Final Exam

2 Hours in Class

1. Consider a finite conducting, isothermal fluid plasma with conductivity, σ_o. (i.e. P = nkT with T= constant). The plasma pressure is balanced by the force density from an external magnetic field, $\vec{B} = B_o \hat{e}_z$ and its own internal plasma current density, J. Find the plasma diffusion coefficient perpendicular to B due to the plasma pressure gradient and the finite conductivity.

2. Find the Rosenbluth collision potential function, h for electron-ion collisions. Assuming the ions are cold and $m_I >> m_e$.

3. A linearly polarized [E_x (z=0)] cold plasma plane wwave. Is propagating along the dc magnetic field , $\vec{B} = B_o \hat{e}_z$. Find the rotation of the electric polarization angle θ in the propagation direction z in terms of the cold plasma wave dispersions.

4. Use ideal MHD and Maxwell's equations to find the first order magnetic field perturbation for the perpendicular propagating magnetosonic wave ($\vec{K} \quad \vec{B_o}$).