PROBLEM SET #8

Physics 1BH

Winter 2016, Prof. Saltzberg

DUE: Friday March 4, in my office by 11:30am
READING: Lecture notes on waves. Chapter 9
(We will go back to Chapter 8 next week)

You are encouraged to work with others, but try as much as you can on your own. At a minimum, check your answers with someone else.

1. PM 9.19 [Find the wave]. Write your answers with the argument of the trigonometric function being a sum of kx anv ωt with the proper relative sign. Then also write them as being a sum of x and vt with the proper relative sign.

2. PM 9.20 [proton kicked by a wave]

3. PM 9.25 [cosmic microwave background (CMB) radiation]. (For simplicity, assume the 1 kilowatt transmitter is isotropic, which is never exactly possible.)

4. PM 9.26 [An electromagnetic wave]

5. PM 9.27 [reflected wave] Note that VSWR is going to be an important quantity for the EE majors.

6. PM 9.28 [Poynting vector for resistor]

7. PM 9.32 [relativistic invariant] This the the EM equivalent of "the interval" Δs^2 that you calculated in a previous week. There are many ways to solve this problem. Show that this works out for the special case of a point on an example electromagnetic plane wave.