May 2024

M.Tech (ECE) II Semester

Antennas and Radiating Systems (MEC-201)

Time : 3 Hours]   [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*

2. *Answer any four questions from Part-B in detail.*

3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART–A

1. (a) Mention any two advantages of micro strip antennas.
                                                        (1.5)

    (b) Define antenna temperature and antenna impedance.
                                                        (1.5)

    (c) What are E-plane and H-plane sectoral horns?   (1.5)

    (d) What are the applications of horn antenna?   (1.5)

    (e) Define antenna efficiency.   (1.5)

    (f) Calculate the radiation resistance of a $\lambda/10$ wire dipole in free space.   (1.5)

    (g) What is meant by parasitic element?   (1.5)

(h) How much current does an antenna draw when radiating 1000 watts and is having a radiation resistance of 300 ohm? (1.5)

(i) What are the applications of loop antenna? (1.5)

(j) What do you understand by MIMO? (1.5)

PART–B

2. (a) Explain horn antenna in detail with radiation pattern and how it differs from helical antenna. (7.5)

(b) What is the significance of loop antennas? Discuss small circular loop antenna in detail. (7.5)

3. (a) Why antenna array is required? Also discuss the concept of super directivity. (7.5)

(b) Derive the expression for the directivity of an n element ordinary end-fire linear array. (7.5)

4. (a) Discuss in detail the ground effects in linear wire antennas. (7.5)

(b) Explain Friis transmission equation in detail. (7.5)

5. (a) Describe in detail the design considerations for linear arrays antennas. (7.5)

(b) Explain feeding mechanisms and method of analysis for micro strip antennas. (7.5)

6. (a) Explain in detail the current distribution on a thin wire antenna. (7.5)

(b) Explain Huygen's field equivalence principle and radiation mechanism of a circular aperture antenna. (7.5)

7. Write short notes on :

(a) Cassegrain reflectors.

(b) Circular Patch. (15)

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