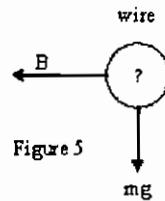Question 845

A straight horizontal length of copper wire is located in a place where the magnetic field of the earth B = 0.5*10**(-4)T (see figure 5). What minimum current in the wire is needed to balance the gravitational force on the wire? [The linear density of the wire is 60.0 gram/m]


Figure 5

(a)   3.2*10**4 A, into the page.
(b)   1.2*10**4 A, out of the page.
(c)   1.2*10**4 A, into the page.
(d)   4.3*10**4 A, out of the page.
(e)   4.3*10**4 A, into the page.

Question 846

In figure 7, a rectangular loop, L1 = 2.0 cm by L2 = 3.0 cm, carrying a current I = 0.1 A, is suspended from a spring of spring constant, k = 8.0*10**(-2) N/m. The loop is placed into a uniform magnetic field, which points into the page, and the spring is observed to stretch 1.0 cm. What is the magnitude of the magnetic field? [Neglect the mass of the loop]

Figure 7
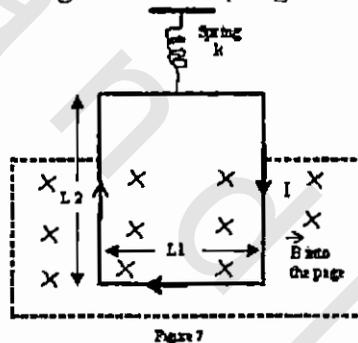
(a)   0.3 T.
(b)   0.4 T.
(c)   0.2 T.
(d)   0.1 T.
(e)   0.5 T.

29-8   Torque on a Current Loop

Question 847

A 100-turn circular coil of wire with radius 1 cm carries a current of 0.5 A. What torque will be exerted on the coil when it is placed in a magnetic field of 5 mT which makes an angle of 60 degrees with the plane of the coil?
(a)   8.33*10**-5 N.m.
(b)   3.93*10**-5 N.m.
(c)   5.63*10**-5 N.m.
(d)   1.34*10**-5 N.m.
(e)   2.96*10**-5 N.m.

Question 848

A square loop, of side a = 5 cm and 200 turns, carries a current of 10 A. The loop is placed in an external magnetic field of 2.0 T. Determine the magnitude of the maximum torque exerted on the loop.

(a)   22 N*m
(b)   20 N*m
(c)   12 N*m
(d)   10 N*m
(e)   44 N*m

Question 849

A current of 17 mA is maintained in a circular loop of 2 m circumference which is parallel to the y-z plane (see Figure 4). A magnetic field B = (- 0.8 k) T is applied. Calculate the torque exerted on the loop by the magnetic field. (i, j and k are the unit vectors in x, y and z directions, respectively).
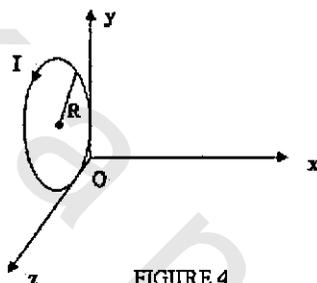

FIGURE 4

(a)   (-4.33*10**(-3) j) N*m
(b)   (-2.27*10**(-2) i) N*m
(c)   (2.27*10**(-2) i) N*m
(d)   (4.33*10**(-3) j) N*m
(e)   (3.54*10**(-3) k) N*m

Question 850

A square loop (L=1.00 m) consists of 100 closely wrapped turns of 0.20 A. The loop is oriented as shown in figure (5) in a uniform magnetic field of 0.10 T directed in the positive x- direction. What is the torque (in N.m) on the loop? (j is a unit vector in the +y-direction.)
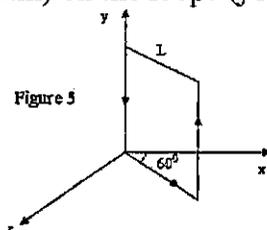

Figure 5

(a)   2.0 j.
(b)   -1.0 j.
(c)   1.0 j.
(d)   -1.2 j.
(e)   1.2 j.