PREFLIGHTS   **LESSON 10 – MAXWELL STRESS TENSOR**

LEARNING OBJECTIVES:
1. **Progress from the highly mathematical formulation of the Maxwell stress tensor to an understanding of what it means conceptually and how it can be used to solve problems.**
2. **Calculate electromagnetic force using the Maxwell stress tensor.**

1) Previous to this section, our understanding of electromagnetic force was that electric and magnetic fields acted on some charge q according to the Lorentz force law. But, in Equation 8.22 for force, both **T** and **S** are defined by the electric and magnetic fields alone. The charge q being affected by the fields does not seem to appear. Explain this seeming discrepancy.

2) Study Example 8.2. In that example, he only calculates three elements of the Maxwell stress tensor – the zx, zy, and zz elements – due to the fact that he knew the net force had to point in the z-direction. If we knew that the net force pointed in the x-direction, which elements of the Maxwell stress tensor would we have to calculate?

3) Describe how you would use the Maxwell stress tensor to calculate the net force on the top half of a long solenoid that lies along the x-axis.

4) *Note: This is a review question from Chapter 7.* Do Problem 7.18 in Griffiths and type in your answer below. You may want to look at your answer for Question 3 of the Lesson 2 Preflights to get you started.

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.