PREFLIGHTS **LESSON 23 – RECTANGULAR WAVE GUIDE / COAXIAL TRANSMISSION LINE**

LEARNING OBJECTIVE:
Determine how to solve for the propagation of waves down wave guides having simple geometry, such as rectangular wave guides and coaxial transmission line wave guides.

1) Why is possible to have longitudinal components (E_z and B_z) for wave guides but not for plane waves? *Hint: At the top of page 378 is the rationale for why longitudinal components are not possible for plane waves. You might also want to compare Equations 9.43 and 9.176.*

2) The math in this reading gets pretty involved. But Section 9.5.2 should look pretty familiar from what you did with Laplace's equation and separation of variables in Chapter 3. Look back at Example 3.3 on page 127. How was the solution method for that example similar to what was done in Section 9.5.2? How was it different?

3) In a few sentences, describe how you would solve for TM modes in a rectangular wave guide. How would your solution method be similar to Section 9.5.2? How would it be different?

4) ***Note: This is a review question from Chapter 8.*** A solenoid is mounted in such a way that it is free to rotate. Initially it is not moving and has a steady current flowing through it. This current of course creates an axial magnetic field inside the solenoid. The current is then ramped up without creating an external torque on the system. According to Faraday's law, the change in current will result in a circumferential electric field. Does the solenoid start rotating when the current is ramped up? Why or why not?

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.