

**ANURAG Engineering College**

(An Autonomous Institution)

III B.Tech I Semester Regular/Supplementary Examinations, Dec-2023/Jan-2024

**ANTENNAS AND WAVE PROPAGATION**

(ELECTRONICS AND COMMUNICATION ENGINEERING)

**Time: 3 Hours****Max.Marks:75****Section – A (Short Answer type questions)****(25 Marks)****Answer All Questions**

	Course Outcome	B.T Level	Marks
1. Evaluate the radiation resistance of an antenna which is radiating 1000W and drawing current of 5A.	CO1	L2	2M
2. Show the relationship between antenna temperature and solid angle.	CO1	L2	3M
3. Recognize the principle of the pattern multiplication?	CO2	L1	2M
4. Design a three element Yagi-Uda antenna to operate at a frequency of 200 MHA.	CO2	L2	3M
5. List out the advantages of helical antenna	CO3	L1	2M
6. What do you meant by sectoral horn and also state its types?	CO3	L2	3M
7. Mention the application of parabolic antenna	CO4	L2	2M
8. List out the types of antenna measurement?	CO4	L2	3M
9. Define skip distance.	CO5	L1	2M
10. Calculate the critical frequency for reflection at vertical incidence if the maximum value of electron density is $1.24 \times 10^6 \text{cm}^{-3}$ ?	CO5	L2	3M

**Section B (Essay Questions)****Answer all questions, each question carries equal marks.****(5 X 10M = 50M)**

- |  |     |    |     |
|--|-----|----|-----|
| 11. A) Derive the Expression for power radiated and find the radiation resistance of a quarter wave monopole antenna.  | CO1 | L3 | 10M |
| <b>OR</b>  |     |    |     |
| B) Explain the following parameters of an antenna:<br>(i) Beam solid angle<br>(ii) Radiation pattern<br>(iii) Gain<br>(iv) Polarization<br>(v) Bandwidth                                   | CO1 | L3 | 10M |
| 12. A) What is an antenna array? What are the types of antenna arrays, for each type explain it with array diagram and radiation pattern   | CO2 | L2 | 10M |
| <b>OR</b>  |     |    |     |
| B) A uniform linear array consists of 16 isotropic point sources with a spacing of $\lambda/4$ . If the phase difference is -90 degree, calculate the directivity, HPBW, Beam solid angle. | CO2 | L3 | 10M |
| 13. A) Draw and explain the function of Helical antenna and various modes of radiation. Highlight some of its applications. How does it differ from other antennas?                        | CO3 | L3 | 10M |
| <b>OR</b>  |     |    |     |
| B) Explain the principle of rectangular horn antenna with a neat sketch. Draw various types of horn structure.   | CO3 | L3 | 10M |

14. A) With neat block diagram, how Radiation pattern of an antenna can be measured. CO4 L3 10M
- OR**
- B) Discuss in detail about lens antennas CO4 L3 10M
15. A) Describe the composition of the ionosphere. Derive the expression for the effective dielectric constant of an Ionospheric medium CO5 L3 10M
- OR**
- B) Discuss in detail about fading and diversity reception and also explain its types CO5 L3 10M