Homework #1
Due 1/25/00

1. The nuclear radius of a deuterium atom is ~ 10^{-14} m. In order foe fusion to occur, two atoms need to be brought to approximate this distance from each other. Find kinetic energy needed to overcome the coulomb repulsion energy to fuse the atoms. The average kinetic energy is 3/2 the thermal energy. Find the "temperature" in ^{o}K equivalent to this averaged kinetic energy.
2. An initial charge density , ρ_o, is placed in a quasi-neutral unmagnetized plasma. Treating the plasma as a macroscopic conducting fluid, Find the time evolution of the charge density from Ampere's law.
3. A charge particle q with mass m is moving with a constant velocity ,v perpendicular to a spatially uniform magnetic field B.
   a) find the work done on the particle by the field if the field is static in time.
   b) find the work done if it is varying in time.
4. An unmagnetized plasma slab with thickness d is moving with a constant velocity perpendicular to an uniform static B field. If there is no electric field applied on the plasma,
   a) find the surface charge density induced on the plasma surface due to the motion.
   b) Find the voltage measured across the plasma thickness d du to the induced charge.