

CU 5191 Advanced Radiation Systems

Important 13 Marks Questions

Unit I

1. Derive the radiated Electric and magnetic field for a short dipole.
2. Derive the total power radiated by a wave dipole. Provide required diagrams and analyse the various factors governing the radiated power.
3. List out the numerical techniques useful for analysis of antenna. Explain one of them in detail.
4. Describe all the non-adaptive and adaptive base station antennas of mobile communication with neat diagrams.
5. Briefly explain the loop antennas and derive expression for its radiated fields.

Unit II

1. Explain the radiation mechanism of slot antenna with diagram.
2. Explain the special features of Reflector antenna and discuss on different types of feed used with neat diagram.
3. Explain in detail the radiation through an rectangular aperture. How does it differ from the circular aperture in terms of field distribution?
4. Compute the far electric field component using Fourier transform technique, for an antenna, assuming aperture dimensions and aperture distributions are known.
5. Discuss in detail the principal and design considerations of reflector antenna. Explain the operation of parabolic reflector antenna.

Unit III

1. Explain the structure of phased array and its function in finding direction.
2. Compare analog and digital beam forming techniques, Explain digital beam forming in phased array.
3. Explain how synthesis technique is employed an antenna array.
4. Derive an expression for steering vector of phased array antenna. Explain its significance. Give an account of beamforming networks for phased array antenna.
5. Derive the expression for Array factor of N element linear array with uniform amplitude and spacing between elements.

Unit IV

1. With neat diagram, explain the radiation mechanism of a microstrip antenna.
2. Explain the different excitation techniques used for microstrip patch antenna.
3. Analyse the various feeding networks for the microstrip array with neat diagrams.
4. Explain the radiation principle of a rectangular patch antenna with a neat diagram. Explain the working of circular patch antenna and derive the expression for resonant frequency.
5. Explain the various micro-strip antennas and draw its radiation pattern. Explain the transmission line model of rectangular patch antenna.

Unit V

1. With neat block diagram, explain the procedure for measuring gain of the antenna.
2. What are the minimum requirements for EMC measurements and explain the measurement process?
3. With schematic diagram, explain both direct and indirect method of measuring gain of the antenna.
4. Draw a neat block diagram for antenna radiation pattern & gain measurements. Explain the procedure in detail.
5. With neat diagrams, explain how transmitter and receiver antenna factors are measured.