CMR ENGINEERING COLLEGE:: HYDERABAD UGC AUTONOMOUS IV–B.TECH–I–Semester End Examinations (Supply) – April-2025 MICROWAVE ENGINEERING (ECE)

R20

[Time: 3 Hours]

Note: This question paper contains two parts A and B. Part A is compulsory which carries 20 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

	PART-A	(20 Marks)
1. a)	Define the phase and group velocities.	[2M]
b)	Briefly list the typical applications of microwaves.	[2M]
c)	What is cavity resonator?	[2M]
d)	Compare probe and loop connectors.	[2M]
e)	Write the classification of microwave tubes.	[2M]
f)	State the applications of TWT.	[2M]
g)	Why magnetron is called as cross filed device?	[2M]
h)	What are the advantages of transit time devices?	[2M]
i)	What are the classifications of power measurements?	[2M]
j)	Write S matrix of 3 port circulator.	[2M]

PART-B

2.	Derive the equation for impedance of Rectangular wave guide in both TE and TM	[10M]
	mode.	

OR

3.	Explain Microwave Spectr	um and Bands and V	Write the applications of	of Microwaves.	[10M]
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4. Explain about rectangular cavity resonator and calculate its Q Factor and Coupling [10M] Coefficients.

OR

- 5. Explain about waveguide Dielectric and Rotary vane phase shifters with neat [10M] diagrams.
- 6. A two cavity amplifier klystron has the following parameters: Beam voltage =900V, [10M] Beam current =30 mA, operating frequency =8GHz, gap spacing in either cavity d=1mm, spacing between centers of cavities=4cm, effective shunt impedance R_h=40kfl.Find the electron velocity, dc electron transit time, input voltage for maximum output voltage, the voltage gain in dB.

OR

7. What is the operation of TWT and explain their amplification process in detail. [10M]

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[Max. Marks: 70]

(50 Marks)

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8.	Explain the modes of Resonance and Pi mode operation in magnetron.	[10M]
	OR	
9.	What is negative resistance phenomenon? Explain the operation and characteristics of	[10M]
	Gunn diode	
10.	Derive the Scattering matrix of Magic tee using its characteristics.	[10M]
	OR	

11. Discuss the different blocks and their features and precautions of Microwave bench set- [10M] up.
