

AMET-9: ELECTROMAGNETIC ENGINEERING

1. COLOMB'S LAW AND ELECTRIC FIELD INTENSITY

The Experimental Law of Coulomb, Electric Field Intensity, Field Due to Continuous Volume Charge Distribution

2. ELECTRIC FLUX DENSITY, GAUSS' LAW, AND DIVERGENCE

Electric Flux Density, Gauss' Law, Applications of Gauss' Law : Some Symmetrical Charge Distributions, Application of Gauss' Law : Differential Volume Element, Divergence, Maxwell's First Equation (Electrostatics), The Vector Operator ∇ and the Divergence Theorem

3. ENERGY AND POTENTIAL

Energy and Potential in a Moving Point Charge in an Electric Field, The Line Integral, Definition of Potential Difference and Potential, The Potential Field of a Point Charge, The Potential Field of a System of Charges : Conservative Property, Potential Gradient, The Dipole, Energy Density in the Electric Field

4. CONDUCTORS, DIELECTRICS, AND CAPACITANCE

Current and Current Density, Continuity of Current, Metallic Conductors, Conductor Properties and Boundary Conditions, The Nature of Dielectric Materials, Boundary Conditions for Perfect Dielectric Materials, Capacitance

5. POISSON'S AND LAPLACE'S EQUATIONS

Poisson's and Laplace's Equations, Uniqueness Theorem, Examples of the Solution of Laplace's Equation, Example of the Solution of Poisson's Equation, Product Solution of Laplace's Equation

6. THE STEADY MAGNETIC FIELD

Ampere's Circuital Law, Magnetic Flux and Magnetic Flux Density, The Scalar and Vector Magnetic Potentials, Derivation of the Steady-Magnetic-Field Laws