Name: 1C Discussion - Week 9

1. **Previous Final** *(by Prof. Simon).* A 200kW radio antenna broadcasts 1500 kHz in all directions. Your house is 10km north of the transmitter.
   (a) At your house 10 km from the source, what is the intensity of the EM wave?

   (b) At your house 10km from the source what is the maximum electric field in the wave?

   (c) The sole transmitter is replaced by two transmitters identical to the first, 200m east and west of the original transmitter. They begin to broadcast in phase. At your house 10km north of the antennas, how does the intensity change (you may take the effective distance from the antennae to the house to be $\sim$10km)?

   (d) You start jogging East with headphones tuned to the radio station. Approximately how far do you go before you completely lose the signal?

2. **Thin film interference** *(YF 13th ed. Example 35.4).* Suppose two glass plates are two microscope slides 10.0cm long. At one end they are in contact; at the other end they are separated by a piece of paper 0.0200mm thick. What is the spacing of the interference fringes seen by reflection? Is the fringe at the line of contact bright or dark? Assume monochromatic light with a wavelength in air $\lambda = \lambda_0 = 500nm$. What pattern would we see if we assumed white light?