Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER – VII • EXAMINATION – WINTER 2012

Subject code: X 71101 Date: 03/01/2013

Subject Name: Microwave Engineering

Time: 10.30 am - 01.00 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 is velocity modulation? Explain the construction, principle of working and operation of two cavity klystron amplifier	**07**
	(b)	How waveguides are different from normal two wire transmission lines. Also discuss similarities and dissimilarities.	**07**
Q.2	**(a)**	Explain Magnetron Oscillators with the diagram and explain its performance characteristics.	**07**
	(b)	Derive the wave equation for a TM wave and obtain field components in a rectangular waveguide. **OR**	**07**
	(b)	Sketch the standing wave patterns for voltage and current along a transmission line when it is terminated with i>short circuit, ii>open circuit, iii>matched load, iv>inductive load>capacitive load, vi>resistive load less than characteristic impedance.	**07**
Q.3	**(a)**	Explain the structure and working of PIN diode. Explain PIN diode as a switch.	**07**
	(b)	An air filled rectangular waveguide has dimension of 10 cmX8 cm. It propagates a signal at 5 GHz. Compute the following for TE10 mode. I>cut off frequency, ii>Guide wavelength, iii>phase velocity, iv>Group velocity, v>Wave impedance.	**07**
		OR	
Q.3	**(a)**	Write short notes on i>IMPATT Diode & TRAPATT Diode.	**07**
	(b)	A 10 GHz signal is to be propagated through a rectangular waveguide. Calculate the dimensions of the waveguides, guide wavelength and phase velocity for dominant mode of propagation. Given a=4 cm.	**07**
Q.4	**(a)**	Explain the principle of amplification in TWT. Explain helix TWT structure. How it is different from Klystron.	**07**
	(b)	Explain the construction, equivalent circuit and application of E-plane tee. How it is different from H-plane tee.	**07**
		OR	
Q.4	**(a)**	Describe the construction and working of a reflex klystron.	**07**
	(b)	Write short notes on i>Directional coupler and ii>Isolator.	**07**
Q.5	**(a)**	What is Maximum Unambiguous Range? Derive the Radar Range equation.	**07**
	(b)	What do you mean by impedance matching? Explain Single Stub matching	**07**
		OR	
Q.5	**(a)**	What is Radar? Describe the principle of operation of basic radar with the help of neat block diagram. What are the various applications of Radar?	**07**
	(b)	Compare strip line and microstrip line. Write short notes on i>Dielectric loss and ii>Ohmic loss.	**07**

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