Question Paper Code: R18A32EC01

R18

ANURAG Engineering College

(An Autonomous Institution)

III B.Tech II Semester Regular/Supplementary Examinations, June/July-2024

MICROWAVE ENGINEERING

(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.	Why TM_{01} and TM_{10} modes in a rectangular waveguide do not exists?	CO1	L1	2M
2.	How would you categorize the modes as degenerate modes in arectangular waveguide?	CO1	L1	3M
3.	Show the importance of circulator in microwave applications.	CO2	L2	2M
4.	State the properties of ferrites.	CO2	L1	3M
5.	What do you meant by Applegate diagram?	CO3	L1	2M
6.	Compare Travelling Wave Tube (TWT) and Klystron amplifier.	CO3	L2	3M
7.	What is Gunn effect?	CO4	L1	2M
8.	Explain-why magnetron is called as Cross field Devices?	CO4	L2	3M
9.	Define Reflection Co-efficient at the input side and output side of a two-port network in terms of S-parameters.	CO5	L2	2M
10.	Compare E-plane Tee and H-plane Tee	CO5	L1	3M

Section B (Essay Questions)

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

11. A)	Assume the plate separation is 10 cm find the propagation constant, phase velocity, group velocity and wave impedance at 6 GHz for TE10 mode.	CO1	L3	10M
	OR			
B)	Examine the different types of microstrip lines and give a brief note of their characteristics.	CO1	L3	10M
12. A)	For an air-filled rectangular guide cavity resonator of 4 cm x 2 cm. cross section and 5 cm axial length, determine the resonant frequency of the lowest 3 possible modes.	CO2	L3	10M
	OR			
B)	Explain the construction and operation of ferrite isolator.	CO2	L2	10M
13. A)	Examine the operation of a two-cavity klystron amplifier. Derive expressions for bunched beam current and efficiency.	CO3	L3	10M
	OR			
B)	What is Helix TWT? Explain the amplification process of TWT with neat diagram.	CO3	L2	10M

14. A)	Organize the pi mode magnetron with and without presence of RF Field.	CO4	L3	10M
	OR			
B)	With neat schematics, explain the physical structure and doping profile of a TRAPATT diode, and sketch its voltage/current versus time characteristics.	CO4	L3	10M
15. A)	Derive the S-matrix of a Magic Tee with neat diagram.	CO5	L3	10M
	OR			
B)	Analyze the different types of Impedance measurement methods?	CO5	L2	10M