

**PREFLIGHTS      LESSON 22 – FREQUENCY DEPENDENCE OF PERMITTIVITY****LEARNING OBJECTIVES:**

- 1. Develop a model that accounts for dispersion of electromagnetic waves propagating through a medium.**
- 2. Make simple calculations based on our model of dispersion.**

1) Based on the Griffiths' discussion, describe in a few sentences why dispersion occurs.

2) Does Griffiths' model predict that dispersion still occurs even if there's no damping?

3) What is anomalous dispersion? What, mathematically, happens in Equation 9.170 to result in anomalous dispersion around a resonance frequency  $\omega_f$ ?

4) Why does maximum absorption typically occur in a region of anomalous dispersion?

**5) Note: This is a review question from Chapter 8.** What equation describes the momentum stored in electromagnetic fields (the equation should be simple enough that you can describe it in words)? This equation has an integral containing a term that was discussed in another context. Outside of the integral for electromagnetic momentum, what quantity does this term describe (i.e., force? power? energy? etc.)?

**6)** 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.

**7)** Document whatever help you received on the preclass work.