Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – SUMMER • 2014

Subject code: 1710411 **Date: 24-06-2014**

Subject Name: RF and 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)**	With neat sketch explain ñAperture Couplingò with equivalent electric and magnetic polarization for various Transmission Line and Waveguide Configurations.	**07**
	(b)	How Signal Flow Graph can be reduced to a single branch between two nodes to obtain any desired wave amplitude ratio using ñDecomposition Rulesò.	**07**
Q.2	**(a)**	Define the Terms: Reflection Coefficient, Return Loss, VSWR and Characteristic Impedance.	**07**
	(b)	Prove that TE mode of Rectangular Waveguide, Cut-off Frequency is $f_{c_{m,n}} = \frac{K_C}{2\pi\sqrt{\mu\varepsilon}}$.	**07**
		OR	
	(b)	Discuss: TE mode of Circular Waveguide.	**07**
Q.3	**(a)**	Compare: Series Resonator and Parallel Resonator	**07**
	(b)	What are the problems with Lossless T-Junction Power Divider? Explain WILKINSON Power Divider with necessary equations.	**07**
		OR	
Q.3	**(a)**	Define: ñResonance Isolatorò. Explain Resonance Isolator with E-Plane and S-Plane Slab.	**07**
	(b)	Write Short Note on : 180^0 HYBRID	**07**
Q.4	**(a)**	With neat Sketch explain ñBalanced Amplifierò using 90^0 Hybrid Coupler.	**07**
	(b)	Discuss: Time Varying Maxwellôs Equations.	**07**
		OR	
Q.4	**(a)**	What do you understand by ñConversion Loss of Mixerò? Explain ñSingle Ended Mixer Circuit	**07**
	(b)	What is ñMicrowave Integrated Circuit? Explain Monolithic Microwave Integrated Circuit in brief with advantage and disadvantage.	**07**
Q.5	**(a)**	A lossless T-Junction power divider has a source impedance of 100q . Find the output characteristics impedance so that the input power is divided in a 2:1 ratio. Compute the reflection coefficients seen looking into the output ports	**07**
	(b)	Explain Gain and Stability of two port amplifier circuit in terms of S parameter of Transistor.	**07**
		OR	
Q.5	**(a)**	Draw ñLumped-element equivalent circuitò of two wire Transmission Line. Prove that Characteristic Impedance: Zo $= \sqrt{L/C}$ with necessary equations.	**07**
	(b)	Write Short Note on: Smith Chart	**07**

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