

EE314
HW #1
Fall 2021
Due 9/5/21

Please only submit 1 file, PDF or word, with good format, presentation and details matter

Note: Please avoid fast solution. Solutions that are fast, and short, only communicate that the person did not care about depth, about learning, and about their cultural journey in EM

Please note: We would like to see in-depth answers. Not short ones, but reflective, thoughtful answers that include facts, resources, citations, your thoughts and learning and ideas.

Please make sure that you have correct references and citations for all that you do in all HWs.

Please provide references to all that you are using. This is also important.

1. (Units) Research (books, web, etc) and find what SI units are.
 - a. What is the SI unit, provide a brief history, and information of what it is?
 - b. How are they defined for each case?
 - c. You should find a good set of references with your favorite ones and answer the following questions

What are the units of the following (it is always good to know where the good resources are?)

Electric Charge: Q

Electric field intensity: E

Electric flux density: D

Magnetic field intensity: H

Magnetic flux density: B

Electric Potential: V

Electric Current: I

Also use the basic circuit equations for resistor (Ω : Ohms), capacitor (F: Farads), and inductors (H: Henrys) to related what Ohms, Farads, and Henry are in terms of the units of current and voltage and time

Here are the equations for VI relationships of Resistor (R in ohms) , Inductor (L in H henrys) Capacitor (C in F farads)

$$V = IR \quad v(t) = L \frac{di(t)}{dt} \quad i(t) = C \frac{dv(t)}{dt}$$

2. (Units, and relationships) Use Lorentz force equation and identify how the units for E and B are related to Newton (the SI unit of force.)

3. (Conceptual basis and equations) We know that (wavelength in meters) x (frequency in Hz)=(Speed in m/s). $f\lambda=v$.

a) Show this with unit analysis

b) find out the wavelengths for red and blue in the visible spectrum. Which one has the shorter wavelength?

c) What about the lower frequencies? Which has the more energy?

d) Repeat this for infrared and ultraviolet.

4. (General research on related topics) Research to find out and learn “what is an Electromagnetic bomb?” Many people talk about it and some movies also mention it. Does it exist? What is it? How does it work? Reflect on what you think, learned, and feel about it?

5. (Reading and learning) please read chapters 1 of the “book” and provide the following. i) Summary of the chapter ii) Identify major definitions (itemized) iii) what did you learn and found interesting in the chapter