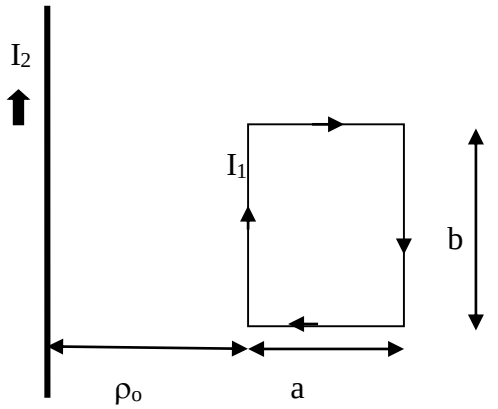
PH 202 Course coordinator/ Instructor**: Alika Khare**

Problem Set no. VIII

1. Griffith third edition, problem nos 5.6, 5.7, 5.9, 5.15, 5.16 , 5.36.
2. A wire bend in the form of a parabola is carrying a constant current *I*. Calculate the magnetic flux density at the focus of the wire. Take the distance from apex to focus as *d*.
3. A very long coaxial cable consists of central wire of radius a carrying a uniformly distributed current *I* and outer cylindrical shell of inner radius b and thickness t carrying a current *–I* (return path). Calculate the magnetic field (***H***) in the region $0 \leq \rho \leq a$, $a \leq \rho \leq b$, $b \leq \rho \leq (b+t)$ and $\rho \geq (b+t)$. Plot magnetic field intensity as a function of ρ.
4. A current is flowing in a long conducting wire of radius *a*. The current is distributed in the wire such that the current density at a distance r from the wire is given by $J = J_o\left(1+\frac{r^2}{a^2}\right)$. Find the magnetic field inside and outside the wire and the total current through it. Plot the magnetic field as a function of distance from the axis of the wire.
5. A rectangular wire loop of width a and height b is carrying a current I_2 in the clock wise direction is placed at a distance of ρ_o from a infinitely long wire carrying a current I_2 in upward direction as shown. Calculate the force experienced by the loop.



6. A closed wire loop of radius *a* carries a constant current I. Find the magnetic field any where in space. (Hint: write down the general expression for A in such case, then apply the multipole expansion in terms of Legendre polynomial, as was implemented in electrostatic case and follow the similar steps).