**Numericals**

**Unit 1**

1. An electron starts from rest and moves freely in an electric field of intensity 2400 V/C. Determine (a) force acting on electron, (b) acceleration, (c) kinetic energy acquired and the velocity attained if the electron moves through a potential difference of 90 V.
2. A charged particle is accelerated through a potential difference of 1000 V whose mass is 1000 times the mass of an electron. Find (a) the velocity and (b) kinetic energy acquired by electron in J and eV.
3. An electron accelerated from rest, through a potential difference of 900 V enters a uniform magnetic field of 0.01 Wb/m2 whose direction is perpendicular to the initial direction of the electrons. Calculate (a) velocity of the electron, (b) radius of the circular path followed by the electron in magnetic field.
4. Calculate the velocity acquired by the electron at 6.6 x 10-9 s, when it starts from rest and is passing through two parallel plates0.05 m apart are connected to a 500 V supply.
5. An alpha particle is accelerated through a potential difference of 1000 V which then enter a magnetic field of flux density 2000 gauss perpendicular to their direction of motion. Calculate the radius of the circular orbit. (Given: mass of alpha particles = 2mP + 2mN = 6.68 x 10-24 kg, charge on alpha particle = 2e = 3.2 x 10-19 C)
6. An electron beam passes through a magnetic field of 2 x 10-3 Wb/m2 and an electric field of 3.4 x104 V/m both acting simultaneously over the same space. If electron remains undeviated, what will be its velocity? If electric filed is removed, what will be radius of electron path?
7. An electron falls through a potential difference of V volts. Prove that, velocity acquired by an electron is .
8. An electron beam is accelerated through a potential difference of 10 kV. It is then passed through a transverse magnetic field where it moves in a circular arc of radius 6 cm. Calculate the magnitude of magnetic field.
9. An electron of energy 40 eV is circulating in a plane at a right angle to a uniform magnetic field of strength 10-4 Wb/m2. Calculate radius and time period of its circular orbit.
10. An electron is accelerated through a certain potential difference and then enters a uniform magnetic field of strength 2 x 10-2 Wb/m2. The radius of the path of electron is 1.18 cm, calculate the potential difference through which electron is accelerated.