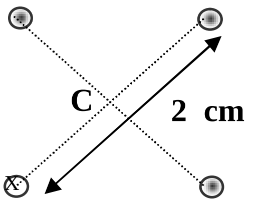
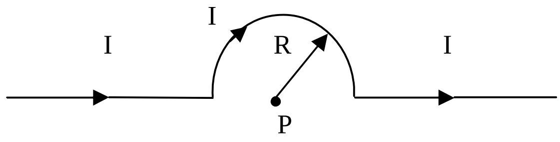
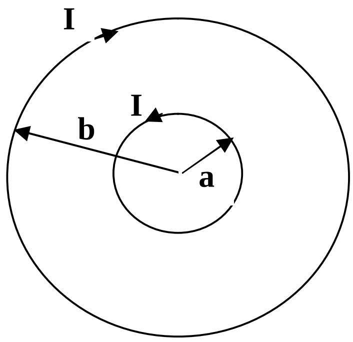
Chapter 30

1- The Figure shows four long straight wires passing through the plane of the paper. They are fixed at the corners of a square of diagonal 2.0 cm. Each wire carries a current of 2 A. Three of them are out of the paper and one is into the paper. The magnitude of the magnetic field at the center "C" of the square has magnitude: [8.0*10**(-5) T]





2- The segment of wire is formed into the shape as shown in the figure and carries a current I = 6 A. When R = 6.28 cm, what is the magnetic field at the point P? [3.0*10**(-5) T into the page]



3- The figure shows two concentric circular loops of radii a and b and both carry a current I. Find the resultant magnetic field at the center of the two loops if a = 10 cm, b = 20 cm and I = 20 A. [63 micro-T, out of the page]

4- Three parallel wires lie in the xy-plane. The separation between adjacent wires is 0.1 m, and each wire carries a 10-A current in the same direction. Find the magnitude of the net force per unit length on one of the outer wires. [3.0*10**(-4) N]

5- A circular loop of radius 0.1 m has a resistance of 6 Ohms. If it is attached to a 12 V battery, how large a magnetic field is produced at the center of the loop? [1.3*10**(-5) T]

6- Solenoid 2 has twice the radius and six times the number of turns per unit length as solenoid 1. If they have the same current, then the ratio of the magnetic field in the interior of 2 to that in the interior of 1 is: [6]

7- Two parallel wires, carrying equal currents of 10 A, attract each other with a force F. If both currents are doubled, and the distance between them reduced by 50%, the new force will be: [8*F]

8- Two long parallel wires, D and B, are separated by 2.0 cm. The current in D is THREE times the current in B. If the magnitude of the force on 2.0 m length of one of the wires is equal to 60 micro-N, find the current in B. [1.0 A]

9- The radius R of a long current-carrying wire is 2.3 cm. If the magnetic field at r1 = 2.0 cm is equal to THREE times the magnetic field at r2, r2 > R, calculate the distance r2. [7.9 cm]

10- A hollow cylindrical conductor of inner radius 3.0 mm and outer radius 5.0 mm carries a current of 80 A parallel to its axis. The current is uniformly distributed over the cross section of the conductor. Find the magnitude of the magnetic field at a point that is 2.0 mm from the axis of the conductor. [zero]