Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

PDDC - SEMESTER–IV • EXAMINATION – SUMMER 2013

Subject Code: X41101 **Date: 04-06-2013**

Subject Name: Electronic Communication

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)**	Define (1) Modulation (2) Noise (3) Noise factor	**03**
	(b)	Explain double conversion in superhetrodyne receiver. Which are the advantages of double conversion receiver compared to single conversion receiver?	**04**
	(c)	(1) A standard AM transmission, sinusoidally modulated to a depth of 30%, produces side frequencies of 4.928 and 4.914 MHz The amplitude of each side frequency is 75 V. Determine the amplitude and frequency of the carrier	**04**
		(2) Compare wideband and narrow band FM	**03**
Q.2	**(a)**	A series tuned circuit has a Q of 130 and a tuning capacitance of 250 pF and is resonant at 450 KHz. Determine the impedance at resonance	**03**
	(b)	List various properties of Fourier transform and briefly explain any two.	**04**
	(c)	Draw block diagram of general communication system and explain function of each block	**07**
		OR	
	(c)	(1) Compare analog and digital communication system	**03**
		(2) Calculate the maximum bit rate for a channel having bandwidth 1600 Hz if (a) S/N ratio is 0 dB (b) S/N ratio is 20 dB	**04**
Q.3	**(a)**	Derive voltage equation of FM wave. Explain clearly difference between Frequency and Phase Modulation	**07**
	(b)	List various FM detectors and explain foster seely discriminator with circuit	**07**
		OR	
Q.3	**(a)**	Explain FM receiver with block diagram	**07**
	(b)	A 20 MHz carrier is modulated by a 400 Hz audio sine wave. If the carrier voltage is 5 V and maximum deviation is 10 KHz, write the equation for this FM wave. If the modulating frequency is now changed to 2 KHz and carrier voltage is changed to 10 V, all else remaining constant, write a equation for this wave, calculate power dissipated across 100 ohm resistor by both the FM waves.	**07**
Q.4	**(a)**	Draw block diagram of superhetrodyne receiver and explain function of each block	**07**
	(b)	Explain thermal noise and shot noise	**07**
		OR	
Q.4	**(a)**	Explain various characteristics of superhetrodyne receiver .	**07**
	(b)	Derive friss's formula for noise factor of amplifiers in cascade	**04**

	(c)	Given two resistors R_1 = 10 kΩ and R_2 = 15 kΩ, calculate the thermal noise voltage at room temperature generated by (a)R_1 (2) R_2 (c) R_1 in series with R_2. Assume a 20 MHz noise bandwidth	**03**
Q.5	**(a)**	Explain filter method and phase shift method for the generation of SSB-SC signal	**07**
	(b)	Explain skin effect	**03**
	(c)	Derive the equation of total power in AM wave	**04**
		OR	
Q.5	**(a)**	Explain Frequency Division Multiplexing in detail	**07**
	(b)	Sketch waveform of (1) AM wave (2) SSB-SC wave (3) DSB-SC wave .	**03**
	(c)	Explain operation and applications of Phase Locked Loop	**04**