



Printed Pages : 3

EC – 032

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 3058

Roll No.

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B. Tech.

(SEM. VIII) EXAMINATION, 2006-07

ANTENNA ANALYSIS & SYNTHESIS

Time : 3 Hours]

[Total Marks : 100

Note : Attempt all questions.

1 Attempt any **four** parts of the following : **5×4=20**

- (a) Define beam width; effective aperture, radiation intensity, directivity and power gain of any antenna.
- (b) What is half wave dipole Antenna? Derive its electric field component and plot its radiation pattern.
- (c) What are the geometrical conditons of Helias as compared to freq. of propagation, when the structure behaves as an antenna.
- (d) Classify Antenna Arrays. Explain any one type of Array with relevant example.
- (e) Consider a linear Brodside Array and elements seperated by a distance of λ_2 with equal amplitude. Draw its radiation pattern. Also find out the direction of all maximas and minimas.
- (f) What are planar arrays and how they are designed. What are the advantages of planer array over linear array.

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2 Attempt any **four** of the following parts : **5×4=20**

- (a) How Reciprocity theorem is used in Antennas. Prove it in respect of Antennas.
- (b) On what factors input Impedance of any Antenna depends upon? What are different methods to calculate impedance of any Antenna ? Explain one of them.
- (c) Find out Mutual Impedance between linear elements when they are configured side-by side.
- (d) Consider the diameter of the wire to be finite, how the current distribution is considered ? Explain moment method.
- (e) Explain what are the factors to choose basis functions.
- (f) Explain current distribution of finite radius centered dipole.

3 Attempt any **two** of the following parts : **10×2=20**

- (a) Describe with the support of mathematical equation and diagrams about feeding structures for Antennas.
- (b) Discuss about Ground plane Antennas, Sleeve Antennas, Turnstile and super turn stile antenna.
- (c) What are Slot Antennas and what are its applications ? Derive and draw the pattern of slot Antennas in Flat sheet.

4 Attempt any **two** parts of the following : **10×2=20**

- (a) What are travelling wave Antennas ? How they are different than standing wave Antenna?
- (b) What are the various modes into which Helical Antennas can be used ? A rectangular aperture with a constant field distribution with $a=3\lambda$ and $b=2\lambda$ is mounted on an infinite ground plane. Compute the FNBW and HPBW in E-plane and directivity.
- (c) What are frequency scanned arrays ? Explain their working and give applications.

5 Attempt any **two** parts of the following : **10×2=20**

- (a) What are Reflectors ? Classify them and describe them with the support of diagram. What is Aperline Blockage and how it is improved?
- (b) In what frequency range lens Antennas are used and why? Compare lens Antennas with Reflectors. How lens with variable index of Refraction can be designed and what are its advantages?
- (c) Show that the directivity of a uniformly illuminated circular aperture of diameter d is equal to $(\pi d / \lambda)^2$. How artificial dielectric lens Antennas are made. Explain surface mismatches and its remedies.