Seat No.: _____

Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY BE - SEMESTER-VII EXAMINATION – WINTER 2015

Su	bject	Code: 171001 Date:12/12/2015	
Su Tii	bject ne: 10	Name: Microwave Engineering0:30am to 1:00pmTotal Marks: 70	
Inst	truction 1. 2. 3.	ns: Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks.	
Q.1	(a)	Discuss the advantages of microwave frequencies compare with low-frequency waves and list out the various applications of microwaves.	07
	(b)	Write the advantages and disadvantages of rectangular waveguide over circular wave guide .List out the differences between the TE mode and TM mode.	07
Q.2	(a)	What do you mean by stub? Explain impedance matching by use of stub with necessary circuit, waveforms and derivation	07
	(b)	Explain structure and working of TRAPATT diode with necessary waveforms and derivations.	07
		OR	
	(b)	Explain construction, characteristic and application of Gunn diode.	07
Q.3	(a)	What is the working principle of Radar? Draw and explain block diagram of MTI radar.	07
	(b)	Define following : (i) Guide wave length (ii) Group velocity (iii) Phase velocity (iv) Wave impedance (v) VSWR (vi) Return loss (vii) Characteristics impedance	07
Q.3	(a)	 OK (i) A transmission line has the following parameters: R=2Ω/m G=0.5mmho/m L=8nH/m C=0.23pF f=1GHz Calculate the characteristic Impedance and the propagation constant. (04) (ii) Draw and explain equivalent circuit of a length Δx of a transmission line at microwave frequencies (03) 	07

(b) Write properties of smith chart and explain its application with example. 07

- Q.4 (a) What is magic associated with a Magic Tee ?Draw a neat sketch of a Magic 07 Tee and list out its applications and properties.
 - (b) Explain working of Circulators and isolators with neat sketch. 07

OR

Q.4 (a) Write short note on: Micro strip lines
(b) (i) Explain working principle of PIN diode. (03)
(ii) Write radar range equations and discuss the factors influencing maximum

(04)

range of radar.

- Q.5 (a) Explain the principle of operation of a multy cavity klystron with necessary 07 diagram and waveforms. Write applications of it .
 - (b) Draw block diagram of pulsed radar and derive the equation to determine the 07 maximum range of radar

OR

- Q.5 (a) What are the problems associated to conventional tubes at microwave 07 frequencies. Explain working of TWT with necessary diagram and waveforms.
 - (b) An air filled rectangular waveguide has dimensions of $6 \text{cm} \times 4 \text{cm}$. It **07** propagates a signal at 3 GHz. Compute the Cut-off frequency, Guide wavelength, Phase constant, Phase velocity, Group velocity and Wave impedance for TE₁₀ mode.