Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–VII • EXAMINATION – SUMMER • 2014

Subject Code: 171001 **Date: 22-05-2014**

Subject Name: Microwave Engineering

Time: 02:30 pm - 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	What are the types of distortion present on a transmission line? Starting from derivation of α and β ,derive the condition for distortionless transmission.	**07**
	(b)	A 75Ω transmission line is terminated in a load of (150 + j 225)Ω Design a suitable stub line to match the load to the line. The operting frequency is 500 Mhz. Use Smith chart for solving the problem.	**07**
Q.2	**(a)**	Explain TE , TM and TEM modes in a waveguide. What is meant by the Dominant mode in a rectangular waveguide? Explain why TEM mode can not propagate through a rectangular waveguide.	**07**
	(b)	(1) Explain the terms : Cut off wavelength (λc) , Guide wavelength (λg) and free space wavelength (λo). What is the relationship between them? (2) Distinguish between Phase Velocity and Group Velocity.	**07**
		OR	
	(b)	Describe the construction and working of Magic Tee.What are its applications? Explain any one application in detail.	**07**
Q.3	**(a)**	Describe the problems associated with conventional tubes at UHF and Microwave?	**07**
	(b)	Explain the construction and working of Magnetron tube. What are its applications?	**07**
		OR	
Q.3	**(a)**	Explain the construction and working of Two cavity Klystron. What are its applications? What will happen when additional cavities are inserted between the buncher and catcher cavities?	**07**
	(b)	What is Faraday's rotation principle? Explain the working of Faraday's rotation isolator. What are its applications?	**07**
Q.4	**(a)**	Explain the basic principle of Parametric amplifier. Explain degenerate and non degenerate mode. What are its applications?	**07**
	(b)	What is Tunneling effect? Explain the construction and working of Tunnel diode. What are the applications of Tunnel diode?.	**07**
		OR	
Q.4	**(a)**	Explain the construction and working of IMPATT diode. What are its applications?	**07**
	(b)	Explain Calory meter method of measuring Medium and High microwave power.	**07**
Q.5	**(a)**	What is a Doppler effect? Draw and explain the block diagram of MTI radar.	**07**
	(b)	Write a note on Directional coupler and its applications. Explain the terms Coupling factor and Directivity.	**07**
		OR	
Q.5	**(a)**	Explain the principle of Radar. Derive the equation of the range of Radar. Discuss the parameters which affect the range of Radar.	**07**
	(b)	Write a note on any one of the following. (1) Step Recovery Diode and its applications. (2) $\lambda/4$ Line and its applications.	**07**

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