

SEMESTER - II

Paper - II : Electromagnetic Theory

Max. Marks: 55

Time: 3 Hrs.

Note: Nine questions will be set and students will attempt 5 questions. Question No. 1 will be compulsory consisting of 4 parts based on the conceptual aspects of the whole syllabus. The answers should not be in yes/no. In addition to Question No. 1 there will be four Units in the question-paper each containing two questions belonging to four Units in the syllabus. Students will select one question from each unit.

UNIT - I

Electromagnetic waves in a homogeneous medium, Uniform plane waves, Wave equation for a conducting media, Sinusoidal time variations, Conductors and dielectrics, Direction cosine of a plane wave, Reflection and refraction of plane waves, Surface Impedence Poynting Theorem, Instantaneous, average and complex pointing vector, power loss in a plane conductor.

UNIT - II

Interaction of fields and matter, Equation of motion for charged particles, Force and motion, Circular motion in a magnetic field, Crossed field motion of charged particle.

Frequency response of dielectric materials, TE and TM waves in rectangular and circular guides, attenuation factor and Q of a wave guide.

UNIT - III

Radiation, Potential function and the electromagnetic field, The oscillating dipole power radiated by a current element, Short antennas Power radiated by a monopole or half wave dipole, Electromagnetic field close to an antenna.

Antenna fundamentals, Network Theorems, Directional properties of dipole antennas, Travelling wave antennas, two element array. Horizontal patterns in broadcasting arrays.

Multiplication of patterns, Effect of earth on vertical patterns, Binomial arrays, Antenna gain and effective area.

UNIT - IV

Ionospheric propagation, Introduction to ionosphere, Effective C and O of ionized gas, Reflection and refraction of waves by the ionosphere, Variations in the ionosphere, Attenuation factor for ionospheric propagation, Sky wave transmission, Effect of earth's magnetic field, Wave propagation in the ionosphere, Faraday rotation, Other ionospheric phenomenon.

References

1. Electromagnetic Waves and Radiating Systems (2nd Ed.) - Jordan and Balmain, PHI.
2. Electromagnetics - Kraus, Mc Graw Hill
3. Classical Electromagnetic Theory - Reitz and Millford.
4. Classical Electromagnetic Theory - Phillips and Phnofaky.