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Question Paper Code	13195
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B.E. / B.Tech. - DEGREE EXAMINATIONS, NOVEMBER / DECEMBER 2024

Seventh Semester

Electronics and Communication Engineering

EC8701 - ANTENNAS AND MICROWAVE ENGINEERING

Regulations - 2017

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

	<i>Marks</i>	<i>K- Level</i>	<i>CO</i>
1. Draw the two dimensional radiation pattern of a directional antenna.	2	K2	CO1
2. Define gain of antenna.	2	K1	CO1
3. List the disadvantages of loop antennas.	2	K1	CO2
4. Name the types of feed method for microstrip antenna.	2	K1	CO2
5. List out the advantages and disadvantages of binomial arrays.	2	K1	CO3
6. Trace the pattern of two point sources separated by $\lambda/2$.	2	K2	CO3
7. Define transit time.	2	K1	CO5
8. Why magnetron is called a cross field device?	2	K2	CO5
9. Calculate the VSWR of an amplifier, if the amplifier has reflection coefficient 0.2533.	2	K2	CO6
10. List the advantages of microstrip line matching networks.	2	K1	CO6

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

11. a) Summarize the Friis transmission equation relating the power received to the power transmitted between the antennas separated by a distance of 'R' units. 13 K2 CO1

OR

b) Explain the concept of (i) Bandwidth, (ii) Beam efficiency, (iii) Antenna Temperature. 13 K2 CO1

12. a) Compare different types of horn antenna structures with neat diagrams. Also determine its directivity and beamwidth. 13 K3 CO2

OR

b) Determine the expression for the radiated fields of a $\lambda/2$ center fed dipole antenna. Sketch the radiation pattern of the $\lambda/2$ center fed dipole antenna. 13 K3 CO2

13. a) Explain in detail the Binomial Array and derive the expression for its array factor. Also obtain the excitation coefficients and directivity of a seven element binomial array separated by $\lambda/2$. 13 K2 CO3

OR

- b) Express the direction of pattern maxima, direction of pattern minima, beamwidth, directivity of uniform end fire array of four point sources of equal amplitude and spacing. 13 K2 CO3
14. a) Illustrate the working principle of two cavity klystron and obtain its velocity modulation and bunching parameter. 13 K2 CO5
- OR**
- b) Explain the working of Gunn diode with two valley model diagram. 13 K2 CO5
15. a) Summarize the characteristics of amplifier and examine the transducer power gain, unilateral power gain, available power gain and operating power gain of a microwave amplifier using S parameters. 13 K2 CO6
- OR**
- b) Explain the concept of RF mixers along with types with neat sketches. 13 K2 CO6

PART - C (1 × 15 = 15 Marks)

16. a) Explain the noise characteristics of a microwave receiver front end with necessary diagrams and mathematical expression. 15 K2 CO4
- OR**
- b) Draw a neat diagram describing the magic Tee working principle and derive its S-matrix. 15 K2 CO4