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Electrical/Electronics Engineering

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1) Newton's second law of motion can be stated as follows;

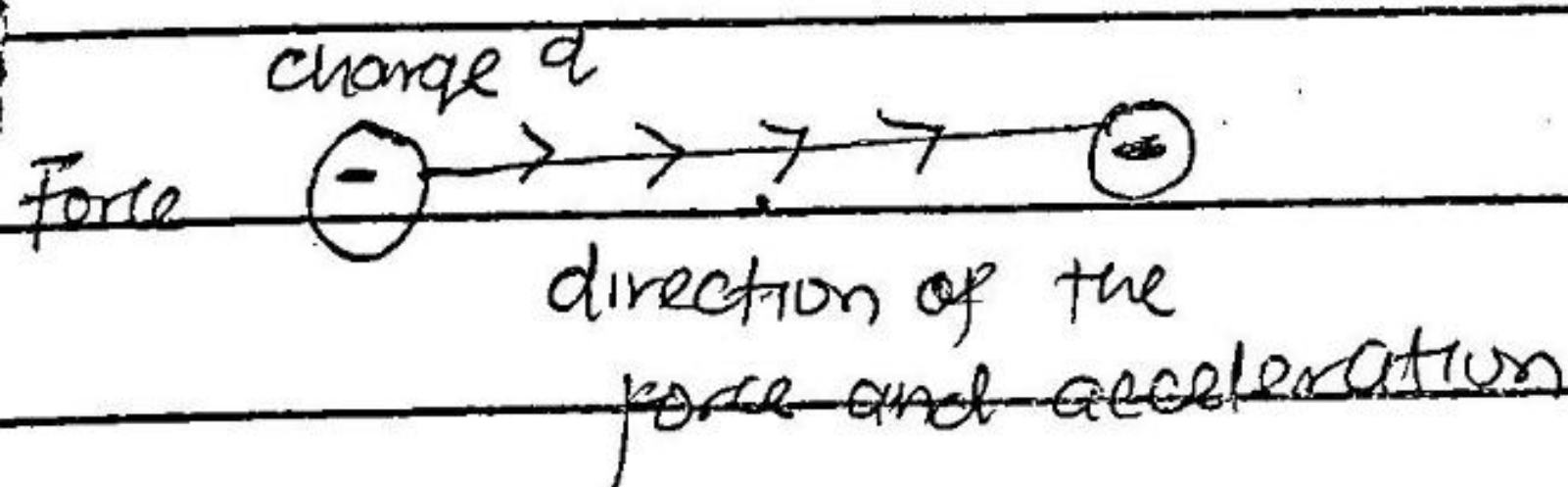
" The acceleration of an object is produced by a net force is directly proportional to the magnitude of the net force, in the net force and inversely proportional to the mass of the object."

$$a = \frac{F_{\text{net}}}{m}$$

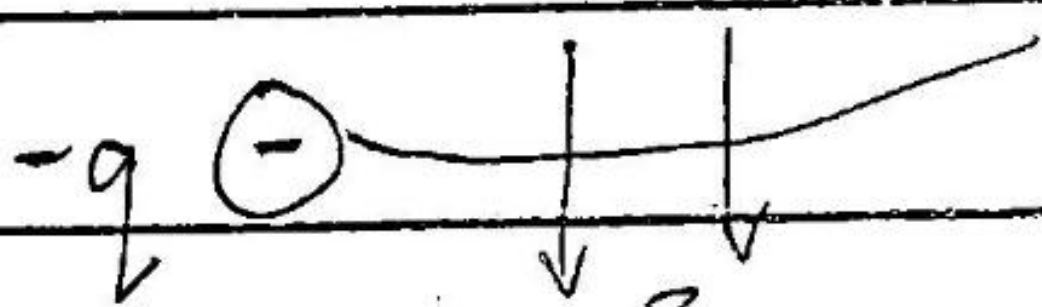
$$F_{\text{net}} = m \cdot a$$

Considering an electron thrown in a uniform electric field, it follows a parabolic path. Neglecting gravity and air resistance, the parabola comes from the constant force experienced by the charge in the electric field. The acceleration is zero in one direction and constant in another.

The Acceleration can be found by drawing a free body diagram



For example, if a uniform electric field in a region is directed upwards and electron shot horizontally into the region



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

will be constant and its direction would be downward

2. Electric field

An electric field is said to exist at a point in space if a charged particle placed at that point experiences a force that would not be felt by an uncharged particle.

A charged particle creates an electric field. The field acts on another charged object to produce a 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 inward toward a negative point charge.

Magnetic field

A charge that is moving in a magnetic field experiences a force that would not be 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 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 stream of charged particles such as electrons or ions moving through an electrical conductor or space.

If a neutral object loses electrons, it becomes more positively charged. If a neutral gains electrons, it becomes negatively charged. Current is the rate of positive charge. Current can be caused by the flow of electron, ions or other charged particles.