## Problems of the Week 6

## Always show your work to receive credit (NO WORK=NO CREDIT)

1. A cylinder 10.0 cm long and 5.00 cm in diameter rests on a $30.0^{\circ}$ incline, in a magnetic field, $B=0.0800 \mathrm{~T}$, directed vertically. The mass of the cylinder is 0.500 kg . A coil of 100 turns of fine wire is wrapped about the cylinder as sketched. If the cylinder is in static equilibrium when the coil is in a vertical plane, what must be the current in the coil (is the equilibrium stable?)?
A. 1.53 A
B. 2.23 A
C. 3.25 A
D. 4.45 A
E. 5.71 A

2. In the Bohr model of the hydrogen atom, the ground state of its electron orbits the nucleus at a radius of .0529 nm . If a magnetic field of 1.8 T is applied perpendicular to the orbit of the electron, by how much is the orbital frequency $(\omega)$ changed?
A. $4.14 \times 10^{16} \mathrm{~s}^{-1}$
B. $6.76 \times 10^{13} \mathrm{~s}^{-1}$
C. $1.23 \times 10^{14} \mathrm{~s}^{-1}$
D. $7.23 \times 10^{12} \mathrm{~s}^{-1}$
E. $1.58 \times 10^{11} \mathrm{~s}^{-1}$
