Please check that this question paper contains___9___ questions and ___2___ printed pages within first ten

[Total No. of Questions: 09] [Total No. of Pages: 2]

Uni. Roll No. .....

MORNING

12 MAY 2023

Program: B.Tech. (Batch 2018 onward)
Semester: 5th
Name of Subject: Antenna and Wave Propagation
Subject Code: PCEC-113
Paper ID: 16420
Scientific calculator is Allowed

Time Allowed: 03 Hours **Max. Marks: 60**

NOTE:

1) Parts A and B are compulsory
2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
3) Any missing data may be assumed appropriately

Part – A **[Marks: 02 each]**

Q1.

a) Define the term Radiation Intensity.
b) Define Antenna Input Impedance.
c) Explain the significance of Scanning Arrays.
d) Explain the term Optimum Working Frequency in context of ionospheric communication.
e) Differentiate between near field and far field regions.
f) Differentiate between monopole and half wave dipole.

Part – B **[Marks: 04 each]**

Q2. Explain current distribution on thin wire antenna.

Q3. Explain Field Equivalence principles with an example.

Q4. Explain the array factor in case of *N* element linear antenna array.

Q5. Compare any two feed networks for microstrip patch antenna.

Q6. Differentiate between duct propagation and tropospheric propagation.

Q7. Derive Friis Transmission Equation.

Part – C **[Marks: 12 each]**

Q8. Explain the term Effective Aperture. Also explain different types of Antenna Apertures.

OR

Explain the concept of Retarded Potential.

Q9. Design a seven element broadside array which has the optimum pattern for a side lobe level of -21 dB. The spacing between the elements has to be $\lambda/2$.

OR

A communication system is to be established at a frequency of 70 MHz with a transmitter power of 1 kW. The field strength of the directive antenna is 3 times that of a half wave antenna. Height of transmitting antenna is 50 m and height of receiving antenna is 5 m. A field strength of 50 μV/m is required to give satisfactory reception. Determine the range of the system.

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