Code No.: EC702PC	R20	H.T.No.			8	R						

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

[Time: 3 Hours] **[Max. Marks: 70]**

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)	Name the different Electromagnetic frequency spectrum region and microwave band designations for CCIR/IEEE/US military bands.	[2M]
	b)	Determine the cut – off frequency of the dominant mode for an air filled rectangular WG when a/b = 2 with a = 4cm.	[2M]
	c)	Explain about circulator.	[2M]
	d)	What is a Magic Tee? Why it is called as Magic Tee?	[2M]
	e)	Write any two application of two-cavity klystron.	[2M]
	f)	Write the Major differences between the TWT and the klystron.	[2M]
	g)	Tabulate the cross-field electron tubes.	[2M]
	h)	Discuss various operating mode of Gunn diodes.	[2M]
	i)	Explain the principle of E Plane.	[2M]
	j)	State the various methods for measuring attenuation.	[2M]

PART-B **(50 Marks)**

2. What are the advantages and applications of microwave frequencies? Discuss in detail. [10M]

OR

3. Derive the expressions for cut off frequency, phase constant, group velocity, phase velocity and wave impedance in rectangular waveguide, for TE modes. [10M]

4. Prove that a cavity resonator is nothing but an LC circuit. [10M]

OR

5. Write short notes on:
a. Tuning Screws [4M]
b. Tuning Posts [3M]
c. Phase Shifters [3M]

6. A reflex klystron operates at the peak mode of n = 2 with Beam voltage: Beam current: Signal voltage: Vo = 300 Y lo= 20 mA Vi = 40 v Determine:
a. The input power in watts [4M]
b. The output power in watts [3M]
c. The effficiency [3M]

OR

7. Draw and Explain the working of Helix Traveling-Wave Tube. [10M]

8. Draw and Explain the schematic diagram of a cylindrical magnetron oscillator [10M]

OR

9. An n-type GaAs GUNN diode has the following specifications: [10M]

Threshold field	3kV/cm
Applied field	3.5 kV/cm
Device length	10 micrometers
Doping constant	1014 electrons/cm3
Operating frequency	10 GHz

Calculate the current density (-ve) and electron mobility in the device.

10. Discuss in detail how a Magic Tee can be used as an Isolator. [10M]

OR

11. Discuss VSWR measurement in detail. [10M]

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