

Code No: R1631045

R16**SET - 1****III B. Tech I Semester Supplementary Examinations, May - 2019****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 **FOUR** Questions from **Part-B**

~~~~~

**PART -A**

1. a) Find effective height if antenna length is  $\lambda/10$ . [2M]
- b) Find the retarded time in antenna field travelled in a medium  $\epsilon_r$  is 4 at Radial distance  $4\lambda$ . [2M]
- c) Calculate the number of elements required to design a linear array of length  $50\lambda$  with  $d=\lambda/2$ . [2M]
- d) Define travelling wave radiators? List out the differences between resonant and travelling wave radiators. [3M]
- e) Define Zoning in lens antenna. [3M]
- f) Define critical frequency and MUF. [2M]

**PART -B**

2. a) Calculate the exact directivities of the unidirectional antenna having Power pattern  $p(\theta, \Phi) = P_m \cos \theta$ . ( $0 \leq \phi \leq 2\pi$ , and  $0 \leq \theta \leq \pi/2$ ). [7M]
- b) Find the radiation resistance of a Hertzian dipole of length  $\lambda/40$ ,  $\lambda/60$ ,  $\lambda/80$ . [7M]
3. a) Estimate the directivity of a half-wave dipole antenna? (Note: Use required basic equations). [7M]
- b) Define retarded potentials? Explain Heuristic approach. [7M]
4. a) Prove that the uniform amplitude linear array antenna SLR(Side lobe Ratio) is Independent on the Configuration. [7M]
- b) Design a Yagi-Uda antenna at frequency 200 MHz and Number of Elements are 5. [7M]
5. a) Design a Microstrip antenna at operating frequency 2 GHz and  $\epsilon_r=2.2$ . Assume the required Data. [7M]
- b) Explain the principle of long -wire antenna with their equations. [7M]
6. a) Classify the lens Antenna? Explain the function of lens antennas. [7M]
- b) Find the gain of a paraboloid of 2m diameter operating at 5 GHz when Half-wave dipole feed is used. [7M]
7. a) Derive the reflective index and cutoff frequency of a layer in sky Wave propagation. [7M]
- b) Draw the equivalent circuit of a ground? Explain the effect of wave tilt in Ground wave propagation. [7M]

\*\*\*\*\*