## **Problems of the Week 6**

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

- 1. A cylinder 10.0cm long and 5.00cm in diameter rests on a 30.0° incline, in a magnetic field, B=0.0800T, directed vertically. The mass of the cylinder is 0.500kg. 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. 1.53A
  - B. 2.23A
  - C. 3.25A
  - D. 4.45A
  - E. 5.71A



- 2. In the Bohr model of the hydrogen atom, the ground state of its electron orbits the nucleus at a radius of .0529nm. If a magnetic field of 1.8T is applied perpendicular to the orbit of the electron, by how much is the orbital frequency ( $\omega$ ) **changed**?
  - A. 4.14x10<sup>16</sup>s<sup>-1</sup> B. 6.76x10<sup>13</sup>s<sup>-1</sup>

  - C. 1.23x10<sup>14</sup>s<sup>-1</sup>
  - D. 7.23x10<sup>12</sup>s<sup>-1</sup>
  - E. 1.58x10<sup>11</sup>s<sup>-1</sup>