PVP 19

Code: 19EC3501

III B.Tech - I Semester – Regular Examinations – JANUARY 2022

ANTENNA ANALYSIS AND SYNTHESIS
(ELECTRONICS & COMMUNICATION ENGINEERING)

Duration: 3 hours Max. Marks: 70

Note: 1. This question paper contains two Parts A and B.
2. Part-A contains 5 short answer questions. Each Question carries 2 Marks.
3. Part-B contains 5 essay questions with an internal choice from each unit. Each question carries 12 marks.
4. All parts of Question paper must be answered in one place

PART – A

1. a) Distinguish between Fresnel zone and Fraunofer zone.
   b) Compare far fields of Loop and Short dipole.
   c) Write short notes on Parasitic elements.
   d) Summarize the Advantages and limitations of Microstrip antennas.
   e) Explain Antenna analysis and Antenna synthesis.

PART – B

UNIT – I

2. a) Write the reciprocity theorem in detail. 6 M
   b) Explain current distribution on linear dipoles. 6 M

OR

3. a) Define the term l_{eff} of an antenna. Show that the l_{eff} of an antenna used in a transmitting mode is the same as that of the l_{eff} used in receiving mode. 6 M
   b) Explain the following:
   i) Main lobes and side lobes (ii) Beam width 6 M

UNIT – II

4. a) Derive an expression for the power radiated by the current element and calculate the radiation resistance. 6 M
   b) What is short electric dipole and explain how it can be realized? 6 M

OR

5. a) Explain about Radiation from a Quarter-wave monopole. 6 M
   b) Obtain the Radiation Resistance of a small loop Antenna. 6 M

UNIT-III

6. a) With a suitable diagram, discuss the construction and operation of a Yagi antenna. 6 M
   b) Describe the operation of Folded dipole. 6 M

OR

7. a) State the Fermat's Principal, and explain its applicability to Horn Antennas. 6 M
   b) Distinguish between the axial and normal modes of radiation characteristics of a helical Antenna. 6 M

UNIT – IV

8. a) Name different types of reflector antennas and explain their working. 6 M
   b) Explain the working principal of parabolic antenna. 6 M

OR

9. a) Give the expressions for impedance, bandwidth and directivity of rectangular patch antenna. 6 M
   b) Explain the cassegrain feed system in parabolic reflector. 6 M

UNIT – V

10. a) What is an EFA and derive for its radiation pattern? 6 M

    b) Explain Schelkunoff Polynomial method. 6 M

OR

11. a) Explain the principle of pattern multiplication with an example. 6 M

    b) Write short notes on

    i) Binomial arrays ii) Broad side arrays 6 M