Electromagnetism Formula Sheet

Maxwell Equations:

Gauss Law:

Ampere Law:

Current Density:

Displacement Current:

Faraday Flux Rule:

Lenz Law: The induced Eddy current creates a field as to oppose the change in magnetic flux

Continuity Equation:

Lorentz Force:

Coulomb Law:

On statics:

Biot-Savart Law:

**Remark**:

Table of Electric Fields

|  |  |
| --- | --- |
| Charge Dist. |  |
| Infinite Plane |  |
| Spherical Shell |  |
| Solid Sphere |  |
| Cylindrical Shell |  |
| Infinite Wire |  |
| Ring at Axis |  |
| Disk at Axis |  |

Table of Magnetic Fields

|  |  |
| --- | --- |
| Current Distribution |  |
| Infinite Wire |  |
| Ring at Axis |  |
| Solenoid |  |

Uniqueness Theorem: given either or , the solution is unique. Further, is continuous over interfaces.

Interface Equation:

Dielectrics: For

and

Interface Dielectric:

Energy stored:

Work:

Conductors: inside and all charges are on the surface.

Ohm’s Law:

Capacitor:

Resistor:

Table of Capacitance and Resistances

|  |  |  |
| --- | --- | --- |
| Geometry |  |  |
| Two Plates |  |  |
| Spherical Shell |  |  |
| Cylindrical Shell |  |  |

Inductor:

Dipoles:

Force: ; Torque: ; Energy:

Dipole Moment:

Force: ; Torque: ; Energy:

Wave:

Poynting Vector:

Poynting Theorem:

Lorentz Transformations: