08 – Electromagnetic Waves (Ch. 33)

$c = 3 \cdot 10^8$ m/s; $\varepsilon_0 = 8.854 \cdot 10^{-12}$ F/m; $\mu_0 = 1.257 \cdot 10^{-6}$ N/A^2

7) What is the intensity of a traveling plane electromagnetic wave if B_m is 1.0×10^{-4} T?

19) High-power lasers are used to compress a plasma (a gas of charged particles) by radiation pressure. A laser generating radiation pulses with peak power 1.5×10^3 MW is focused onto 1.0 mm^2 of high-electron-density plasma. Find the pressure exerted on the plasma if the plasma reflects all the light beams directly back along their paths.

20) Radiation from the Sun reaching Earth (just outside the atmosphere) has an intensity of 1.4 kW/m^2. (a) Assuming that Earth (and its atmosphere) behaves like a flat disk perpendicular to the Sun's rays and that all the incident energy is absorbed, calculate the force on Earth due to radiation pressure. (b) For comparison, calculate the force due to the Sun's gravitational attraction.