U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2023 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: Electronics & Telecommunication Engineering **Duration: 3 hrs.**
Course Code : 16TE7DCMWR **Max Marks: 100**
Course: Microwaves and Radar **Date: 10.07.2023**

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	Derive the expression for the line impedance of a transmission line	*CO2*	*PO1*	**10**
	b)	Explain different types of polarization in Uniform Plane waves	*CO1*		**10**
		OR			
2	a)	The propagation constant of a lossy transmission line is $(2 + j5)$ m^{-1} and its characteristic impedance is $(50 + j0)$ Ω at $\omega = 10^6$ rad s^{-1}. Find the values of the primary line constants L, C,R, G	*CO2*	*PO1*	**10**
	b)	Draw the lumped equivalent circuit of a small section of a uniform transmission line and derive the expression for voltage V(z) and current I(z) at any point on it	*CO2*	*PO1*	**10**
		UNIT - II			
3	a)	State and Prove properties of S Matrix.	*CO2*	*PO1*	**10**
	b)	Derive the S matrix for Magic Tee	*CO2*	*PO1*	**10**
		UNIT - III			
4	a)	What are varactor diodes? Explain how they can be used in frequency multipliers Mention Applications of varactor diodes	*CO1*		**10**
	b)	Explain how negative resistance is achieved in IMPATT diodes? With neat diagrams, describe the structure of any form of IMPATT diode. Explain its operation with relevant waveforms	*CO1*		**10**
		OR			
5	a)	What are parametric amplifiers? What are their applications? Compare parametric up-converter with negative resistance parametric device	*CO1*		**10**

		b)	Explain the following modes of operation of Gunn diode (i) Transit time mode (ii) LSA Mode (iii) Quenched domain mode (iv) Delayed mode	*CO1*		**10**
			UNIT - IV			
	6	a)	A certain radar has Pulse Repetition Frequency (PRF) of 1250 pulses per second. What is the maximum unambiguous range	*CO2*	*PO1*	**04**
		b)	Explain different types of Tracking Radar with relevant diagram and equations	*CO2*	*PO1*	**10**
		c)	A radar mounted on a ship has 0.9µsec pulse width transmitted. Two small boats are separated in the range by 150 m. Will the radar detect the two boats as two different targets or will they be detected as one single target	*CO3*	*PO3*	**06**
			UNIT -V			
	7	a)	Explain in detail the hazards of EM Waves	*CO1*		**10**
		b)	Define insertion loss and attenuation .Explain method of measurement of insertion loss and attenuation with neat diagram.	*CO1*		**10**

****