*Regulation R20* *Subject code: 3P6DB*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

## B.Tech VI Semester Supplementary Examinations, February 2024

## ANTENNAS AND WAVE PROPAGATION

*(Electronics and Communication Engineering)*

***Maximum Marks: 70*** Date:17.02.2024 Duration: 3 hours

**Note:** **1.This question paper contains two parts A and B.**
**2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.**
**3. Part B consists of 5 Units. Answer any one full question from each unit.**
**4. Each question carries 10 marks and may have a, b, c, d as sub questions.**

## Part-A

**All the following questions carry equal marks** **(10X2M=20 Marks)**

| | | | CO | Blooms Tx |
|---|---|---|---|---|
| 1 | Write about fields from oscillating dipole | 2M | CO1 | L1 |
| 2 | Define Reciprocity Theorem applicable to Antennas. | 2M | CO1 | L2 |
| 3 | Differentiate normal mode and axial mode in helical antenna | 2M | CO2 | L2 |
| 4 | Draw Folded dipole antenna and what is its input impedance? | 2M | CO2 | L2 |
| 5 | Write image principle in corner reflector antenna | 2M | CO3 | L1 |
| 6 | Write applications of Parabolic reflector antenna | 2M | CO3 | L1 |
| 7 | What are the advantages and disadvantages of binomial arrays. | 2M | CO4 | L1 |
| 8 | Differentiate near field region and far field region in antenna measurements | 2M | CO4 | L2 |
| 9 | Write short notes on Ground wave propagation | 2M | CO5 | L1 |
| 10 | Define Optimum usable frequency of an Ionosphere layer | 2M | CO5 | L2 |

## Part-B

Answer All the following questions. **(10M X 5=50Marks)**

| | | | | |
|---|---|---|---|---|
| 11 | Differentiate small loop antenna and large loop antenna? Derive radiation resistance of small loop antenna | 10M | CO1 | L4 |
| | OR | | | |
| 12 | Derive the radiation resistance of Quarter wave Monopole Antenna | 10M | CO1 | L4 |
| 13 | Discuss the construction and basic principle of operation of Helical Antenna under Normal and Axial mode of operation. | 10M | CO2 | L3 |
| | OR | | | |
| 14 | Explain the constructional details and radiation pattern of Yagi Uda Antenna with a neat diagram. | 10M | CO2 | L3 |
| 15 | a) Explain the geometry of Rectangular patch antenna.<br>b) A parabolic dish provides a power gain of 50dB at 10 MHz with 70% efficiency. Find (i) diameter (ii) BWFN | 5M<br>5M | CO3 | L4 |
| | OR | | | |

| | | | | |
|---|---|---|---|---|
| 16 | a) Explain various types of reflector antennas.<br>b) Discuss the various feeds of parabolic reflector antenna. | 5M<br>5M | CO3 | L3 |
| 17 | Sketch the radiation pattern of array of 2-point sources for the following cases. Two elements fed with currents equal in magnitude and in phase separated by $\lambda/2$. Two elements fed with currents equal in magnitude and opposite in phase separated by $\lambda/2$ | 10M | CO4 | L3 |
| | OR | | | |
| 18 | a) Explain gain measurement using direct method<br>b) List the different sources of errors in antenna measurements. | 5M<br>5M | CO4 | L2 |
| 19 | a) How the field strength is varied according to the distance and height in space wave propagation.<br>b) Explain the concept of Wave tilt | 5M<br>5M | CO5 | L2 |
| | OR | | | |
| 20 | Explain the following: i) M- Curves<br>ii) Tropospheric propagation | 5M<br>5M | CO5 | L3 |