PREFLIGHTS **LESSON 28 – RADIATION FROM AN ARBITRARY SOURCE**

LEARNING OBJECTIVE:
Determine how arbitrary charge distributions radiate.

1) In Section 11.1.2, we started with the assumption that an electric dipole was oscillating such that the dipole moment was given by the equation $p(t) = p_0 \cos(\omega t)$. From that, we eventually derived Equations 11.18 and 11.19 for the radiative electric and magnetic fields of an oscillating dipole. Knowing that, is Equation 11.58 for the radiative fields from an arbitrary source consistent with Equations 11.18 and 11.19? Explain why or why not.

2) Your previous answer should have indicated that to first-order approximation, the radiative fields from an arbitrary source are entirely due to the motion of *electric* dipoles. Why is the motion of magnetic dipoles not included?

3) Study Example 11.2. Based on that example, what quantity or quantities are most important for determining the radiative properties of an arbitrary source?

4) ***Note: This is a review question from Chapter 8.*** You want to use the Maxwell stress tensor to find the force on a conducting plane when a point charge is nearby. The electric field can be found using the image charge technique. But, to find the force using the Maxwell stress tensor, you need to define a *closed* surface (see Equation 8.22 on page 353). You'd like to treat the conducting plane as an infinite plane, so explain how you can define a closed surface for the Maxwell stress tensor force calculation for this problem.

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.