Roll No. | | | | | | | | | | |

ANNA UNIVERSITY (UNIVERSITY DEPARTMENTS)

B.E. (Full Time) - END SEMESTER ARREAR EXAMINATIONS, APR / MAY 2024

ELECTRONICS AND COMMUNICATION ENGINEERING

V

EC5501 & ANTENNAS AND WAVE PROPAGATION

(Regulation 2019)

Time:3hrs Max.Marks: 100

CO1	Ability to apply EM Concepts to determine antenna parameters.
CO2	Ability to design and analyze aperture antennas.
CO3	Ability to design and analyze weighted distribution in antenna arrays.
CO4	Ability to design and analyze modern antennas.
CO5	Ability to apply wave propagation concepts to atmosphere propagation.

BL – Bloom's Taxonomy Levels

(L1-Remembering, L2-Understanding, L3-Applying, L4-Analysing, L5-Evaluating, L6-Creating)

PART- A (10x2=20Marks)

(Answer all Questions)

Q. No.	Questions	Marks	CO	BL
1	Sketch the structure of Yagi Uda Array for a frequency of 200 MHz.	2	1	3
2	What is the need for Baluns?	2	1	2
3	Explain pattern multiplication.	2	2	1
4	Compare Binomial and Chebyshev distributions.	2	2	5
5	State Huygens principle for Aperture antennas.	2	3	3
6	State Babinet's principle and how does it give rise to the concept of complementary antenna.	2	3	1
7	What is adaptive array? Where is it employed?	2	4	1
8	Classify reconfigurable antenna by considering the properties of a base design.	2	4	2
9	List the factors that affect the propagation of radio waves.	2	5	2
10	Mention the requirements and types of anechoic chamber.	2	5	2

PART- B (5x 13=65Marks)

(Restrict to a maximum of 2 subdivisions)

Q. No.	Questions	Marks	CO	BL
11 (a)	Derive the field equations, power radiated and radiation resistance of a half wave dipole.	13	1	5
	OR			
11 (b)	Describe the antenna parameters. (i) Gain (ii) Bandwidth (iii) Input Impedance (iv) Effective aperture	13	1	1
12 (a)	An antenna array consists of two identical isotropic radiators spaced by a distance of $d=\lambda/4$ meters and fed with currents of equal magnitude but with a phase difference β. Compose the resultant radiation for $\beta=0^0$ and thereby identify the direction of maximum radiation.	13	2	6
	OR			

12 (b)	Discuss and derive the expressions for directivity of the following N element linear array antennas. (i) Broad side array (ii) End fire array.	**13**	2	2
13 (a)	What are the different types of horn structures? Draw the radiation pattern of horn antenna and hence describe the radiation mechanism with neat diagram.	**13**	3	1
	OR			
13 (b)	With necessary sketches, explain in detail the radiation mechanism of a microstrip patch antenna.	**13**	3	2
14 (a)	Write short notes on Wearable antennas and Dielectric resonator antennas.	**13**	4	3
	OR			
14 (b)	Briefly describe (i) Gain Enhancement techniques (ii) Bandwidth enhancement Techniques.	**13**	4	3
15 (a)(i)	Explain Gain measurement by direct comparison method.	**7**	5	5
(ii)	Explain the gain measurement using absolute method.	**6**	5	5
	OR			
15 (b) (i)	Define the terms: (1) Optimum working frequency (2) Skip distance (3) Virtual height.	**6**	5	1
(ii)	Describe in detail the important features of ground wave propagation?	**7**	5	2

PART- C (1x 15=15Marks)

(Q.No.16 is compulsory)

Q. No.	Questions	Marks	CO	BL
16. (i)	Construct a 2 ray model of sky wave propagation and explain in detail.	**8**	5	3
(ii)	Draw the neat block diagram for polarization and VSWR measurement and describe the procedure in detail.	**7**	5	2