

PREFLIGHTS**LESSON 8 – THE CONTINUITY EQUATION, POYNTING’S THEOREM****LEARNING OBJECTIVES:**

- 1. Define Poynting’s theorem and the Poynting vector.**
- 2. Use the Poynting vector to determine energy flow in electromagnetic problems.**

1) Describe, in words, the assumptions and substitutions that were made in deriving the equation at the bottom of page 346.

2) Describe, in words, what dW/dt and each of the two integrals represent in Equation 8.9.

3) Study Example 8.1. Implicit in the example is the fact that the wire is in a state of steady-state equilibrium. Among other things, this means that whatever energy is entering the wire must be balanced by the same amount of energy leaving the wire. The problem finds that the energy per unit time entering the wire is VI . What type of energy is this? What type of energy leaves the wire at a rate of VI ?

4) Note: This is a review question from Chapter 7. Briefly (in two or three sentences), explain two things.

- a. Why is magnetic force not considered when deriving Ohm's law from Equation 7.1?
- b. Based on Equation 7.3, why do charges not accelerate down a wire and create a constantly increasing current if there is a constant electric field pushing on them?

5) What did you find difficult or confusing in the pre-class work? If nothing was difficult or confusing, tell me what you found most interesting. Please be as specific as possible.

6) Document whatever help you received on the preclass work.