**4-MAGNETIC EFFECTS OF CURRENT**

**1. Biot-Savart Law**

Biot-Savart law, 

**2. Magnetic field due to straight Current Carrying Conductor**

1. Magnetic field due to a straight conductor of finite length,  2. Magnetic field due to an infinitely long straight conductor 

**3. Magnetic Field due to a Circular Coil**

1. Magnetic field at the centre of a circular loop  2. Magnetic field at an axial of a circular loop, 

**4. Ampere’s Circuital law and Magnetic Field due to (i) Straight Solenoid (ii) Toroidal Solenoid**

1. Ampere’s circuital law, When B is directed along tangent to every point on closed curve  2. Magnetic field due to straight solenoid (i) At a point well inside the solenoid,  (ii) At either end of the solenoid Here *n* is the number of turns per unit length. 3. Magnetic field inside a toroidal solenoid, Magnetic field is zero outside the toroid.

**5. Force on Moving Charges in a Magnetic Field**

Force on a charge *q* moving with velocity *v* in a magnetic field at an anglewith it is  The direction of the force is given by Fleming’s left hand rule.

**6. Motion of Charges in Electric and Magnetic Fields**

1. Electric force on a charge, *Fe = qE* 2. Magnetic force on a charge,  3. In a perpendicular magnetic field, the charge follows a circular path.  or   and  4. When makes anglewith, the charge follows helical path.  Pitch of helix, *h = * 5. K.E. gained by an electron when accelerated through a potential difference V,  

**7. Cyclotron**

For the accelerated charged particle.

1. Velocity  2. Period of revolution,  3. Cyclotron frequency,  4. Maximum kinetic energy, 

Where R is the radius of the dees.

**8. Force on a Current Carrying Conductor in a Magnetic Field**

1.  2.  3. 

**9. Forces between Parallel Current-Carrying Wires**

1. Force per unit length  2. Force on length *l* of one of the wires



**10. Torque on Current Loops**

Torque on a current loop in a magnetic field, *NIBA*  where *m* – *NIA* = magnetic dipole moment of the current loop. In vector form, 

**11. Moving Coil Galvanometer and its Sensitivity**

1. In a moving coil galvanometer Current,  Deflection produced,  2. Fig. of merit, G =  3. Current sensitivity,  4. Voltage sensitivity, 

**12. Conversion of Galvanometer into (i) Ammeter and (ii) Voltmeter, and Measurement of Current and Voltage**

1. For conversion of a galvanometer into ammeter the shunt resistance,  Here  2. Resistance of an ammeter,  3. For conversion of a galvanometer into a voltmeter, the value of high series resistance, ; Here  4. Resistance of a voltmeter,  5. For a galvanometer, *Ig* = *nk* where *n* = no of divisions on the galvanometer scale. *k* = current required to produce deflection of one scale division or figure of merit of the galvanometer.