

Homework Problems III for PY2T10

- 1). GP 11.3 A laser is a device that emits a parallel beam of monochromatic light. The intensity may be assumed constant across the beam. If the power is 1 W and the beam has a diameter of 1 mm, calculate the maximum amplitude of the magnetic field \mathbf{B} in the beam in free space.
- 2). GP 11.2 Show that the time average of the energy density in a monochromatic, linearly polarized plane wave moving in vacuum is distributed equally between the \mathbf{E} and \mathbf{B} fields.
- 3). (a) A block of dielectric ($\epsilon = 3.2$) has dimensions 5 cm square and 12 mm thick. A total charge of 0.1 micro coulomb (inserted by uniform electron bombardment of one square face) lies within a 2 mm thick layer which is equidistant from both square faces. Calculate the bound charge density (a) in this layer and (b) at either square face of the block.