AMEE12 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 V 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