Code No: RT31045 **R13** SET - 1

III B. Tech I Semester Supplementary Examinations, March – 2021

ANTENNAS AND WAVE PROPAGATION

(Electronics and Communication Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answering the question in **Part-A** is compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A (22 Marks)

1. a) What is the effective area of a half-Wave dipole operating at 500 MHz? [3M]
   b) Discuss about 1/r, $1/r^2$ and $1/r^3$ terms and suggest the suitable term at far-field calculations. [4M]
   c) How much 'αe' is required for BSA, EFA (forward & backward directions)? [4M]
   d) List out the differences between conventional dipole antenna and Helical Antenna. [4M]
   e) List out the measurement ranges? Explain any one of the range. [4M]
   f) Explain Ionospheric Layers. [3M]

PART –B (48 Marks)

2. a) Write notes on polarization, Antenna Aperture (A_{eff}) and directivity (D)? What is the relation between A_{eff} and D? [8M]
   b) Define and estimate effective weight of an antenna if current distributions are triangle and sinusoidal. [8M]

3. a) Derive the radiated fields by small loop antenna. [8M]
   b) How can estimate E and M fields at far-field distance radiated by an antenna? Explain. [8M]

4. a) Derive the array factor and draw the radiation pattern of 2-Element linear Array with'd'=λ/2 and direction is broad side. [8M]
   b) Explain the design and working of 5-Element linear array at f=1 GHz. [8M]

5. a) Compare the performance of traveling wave radiator with respect to resonant radiator. [8M]
   b) Define axial Ratio. Estimate the type of Polarization if AR=0, 1 and 100. [8M]

6. a) Explain the 90^0 corner reflector. [8M]
   b) Find the power gain and directivity of a horn whose dimensions are 10 cm x 5 cm operating at a frequency of 6 GHz. [8M]

7. a) Explain the Tropospheric wave Propagation. [8M]
   b) Prove that: $f_{muf} = Sec(\theta i)$. [8M]

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