



Swami Keshvanand Institute of Technology, Management & Gramothan

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Affiliated to Rajasthan Technical University, Kota

Sample Assignment Sheets *Session: 2022-23*

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Branch: ECE
Subject Code: 6EC4-04

Assignment -1
Semester/session: VI/2022-23
Subject: Antenna and Propagation

Max Marks: 10

PART A

- Q.1 Find out the radiation resistance of a $\frac{\lambda}{20}$ wire dipole in free space.
- Q.2 Explain the radiation mechanism of a self-resonant antenna.
- Q.3 An antenna has a loss resistance 15Ω , power gain of 13.01dB and directivity 14dB. Calculate its radiation resistance?
- Q.4. What is Smart Antenna? Write the benefits of smart Antennas?
- Q5. Derive FRISS free space formula.
- Q6. An antenna has a field pattern given by $E(\theta) = \cos^2 \theta$, for $-90^\circ \leq \theta \leq 90^\circ$. Find Half power Beam width.
- Q7. Define following parameters:
a) Directivity b) Radiation pattern c) Antenna input impedance
- Q8. What is the importance of radiation resistance of an antenna.
- Q9. Briefly describe the types of polarization.
- Q10. Explain Tropospheric scattering.

PART B

- Q1. Derive the far field equations of finite length dipole antenna.
- Q2. Explain the applications of reciprocity theorem.
- Q.3 Explain the field regions of an antenna.
- Q.4 Calculate the maximum effective aperture of a microwave antenna which has a directivity of 29.5dB.
- Q.5 Explain different mechanism of wave propagation.

PART C

- Q1. What is Line of sight Propagation? Explain the duct propagation.
- Q.2 What is Fixed weight beam forming technique?
- Q.3 Derive an expression for the fields of an infinitesimal Dipole carrying current I_0 which is located at the origin along z axis of the coordinate system?
- Q.4 What is the need of Auxiliary potential function and explain the methodology to analyze field equations.



Assignment -2

Branch: ECE
Subject Code: 6EC4-04

Semester/session: VI/2022-23
Subject: Antenna and Propagation

Max Marks: 10

PART A

- Q1. Draw the labeled diagram of E-plane sectoral horn and H-plane sectoral horn.
- Q2. Write down the application of Log periodic and Yagi-Uda antenna.
- Q3. State Babinet's Principle?
- Q4. What is antenna array? Write the types of antenna array.
- Q5. Write the difference between End fire array and Broadside Array.
- Q6. Explain Cassegrain feeding in reflector antenna.
- Q7. Write down design formula of rectangular microstrip patch antenna.
- Q8. Explain construction and working of Horn Antenna.
- Q9. Explain Aperture and Reflector Antennas with its applications.
- Q10. Explain the feeding techniques for Microstrip patch antenna?

PART B

- Q1. What do you understand by field equivalence principle? Explain.
- Q2. Sketch a 3 element Yagi-Uda antenna. Describe the importance of length of reflector and its separation from driven element with regard of performance of Yagi-Uda antenna.
- Q3. Design a rectangular microstrip patch antenna using a substrate with dielectric constant of 2.2, $h=0.1588$ cm so as to resonate at 10 GHz.
- Q4. Design a rectangular pyramidal horn antenna to be operated at 11 GHz frequency with required gain of 22.6 dB, if dimensions of the connecting waveguide are $a = 2.286$ cm and $b = 1.016$ cm.
- Q5. Explain the substrate thickness & dielectric constant on the performance of Microstrip Antenna.

PART C

- Q1. Explain the transmission line model for analysis of Microstrip patch antenna? Write down the criteria for substrate selection?
- Q2. Derive the expression for field distribution on circular aperture in an infinite ground plane?
- Q3. What is Schelkunoff polynomial method? Explain array design with an example.
- Q4. A waveguide aperture is mounted on an infinite ground plane, as shown in figure. Assuming that the tangential component of the electric field over the aperture are