**BASIC EQUATIONS OF ELECTRODYNAMICS**

**Maxwell's Equations**

 In General: In Matter:

   

**Auxiliary Fields**

 Definitions: Linear Media:

  

**Potentials**

 

**Lorentz Force Law**

 

**Energy**

 Energy:  

**FUNDAMENTAL CONSTANTS**

|  |  |
| --- | --- |
|  (permittivity of free space) | (charge of the electron) |
|  (permeability of free space) |  (mass of the electron) |

**SPHERICAL AND CYLINDRICAL COORDINATES**

**Spherical**

  

**Cylindrical**

  

**FUNDAMENTAL THEOREMS**

**Gradient Theorem:** 

**Divergence Theorem:** 

**Curl Theorem:** 

**VECTOR DERIVATIVES**

**Cartesian.**  

 Gradient: 

 Divergence: 

 Curl: 

 Laplacian: 

**Spherical.**  

 Gradient: 

 Divergence: 

 Curl: 

 Laplacian: 

**Cylindrical.  ** Gradient: 

 Divergence: 

 Curl: 

 Laplacian: 

**VECTOR IDENTITIES**

**Triple Products**

 (1) 

 (2) 
**Product Rules**

 (3) 

 (4) 

 (5) 

 (6) 

 (7) 
 (8) 
**Second Derivatives**

 (9) 

 (10) 

 (11) 