward.

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

ANSWER:

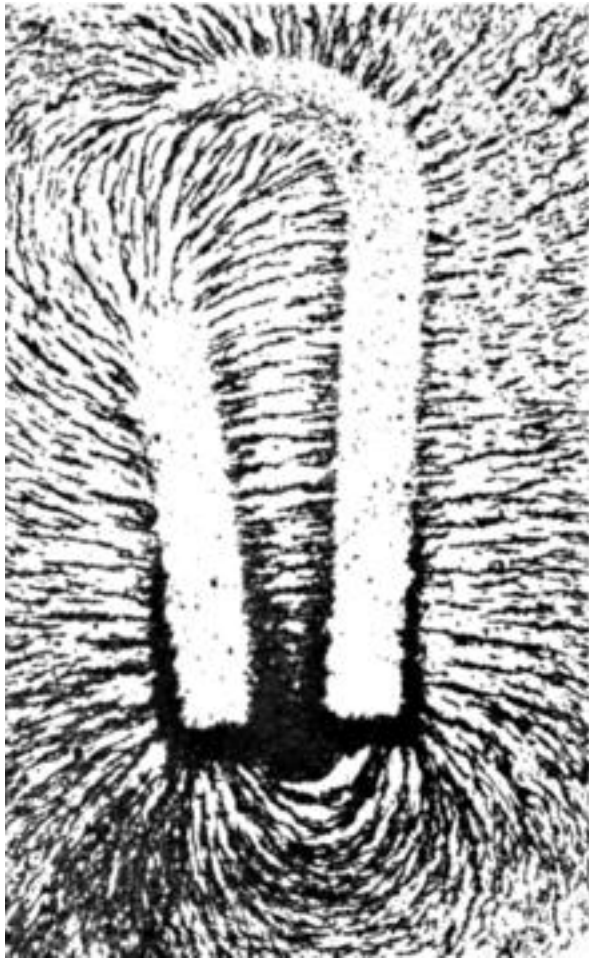
ELECTRIC FIELD: Electric field is defined as the electric force per unit charge. The direction of the field is taken to be the direction of the force it would exert on a positive test charge. The

electric field is radially outward from a positive charge and radially in toward a negative point charge.



MAGNETIC FIELD

A 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. The effects of magnetic fields are commonly seen in permanent magnets, which pull on magnetic materials such as iron, and attract or repel other magnets. In addition, a magnetic field that varies with location will exert a force on a range of non-magnetic materials by affecting the motion of their outer atomic electrons.



ELECTRIC CURRENT

An electric current is a stream of charged particles, such as electrons or ions, moving through an electrical conductor or space. ... The SI unit of electric current is the ampere, or amp, which is the flow of electric charge across a surface at the rate of one coulomb per second. If a neutral object loses electrons, it becomes more positively charged. If a neutral object gains electrons, it becomes more negatively charged. Current is the rate of flow of positive charge. Current can be caused by the flow of electrons, ions or other charged particles.

