30-02
Question 893 0.48-33%
Two infinite parallel wires are separated by 2.5 cm and carry current 10 A and 12 A in the same direction. What is the force per unit length on each wire?
(a) 0.5*10**(-3) N/m, repulsive.
(b) 1.0*10**(-3) N/m, attraction.
(c) 1.0*10**(-3) N/m, repulsive.
(d) 0.5*10**(-3) N/m, attraction.
(e) 2.0*10**(-3) N/m, attraction.

30-02
Question 894 0.48-48%
Three long parallel wires are arranged as shown in figure 8. Wires 1 and 3 each carries a current of 5.0 A in the directions shown. If the net magnetic force on wire 3 is zero, what is the magnitude and direction of the current in wire 2?

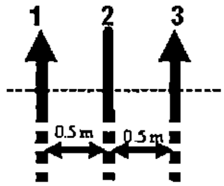

Figure 8

(a) 2.5 A, downwards.
(b) 5.5 A, upwards.
(c) 2.5 A, upwards.
(d) 30 A, downwards.
(e) 5.5 A, downwards.

30-3 Ampere's Law

30-03
Question 895 0.49-50%
A long cylindrical wire has a radius R = 2.0 cm and carries a current I = 40 A that is uniformly distributed through the cross-section of the wire. What is the magnitude of the magnetic field at a point which is 1.5 cm from the axis of the wire?
(a) 6*10**(-3) T
(b) 5*10**(-4) T
(c) 2*10**(-3) T
(d) 3*10**(-4) T
(e) 4*10**(-5) T

30-03
Question 896
What must be the radius R of a long current-carrying wire if the magnetic field at r1 = 2.0 cm (inside the wire) is equal to three times the magnetic field at r2 = 8.0 cm (outside the wire).
(a) 3.8 cm
(b) 4.4 cm
(c) 5.2 cm
(d) 2.3 cm
(e) 7.3 cm

30-03
Question 897 0.57-41%
A long solid cylindrical conductor of radius R= 4.0 mm carries a current I parallel to its axis. The current density in the wire is 2*10**4 A/m**2. Determine the magnitude of the magnetic field at a point that is 5.0 mm from the axis of the conductor.
(a) 30 micro-T
(b) 12 micro-T
(c) 17 micro-T
(d) 40 micro-T
(e) 55 micro-T

30-03
Question 898 0.45-36%
Consider an infinitely long straight wire carrying a current I. If the magnetic field at r1 = 2.5 mm inside the wire and at r2 = 10 mm outside the wire are equal, then the radius of the wire is:
(a) 4.0 mm.
(b) 6.0 mm.
(c) 5.0 mm.
(d) 7.0 mm.
(e) 3.0 mm.

30-03
Question 899 0.51-55%
A cylindrical conductor of radius R = 2.50 cm carries a current of I = 2.50 A along its length. This currents is uniformly distributed throughout the cross section of the conductor. Calculate the magnitude of the magnetic field at a point that is 1.25 cm from the axis of the conductor.
(a) 8.00 microTesla
(b) 10.0 microTesla
(c) 20.0 microTesla
(d) 15.3 microTesla
(e) zero

30-03
Question 900 0.47-56%
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.
(a) 5.2 cm.
(b) 7.9 cm.
(c) 4.4 cm.
(d) 2.0 cm.
(e) 3.8 cm.

30-03
Question 901 0.50-33%
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.
(a) 5.3 mT.
(b) 0.7 mT
(c) 8.0 mT.
(d) 10 mT.
(e) zero.

30-03
Question 902 0.54-49%
Figure 4 shows four circular loops concentric with a wire whose current is directed out of the page. The current is uniform across the cross section of the wire. Rank the loops according to the magnitude of the enclosed current, greatest first [loops a and b inside the wires, c and d are outside]

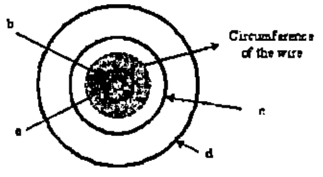

Figure (4)

(a) a > c > b > d.
(b) a > c > b > d.
(c) a = b > c > d.
(d) d = c > b > a.
(e) d > c > b > a.
