Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V(New) • EXAMINATION – WINTER 2016

Subject Code:2151004 **Date:02/12/2016**

Subject Name:Electronic and Communication

Time:10:30 AM to 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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Define Communication.	
	2	Where do we use AM and FM?	
	3	Define Modulation Index (m).	
	4	Write the expression for AM wave?	
	5	What is the Bandwidth of AM wave?	
	6	What is the difference between SSB and DSB wave.	
	7	What is Carson's rule?	
	8	State the principal of a Super heterodyne receiver.	
	9	Define term image frequency.	
	10	Define modulation index for FM.	
	11	What is transmission Bandwidth for FM?	
	12	Write the expression for thermal noise generated in a resistor.	
	13	State the Time-delay theorem of Fourier Transform.	
	14	Write two major differences between FM and AM receivers.	
Q.2	**(a)**	Draw the block diagram of the basic communication system.	**03**
	(b)	Find the Fourier Transform of following functions: 1) $x(t) = \delta(t)$ 2) $x(t) = \text{sgn } t = \begin{cases} 1 & \text{for } t > 0 \\ -1 & \text{for } t < 0 \end{cases}$ (Signum fuction)	**04**
	(c)	List the properties of Fourier transform and prove any two of them.	**07**
		OR	
	(c)	For series tuned circuit derive expression for resonance frequency, series Q-factor and the -3dB bandwidth. Give the uses of this circuit in communication.	**07**
Q.3	**(a)**	List different types of Amplitude Modulated Signal and Give Transmission Bandwidth of respective types of AM.	**03**
	(b)	What is modulation and why modulation is required in communication?	**04**
	(c)	The antenna current of an AM broadcast transmitter, modulated to a depth of 40 percent by an audio sine wave, is 11 A. It increases to 12 A as a result of simultaneous modulation by another audio sine wave. What is the modulation index due to this second wave?	**07**
		OR	
Q.3	**(a)**	What is single-sideband suppressed-carrier modulation? What are its advantages with respect to "ordinary" AM.	**03**
	(b)	With related to Amplitude modulation discuss following parameters: (I) Bandwidth requirement (II) Power distribution in sidebands and carrier.	**04**
	(c)	Explain Amplitude Modulation with required waveforms. Also give mathematical representation of Amplitude modulated Wave.	**07**
Q.4	**(a)**	Differentiate between FM and PM system.	**03**
	(b)	Draw the circuit diagram of delayed AGC. What are the advantages of delayed AGC?	**04**
	(c)	Find the carrier and modulating frequencies, the modulation index, and the maximum deviation of FM wave represented by the voltage equation: $V = 12 \sin (6 \times 10^8 t + 5 \sin 1250 t)$.	**07**
		OR	

Q.4	**(a)**	Give Comparison between FM and AM system.	**03**
	(b)	Explain the Pre-emphasis and De- emphasis.	**04**
	(c)	List all the basic FM demodulators, Draw and explain Foster seeley discriminator in brief.	**07**
Q.5	**(a)**	Draw only diagram of Super heterodyne receivers.	**03**
	(b)	A receiver connected to an antenna whose resistance is 50 Ω has an equivalent noise resistance of 30 Ω. Calculate the receiver's noise figure in decibels and its equivalent noise temperature.	**04**
	(c)	Derive Friiss formula for noise factor of cascaded amplifier.	**07**
		OR	
Q.5	**(a)**	List the main function of a radio receiver.	**03**
	(b)	Define the following terms related with radio receivers: (1) Selectivity (2) Fidelity (3) sensitivity (4) Adjacent channel selectivity.	**04**
	(c)	What is Ham radio? Discuss importance of Ham radio during natural calamities.	**07**

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