

AMEI-12 FUNDAMENTALS OF E.M. THEORY

UNIT-1 COLOMB'S LAW AND ELECTRIC FIELD INTENSITY

- 1.1 The Experimental Law of Coulomb,
- 1.2 Electric Field Intensity,
- 1.3 Field Due to Continuous Volume Charge Distribution

UNIT-2 ELECTRIC FLUX DENSITY, GAUSS' LAW, AND DIVERGENCE

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

UNIT-3 ENERGY AND POTENTIAL

- 3.1 Energy and Potential in a Moving Point Charge in an Electric Field, The Line Integral,
- 3.2 Definition of Potential Difference and Potential,
- 3.3 The Potential Field of a Point Charge,
- 3.4 The Potential Field of a System of Charges:
- 3.5 Conservative Property, Potential Gradient,
- 3.6 The Dipole, Energy Density in the Electric Field

UNIT-4 CONDUCTORS, DIELECTRICS, AND CAPACITANCE

- 4.1 Current and Current Density,
- 4.2 Continuity of Current, Metallic Conductors,
- 4.3 Conductor Properties and Boundary Conditions,
- 4.4 The Nature of Dielectric Materials,
- 4.5 Boundary Conditions for Perfect Dielectric Materials, Capacitance

UNIT-5 POISSON'S AND LAPLACE'S EQUATIONS

- 5.1 Poisson's and Laplace's Equations, Uniqueness Theorem,
- 5.2 Examples of the Solution of Laplace's Equation,
- 5.3 Example of the Solution of Poisson's Equation,
- 5.4 Product Solution of Laplace's Equation

UNIT-6 THE STEADY MAGNETIC FIELD

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

Reference Book:

1. Electromagnetic Fields and Waves, Publisher Katsons, Writer R. Goweri