B – 2912

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Reg. No. : .....

Name : .....

Second Semester M.Tech. Degree Examination, December 2016
(2013 Scheme)
Branch : Electronics Engineering
Stream : Telecommunication Engineering
TTC 2001 : ANTENNA THEORY ANALYSIS AND DESIGN

Time : 3 Hours

Max. Marks : 60

Instruction : *Answer* ***any two*** *questions from* ***each*** *Module.* ***Each*** *question carries* ***10*** *marks.*

MODULE – I

1. a) State and explain Babinet's principle as applied to slot antennas.

   b) Find the terminal impedance of complementary slot for a cylindrical dipole with $\frac{L}{D}$ ratio of 28 and length of 0.925 λ having terminal impedance of 710Ω s.

2. Explain the radiation mechanism of parabolic reflector antenna. What are the various feeding methods of parabolic reflector antenna ?

3. a) Explain field equivalence principle.

   b) Design an aperture antenna with uniform illumination so that the directivity is maximized at an angle 30° from the normal to the aperture. Determine the optimum dimension and its directivity when the aperture is square.

MODULE – II

4. a) Explain the design method of rectangular patch antenna.

   b) Design a rectangular patch antenna to resonate at 12 GHz. The dielectric constant of the substrate is 2.2 with a thickness of 0.1588 cm.

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5. Design a 4-element broad side array of $\lambda/2$ spacing between elements. The pattern is to be optimum with a side lobe level of 19 dB below the main lobe maximum.

6. A linear broad side array consists of 4 equal inphase isotropic elements with $\lambda/3$ spacing. Calculate and plot the field pattern. Find the directivity and Beam width.

MODULE – III

7. a) Discuss the implementation issues of Smartantenna.

   b) How adaptive antennas are used for enhanced coverage and range extension ?

8. a) Explain the principle of switched beam antennas.

   b) With suitable diagram explain the concept of spatial division multiple access.

9. Determine the complex weight of a two element linear array, half wavelength apart to receive a desired signal of certain magnitude at $\theta_0 = 0°$ while tuning out an interferer at an angle of 30 degree. The element of the array are assumed to be isotropic and the impinging signals are sinusoids.