CBCS SCHEME

USN | | | | | | | | | | |

18ECS22

Second Semester M.Tech. Degree Examination, June/July 2019
Antenna Theory and Design

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. Explain antenna performance parameters :
i) Radiation pattern ii) Directivity iii) Gain iv) Polarization v) Bandwidth. **(10 Marks)**

b. A voltage source of amplitude $V_g = (50 + j40)V$ and a source impedance $Z_g = 50\Omega$ is connected to an antenna having a radiation resistance $R_{rad} = 70\Omega$, loss resistance $R_{loss} = 1\Omega$ and reactance $jX = j25\Omega$. Calculate :
i. Radiation efficiency.
ii. Current through antenna circuit
iii. Real power input to the antenna
iv. Power radiated by the antenna
v. Power dissipated in the antenna. **(10 Marks)**

OR

2 a. Define polarization of antenna and explain the three types of polarizations. **(10 Marks)**

b. What is an ideal dipole? Derive an expression for electric and magnetic fields of an ideal dipole. **(10 Marks)**

Module-2

3 a. Explain pattern multiplication, obtain pattern multiplication for two collinear, half wave length spaced short dipoles. **(10 Marks)**

b. What is antenna synthesis? Explain Woodward–Lawson sampling method for line source shaped beam synthesis. **(10 Marks)**

OR

4 a. Derive an expression for normalized array factor for uniformly excited equally spaced linear array for 'N' elements. **(10 Marks)**

b. Explain the Tylor line source method for deriving the expressions for current distribution and half power beam-width. **(10 Marks)**

Module-3

5 a. Derie the expression for radiation resistance for a half wave dipole antenna. **(10 Marks)**

b. What is LPDA? Derive the design equations for LPDA. **(10 Marks)**

OR

6 a. With suitable expressions, explain axial mode Helical antenna. **(10 Marks)**

b. Explain the principles of frequency independent antennas and briefly explain spiral antennas. **(10 Marks)**

Module-4

7 a. Explain the axisymmetric parabolic reflector antennas. (10 Marks)
b. Explain the general feed model for reflector antennas. (10 Marks)

OR

8 a. Explain Gain calculations for reflector antennas. (10 Marks)
b. Write a short notes on feed antennas used in practice. (10 Marks)

Module-5

9 a. Explain the classification of CEM for antenna and the method of moments. (10 Marks)
b. Explain the Pocklington's integral equation. (10 Marks)

OR

10 a. Explain weighted residuals and the method of moments. (10 Marks)
b. Derive the Kirchoff's network equations form integral equations. (10 Marks)

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