

EM Prelim Exam Questions  
Fall 2000

Van Duzer: There is a plane wave in a medium with permeability  $\epsilon_1$  incident to another medium with permittivity  $\epsilon_2$  at oblique angle. What are the angle relationships? If a probe is put in the second medium, will the probe measure anything?

Smith: Given the voltage and the current in a cylindrical transmission wire, calculate the electric field and magnetic field inside the wire. Assume there is a regular transmission wire with impedance = 50 ohms at 1 MHz. Is it possible to run the cable at 1GHz?

Birdsall: Given two parallel conducting planes separated by a distance  $L$ . There is a parallel sheet of charges (surface charge density  $\sigma$ ) between the planes. The conducting planes are connected together. Find the charges on each plane, the electric field, potential, and force on the charge sheet. Is there an equilibrium point?