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

CMR ENGINEERING COLLEGE:: HYDERABAD
UGC AUTONOMOUS
IV–B.TECH–I–Semester End Examinations (Supply) - April- 2024
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)	What are the applications of Microwaves?	[2M]
b)	What is Cut off frequency?	[2M]
c)	What are waveguide windows?	[2M]
d)	Give the applications of directional coupler.	[2M]
e)	Mention the application of two-cavity klystron.	[2M]
f)	Name different types of slow wave structures.	[2M]
g)	What are the various modes of operation of Gunn diode?	[2M]
h)	What are the advantages of transit time devices?	[2M]
i)	Mention properties of S matrix.	[2M]
j)	What is Low and High VSWR?	[2M]

PART-B **(50 Marks)**

2.	An air-filled rectangular waveguide has dimensions of a = 6cm and b = 4cm. The signal frequency is 3GHz. Compute the following for the TE10, TE01, TE11 and TM11 modes: i) Cutoff frequency. ii) Wavelength in the waveguide. iii) Phase constant and phase velocity in the waveguide. iv) Group velocity and wave impedance in the waveguide.	[10M]
	OR	
3.a)	Derive Phase velocity and group velocity in waveguide.	[5M]
b)	Why TEM mode wave propagation is not possible in rectangular wave guide.	[5M]
4.	Justify and explain about rectangular cavity resonator and calculate its resonant frequency.	[10M]
	OR	
5.	What are the different types of attenuators? Explain them with neat sketch.	[10M]
6.	Draw and explain the mode characteristics of Reflex Klystron.	[10M]
	OR	
7.	Discuss the significance and types of Helix TWTs.	[10M]
8.	How cross-field is used to generate oscillations in Magnetron and derive the Hull cut-off conditions?	[10M]
	OR	
9.	Discuss about the principle and operation of Gunn Diode and write its applications.	[10M]
10.	Explain the operation of magic tee with neat diagram and derive its S- matrix.	[10M]
	OR	
11.	Discuss briefly about Circulators and Isolators with neat structural diagrams.	[10M]

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