(1) In a single-slit experiment, the first minimum is 2 centimeters up from the centerline. If the light has wavelength of 600 nm, and the screen is 5 meters from the slit, what is the width of the slit?

(2) A layer of oil (n=1.22) lies on top of water (n=1.33). Above the oil is air. What is the minimum thickness, if light of wavelength 600 nm is removed (through destructive interference) from the reflected light?

(3) In a circular region or radius 2 meters in the x-y plane, centered on the origin, the electric field decreases according to $20e^{-3t}$ in the z-direction. At r=0.5 meters, inside the region, what is the induced magnetic field? How about at r=3 meters? Answer as a multiple of $\epsilon_0\mu_0$.

(4) Find the electric field of the electromagnetic wave with magnetic field given by $\vec{B} = 0.5\ \cos(20x - \omega t)\hat{j}$. Find all parts frequency, angular frequency, angular wave number, wavelength, amplitudes..

(5) A 500 watt radio transmitter emits spherical waves. At r=10 meters, what is the magnetic field amplitude (i.e. Bmax)? The electric field amplitude? The total average energy density?

(6) Unpolarized light passes through a polarizer, then passes through three more, each polarizer axis oriented at angle $\pi/4$ with respect to the previous polarizer axis. What's the final intensity in terms of the initial intensity ?

(7) What is the wavelength of a photon having an energy of 8 electron volts?

(8) A massive particle traveling 50,000 m/s is found to have a wavelength of 800 nanometers. What's the mass of the particle?

(9) Electrons freed from a metal surface irradiated by light are found to have a maximum kinetic energy of 7 eV. If the light has a frequency of $1x10^{15}Hz$, what is the work function of the metal?

(10) Suppose at a certain time, a light wave has its electric field oriented in the same direction as (3,2,1) and magnetic field oriented in the same direction as (0.-1,1) . In what direction is the wave propagating?