Exam QUIZ 5 PHYSICS 2B SPRING 2010

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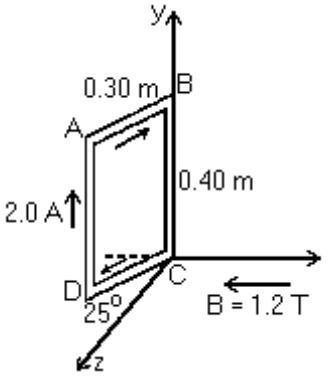
Charge on electron = - 1.6 . 10^-19 C epsilon0 = 8.85 . 10^-12 C2/N.m2 Coulomb's Constant = 9. 10^9 N.m2/C2
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) Which of the following is an accurate statement?
   A) The magnetic force on a current carrying wire is greatest when the wire is parallel to the magnetic field.
   B) A magnetic field line is, by definition, tangent to the direction of the magnetic force on a moving charge at a given point in space.
   C) The magnetic force on a moving charge does not change its energy.
   D) Magnetic field lines have as their sources north and south poles.
   E) A current carrying loop of wire tends to line up with its plane parallel to an external magnetic field in which it is positioned.

2) A 15 meter length of wire carrying a current of 6 A lies on a horizontal table with a rectangular top of dimensions 0.9 m x 1.20 m. The ends of the wire are attached to opposite ends of a diagonal of the rectangle. A vertical magnetic field of 0.10 T is present. What magnetic force acts on this segment of wire?
   A) 0.9 N
   B) 1.26 N
   C) 9.0 N
   D) Zero.
   E) The force cannot be determined without knowing the shape of the length of wire.

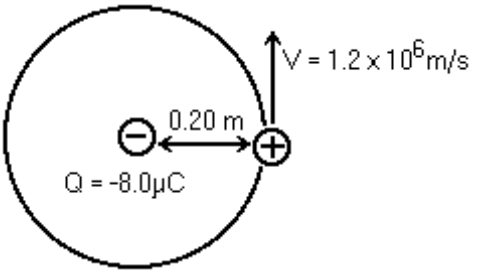
Figure 28.7



A rigid rectangular loop, which measures 0.30 m by 0.40 m, carries a current of 2.0 A, as shown. A uniform external magnetic field of magnitude 1.2 T in the negative x-direction is present. Segment CD is in the x-z plane and forms a 25° angle with the z-axis, as shown.

3) In Figure 28.7, an external torque applied to the loop keeps it in static equilibrium. The magnitude of the external torque is closest to:
   A) 0.20 N · m B) 0.09 N · m C) 0.16 N · m D) 0.26 N · m E) 0.12 N · m

Figure 28.4



An ion of mass m and of charge +e is in circular orbit around a fixed point charge Q, with charge -8.0 μC. The radius of the orbit is 0.20 m, and the speed of the ion in the orbit is 1.2×10^6 m/s. A uniform external magnetic field, perpendicular to the plane of the orbit, is present. The magnetic force on the ion is equal to the electric force in magnitude and in direction at all points of the orbit.

4) In Figure 28.4, the external magnetic field and the direction relative to the plane of the orbit are closest to:

A) 1.7 T, outward

B) 1.5 T, inward

C) 1.3 T, outward

D) 1.1 T, inward

E) 1.9 T, inward