

Code No: RT31045

R13**SET - 1****III B. Tech I Semester Supplementary Examinations, October/November - 2018****ANTENNA 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. Answer **ALL** the question in **Part-A**3. Answer any **Three** Questions from **Part-B****PART -A**

1. a) Estimate radiation intensity if power density is $A_0 \sin \theta$? [3M]
- b) Estimate the retarded time in antenna field propagation at a radial distance 6λ ? [3M]
- c) Draw the configuration of 16 elements in linear, planar and circular Array structure? [4M]
- d) Define resonant and non-resonant radiators? [4M]
- e) Discuss about importance of F/D ratio in parabolic antenna? [4M]
- f) Define path loss in Friis Transmission formula? [4M]

PART -B

2. a) Explain the working principle of a single wire antenna? [8M]
- b) Define effective height (h_{eff}) of an antenna? Discuss h_{eff} for half wave Dipole and short dipole antenna? [8M]
3. a) Using basic equations, prove that R_{rad} of a half wave dipole is 73Ω ? [8M]
- b) Find the radiation resistance of a loop antenna (i) single turn (ii) Number of turns = 10 of diameter 0.5 m and operating at 1 MHz. [8M]
4. a) Derive the array factor of N-element isotropic linear uniform distributed Antenna? [8M]
- b) An array contains 10 isotropic radiators with an inter element spacing of 0.5λ . It is required to produce broadside and end-fire beams
i) Find Null-to-Null beam width and half-power beam width in degrees.
ii) Find the directivity of both forms of arrays. [8M]
5. a) Design and explain the working principle of a microstrip antenna? [8M]
- b) Explain the working principle of a helical antenna in normal mode? [8M]
6. a) List out different types of Familiar reflector antennas? Explain any one of the antenna? [8M]
- b) Explain the Gain Measurement 3-antenna method? [8M]
7. a) A transmitter operating at a frequency of 2 MHz is required to provide a ground wave field strength of 0.5 mV/m at a distance 10 km. A short Vertical transmitting antenna has an efficiency of 50%. The conductivity of the ground is 5×10^{-5} (mho) / cm and its relative permittivity is 10. Find the transmitter power required. [8M]
- b) Derive the LOS distance in space wave propagation? [8M]
