

III B. Tech I Semester Supplementary Examinations, October/November - 2020

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**(14 Marks)**

1. a) Define radiation intensity of an antenna. [2M]
- b) Obtain the directivity of an Isotropic antenna. [2M]
- c) Write weights of 5 elements binomial array. [2M]
- d) Explain the significance of Long length antennas. [3M]
- e) Differentiate between wire grid reflectors and corner reflectors. [3M]
- f) Write short notes on M curves. [2M]

PART -B**(56 Marks)**

2. a) Define the term I_{eff} of an antenna. Show that the I_{eff} of an antenna used in a transmitting mode is the same as that of the I_{eff} used in receiving mode. [7M]
- b) Define and derive the effective height h_{eff} of an antenna. Find ' h_{eff} ' of a short dipole and $\lambda/2$ antenna. [7M]
3. a) What are the main characteristics of a radiated wave in far field region? The components of a wave in far field region are $E_{\theta}=3mV/m$ and $E_{\phi}=4mV/m$. Calculate the total electric and magnetic field in free space. [7M]
- b) What is short magnetic dipole and explain how it can be realized? [7M]
4. a) An array consists of two collinear $\lambda/2$ dipoles with λ spacing. Determine gain and beam width of the major lobe between 3dB points in the plane containing the array. [7M]
- b) Explain the significance and characteristics of an EFA with increased directivity. [7M]
5. a) Describe the characteristics of long wire travelling wave antennas and sketch their patterns. [4M]
- b) Explain the working principle of helical antenna in various modes. [10M]
6. a) Establish and explain the gain and beamwidth relations for a parabolic reflector and account for its beam shaping considerations in terms of F/D and losses. [7M]
- b) Distinguish between sectoral, pyramidal and conical horns, with neat sketches. List out their utility and applications. [7M]
7. a) Establish the mathematical relations for: i) radio horizon, and ii) Field strength at receiver. [10M]
- b) Explain the principle of operation of troposcatter of communication. [4M]
