

M.E. DEGREE EXAMINATIONS: DECEMBER 2009

First Semester

COMMUNICATION SYSTEMS

COM501: Advanced Radiation Systems

Time: Three Hours

Maximum Marks: 100

Answer ALL Questions:-

PART A (10 x 2 = 20 Marks)

1. Explain retarded vector potential A.
2. Define radiation resistance of an antenna.
3. Enumerate the features of dolph chebyshev array.
4. What is a continuous source and discretisation of continuous source?
5. Explain dual's of E, H, A, J, μ
6. Draw the cornu's spiral
7. Draw the transmission line equivalent model for rectangular patch antenna
8. Draw the figure of the cassegrain antenna and label its parts
9. Define circular polarization? How it is classified?
10. What are stokes Parameters?

PART B (16 x 5 = 80 Marks)

- 11 (a) (i) Derive the electric field components and magnetic field components for the field radiated by an alternating current element. (12)
- (ii) For a magnetic current source M find the retarded vector potential F also find E_{Φ} of the magnetic current source. (4)

(OR)

- (b) Derive the electric field components and magnetic field components for the field radiated by an $\lambda/2$ dipole

- 12 (a) (i) Differentiate Broad side array from end fire array (4)
- (ii) Derive an expression for Array factor of broad side array. (12)

(OR)

- (b) What is polynomial method of antenna synthesis? What are visible and invisible regions?

- 13 (a) Write the expressions for electric field and magnetic field for
- (i) Electric current sheet
 - (ii) Magnetic current sheet
 - (iii) Combined electric and magnetic sheets
 - (iv) Electric sheet placed in front of the reflector (12)
- Explain complementary screens and slot antennas with equations. (4)

(OR)

- (b) (i) Derive expression for the electric field of a secondary or Huygens source. (10)
- (ii) Explain Babinet's principle using neat diagrams. (6)

- 14 (a) (i) Draw a neat cross sectional diagram of H plane horn and bring out its electric field expressions. (10)
- (ii) Draw the diagram of a E plane horn antenna and explain its principle of working. (6)

(OR)

- (b) (i) Explain the construction details of a rectangular patch antenna with neat sketches. (8)
- (ii) Obtain the geometrical relations of parabolic reflector antenna. (8)

- 15 (a) (i) Differentiate between linear and elliptical polarization. (10)
- (ii) Explain the significance of the Poincare sphere. (6)

(OR)

- (b) Discuss the development of the Poincare sphere and represent, the state of polarization on the Poincare sphere.
