Ivan Linscott

EE Quals

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The four laws that form the cornerstones of electricity and magnetism are:

a. Gauss's Law for electricity.
b. Gauss's Law for magnetism.
c. Ampere's Law for magnetism.
d. Faraday's Law for magnetic induction.

These four laws can be represented in both a global, i.e. integral, form or a local, i.e. differential form.

1. Express in either form these four laws in terms of the electric and magnetic fields and the charges and currents with it in mind that we will be looking toward Maxwell's Equations..

2. Are these Maxwell's equations? Or how are they modified to obtain Maxwell's Equations?

3. From Maxwell's equations in vacuum, derive the wave equation.

4. What is the velocity of the waves? What are the values of mu_zero, and epsilon_zero?

5.. How would the derivation of the wave equation change for waves in say a person such as yourself? Consider, for example, the principal material that your composed of.

6. What would be the speed of the waves then in you?

7. If magnetic charge existed, how would that change the laws and Maxwell's equations?

8. Derive the wave equation in the presence of magnetic charge.