Sub Code: BECT602 **ROLL NO……..……..**

EVEN SEMESTER EXAMINATION, 2023 – 24

III year B.Tech. – Electronics & Communication Engineering

Antennas and Wave Propagation

Duration: 3:00 hrs **Max Marks: 100**

Note: - Attempt all questions. All Questions carry equal marks. In case of any ambiguity or missing data, the same may be assumed and state the assumption made in the answer.

Q 1.	Answer any four parts of the following. a) What is the basic requirement of an Antenna? Provide the expression for the power radiated by a current element? b) Explain how the Woodward-Lawson method optimizes the radiation pattern of an antenna array. c) Explain frequency independent antenna with the help of clear diagram? d) If the critical frequency of an ionized layer 1.5MHz, find the electron density of the layer. e) What is the effect of feed on standing wave antennas? f) Prove that the Radiation Resistance of Half wave dipole is 73Ω.	5x4=20
Q 2.	Answer any four parts of the following. a) What is the critical angle of propagation for D-layer if the transmitter and receiver are separated by 500Km ? b) Write the advantages and disadvantages of Rhombic Antenna? c) What is the effective area of a half wave dipole operating at 500 MHz ? d) Write a short note on Lens Antenna with clear diagram and expressions? e) What are the various methods of analysis used to study microstrip antennas? f) How does ducting affect radio wave propagation, and where is it commonly encountered?	5x4=20
Q 3.	Answer any two parts of the following. a) Derive the expression for Radiation Resistance of Hertzian Dipole. b) What is Microstrip Patch Antenna? Give the detailed classification of different types of Feeding method used in Microstrip patch Antenna? c) Derive the expression for resultant radiation pattern of two-element uniform array.	10x2= 20

Q 4.	Answer any two parts of the following. a) Explain and prove Uniqueness Theorem in detail. b) Design a rectangular microstrip antenna using a substrate(RT/duroid 5880) with dielectric constant of 2.2. h = 0.1588 cm to resonate at 10 GHz. c) Explain Ionospheric wave propagation along with the characteristics of different layer of Ionosphere	10x2= 20
Q 5.	Answer any two parts of the following. a) Explain Yagi-Uda Antenna with its salient features and radiation pattern with all the designing parameters. b) Derive the relation between MUF and the skip distance. c) Give the classification of Antennas based on different parameters? Explain the multiplication of patterns in detail?	10x2= 20

****